

# BANGLADESH JOURNAL OF POLITICAL ECONOMY

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## **Bangladesh Economic Association**

4/C, Eskaton Garden Road, Dhaka-1000

Phone : 9345996, Fax : 880-2-9345996

E-mail : [bea.dhaka@gmail.com](mailto:bea.dhaka@gmail.com)

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# বাংলাদেশ জার্নাল অফ পলিটিক্যাল ইকনমি

একত্রিশ খণ্ড, সংখ্যা ৫, জানুয়ারী ২০১৭

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This volume (Vol. 31, No. 5, January 2017) of Bangladesh Journal of Political Economy (BJPE) contains selected papers presented at the Bangladesh Economic Association (BEA) 18th Biennial Conference held in 2015. In addition to these, this volume contains an article which was submitted in the last year. All the papers included in this volume were reviewed by both internal and external reviewers and concurred by the editorial Board for publication.

I express my indebtedness to the authors, the reviewers, and the members of the Editorial Board of the Journal. Special thanks are due to Prof. Abul Barkat, former President BEA and member of the Editorial Board of the Journal who shouldered special responsibility to the task.



(Ashraf Uddin Chowdhury)  
Editor, Bangladesh Journal of Political Economy  
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**বাংলাদেশ অর্থনীতি সমিতির যান্মাসিক জার্নাল**  
**Bangladesh Journal of Political Economy**  
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- ১। অর্থনীতির বিভিন্ন শাখায় তাত্ত্বিক এবং প্রায়োগিক বিষয়ে প্রবন্ধ প্রণয়ন করার জন্য প্রবন্ধকারদেরকে অনুরোধ জানানো হবে। ইংরেজী এবং বাংলা উভয় ভাষায় রচিত প্রবন্ধ জার্নালের জন্য গ্রহণ করা হবে।
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## Excess Liquidity And The Recent Financial Crisis: A Study On The Bangladesh Banking Sector Applying Different Bank Typologies

Qamarullah Bin Tariq Islam\*

**Abstract:** *With the recent financial crisis and the possibility of its future recurrence, it is important to analyse the resilience of the banking sector in Bangladesh. This paper analyses the performance of the banking sector during the recent crisis. Using data of 15 years from 37 banks, the results show that the banking sector in Bangladesh performed resiliently during the financial crisis. Additionally, different bank typologies are applied to see if banks behaved differently according to these characteristics. It is observed that they behaved mostly in a similar way except for one typology. This paper's main findings are twofold: firstly, the banking sector of Bangladesh was generally resilient during the crisis and secondly, the resilience was observed for most typologies. However, the significant difference for one typology nevertheless suggests the need for a tailor-made, rather than a general, approach for this sector.*

**Keywords:** Excess liquidity, financial crisis, banking sector, bank typologies, Bangladesh.

### 1. Introduction

The banking sector in Bangladesh is one of the most emerging sectors in the economy with an annual growth rate of 9.79 per cent in 2014-15. This growth rate puts it among the top five sub-sectors in the economy. With a contribution of around 2.87 per cent of GDP, the banking sector in Bangladesh needs particular attention (Bangladesh Economic Review, 2015). With a recent approval of 10 banks, taking the total number of banks to 57, this sector's importance is continuously increasing.

The recent financial crisis of 2007-08, also known as the great recession, was a

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\* This paper is based on work done at Glasgow, UK..

Department of Economics, University of Rajshahi. Corresponding author.

major test of resilience for the financial sector all over the world and this was no different for Bangladesh. Although according to some, the crisis was over a few years back, while some believe that its effect is still present. Some others feel that the world is still not out of the crisis fully and the danger of a similar crisis is still looming.

### 1.1 Previous works

There were various works on the relationship between bank lending and ownership during business cycles. Recently the focus shifted to examine the lending pattern of different types of banks during and after the crisis. The main reason for this shift of focus of the recent works was mainly due to the 'Great Recession' that occurred from 2007. Because of this, it became important to investigate how it affected the lending situation of banks and the focus shifted to address this issue to some extent (Micco et al., 2007; Omran 2007; Lin and Zhang, 2009; Davydov, 2013; Duprey, 2013).

However, these studies mainly examined the effect of ownership of banks to see the effect of lending<sup>3</sup>. But this study goes further to see other possible and pertinent bank-specific characteristics and their impact on excess liquidity via lending. This was done to have a very comprehensive picture of how bank typologies affect excess liquidity pattern in the banks. According to our knowledge, the four bank-specific characteristics used in this study had not been used previously together to study excess liquidity.

Different ownerships of banks had different lending patterns during the crisis time. In different cross-country studies on non-crisis times, it is commonly found that public banks were less efficient and sometimes led to lower financial development than the private banks. Davydov (2013) identified three possible reasons for the comparative inefficiency of the public banks. These were: (i) political interference that deviate them from the profit maximization aims; (ii) incentives structure for managers that were weaker than the private banks; and (iii) inferior incentives for owners that lead to poor monitoring<sup>4</sup>.

During the recent financial crisis of 2007-08, public banks played a positive role for the economy by generally acting counter-cyclically (Allen et al., 2013) or less pro-cyclically (Fungacova et al., 2013). This was crucial and helped the economy to stabilise as the domestic private banks acted pro-cyclically (Kowalewski and

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<sup>3</sup> Bank lending and excess liquidity are very closely related two aspects (Alper et al., 2012) of the banking sector and there are many works on lending and bank ownership related to the financial crisis.

<sup>4</sup> Comparing public and private banks in terms of efficiency or profitability can be misleading (UNCTAD, 2008) since public banks have other agenda (along with that of profitability) and hence pursuing solely the profit objective is not their aim. Therefore, they may sometime need to sacrifice the objective of profit maximisation and become less profitable than the private banks. This (less profitability) does not imply that the public banks were less efficient.

Rybinski, 2011; Cull and Peria, 2012). This was also true for earlier financial crises in Asia and Latin America in the 1990s (Hawkins and Mihaljek, 2001).

Micco and Panizza (2006), in their study of 179 countries, mentioned the following four possible reasons why public banks stabilise credit: (i) it was part of their objectives as public banks; (ii) generally it was considered by depositors to be a safer place during possible bank failures, ending up public banks having a better deposit base during the crisis and thereby also in a better position to smooth credit; (iii) sometimes the public banks do not have a proper set of incentives and hence the managers can be lazy; and (iv) politicians might try to influence public bank lending in election years.

Interestingly enough, there were very few empirical works on excess liquidity directly related to the financial crisis, especially investigating the aftermath of the crisis on excess liquidity. The existing works on financial crisis and excess liquidity can broadly be divided into two categories. One group discussed how excess liquidity acted as one of the factors for the financial crisis (Palma, 2009; Acharya and Naqvi, 2012; Brana et al., 2012). The other group discussed how the crisis situation affects excess liquidity.

One of the possible effects of a financial crisis is that it increases the uncertainty and risk in the economy making lending riskier for the banks. Therefore, banks lend less and increase excess liquidity. This was found in the studies of Agenor et al. (2004) for Thailand and Ashcraft et al. (2011) for the US economy. Montoro and Moreno (2011) found similar results for Peru. In another study, Murta and Garcia (2010) examined the excess liquidity in the banks of the Euro area.

The most direct empirical study till now, to our knowledge, that examined the effect of the recent financial crisis on the excess liquidity situation of the banking sector was carried out by Pontes and Murta (2012). They studied this relationship for the African economy of Cape Verde. Their results suggested that the crisis decreased the excess liquidity in the economy. The possible reasons included the extreme dependence of the economy on the external economic factors (especially remittance) and also the underdevelopment of the financial markets.

## **1.2 Contribution of this paper**

The objective of this research is to fill some of the gaps in this strand of literature. Generally, this study attempts to examine if the recent financial crisis and excess liquidity were related? Financial crisis is a time when banks do not feel very confident to lend and there is less demand from the investors' side. Hence a positive relationship between the crisis and the excess liquidity is expected. However, the period of crisis is normally accompanied by a process of recapitalisation to increase lending. This can in turn reduce the amount of excess liquidity.

On this perspective, this paper attempts to investigate how the banking sector in

Bangladesh fared during the last financial crisis using data of 37 banks for 15 years. Four bank-specific typologies of ownership, size, mode of operation and age are applied to examine if there were any difference in the performance of banks according to these typologies. The main objectives of this study are twofold: (i) to find out the impact of the last financial crisis on the banking sector of Bangladesh, and (ii) if the banking sector performed differently according to different typologies.

### **1.3 Structure of this paper**

This paper is divided into the following sections. Section 1 describes some of the earlier works on financial crisis and the contribution of this paper. The financial crisis and the Bangladesh economy is described in Section 2. The empirical approach is described in Section 3 while empirical results are discussed in Section 4 along with additional estimates and possible explanation of results. This is followed by concluding remarks in Section 5 which include a summary, some policy recommendations and conclusion.

## **2. The Financial Crisis and the Bangladesh Economy**

The experience of the recent financial crisis showed that not all economies were affected at the same time. Some were affected immediately (termed as the first shockwave), some were after some time (called the second shockwave through impact on credit), while some took even more time (named the third shockwave through impact on real economy). Like other economies, the recent financial crisis also affected the economy of Bangladesh. However, it did not impact the economy immediately but after some time. According to Rahman et al. (2009), the crisis started affecting the Bangladesh economy from October 2008. One of the main features of this crisis was that ‘the crisis ... evolved from financial crisis to credit contraction to crisis of confidence’ (Rahman et al., 2009).

The lag effect of crisis could be attributed to the very little exposure of the capital market in Bangladesh to foreign portfolio investment (only 2.4%). This led Bangladesh to survive the first shockwave but it started to feel the impact from the second shockwave. The economy was mainly affected through the channels of exports, remittances and foreign investment.

One of the key factors of the impact of these channels depended on the economic performance of the main partner countries (Murshid et al., 2009). As they were unable to perform well, the crisis negatively affected the economy of Bangladesh.

Ali and Islam (2010) stated that although the financial crisis did not affect the economy very harshly but it still slowed down along with exports and remittances. However, they also mentioned that Bangladesh performed well in agriculture and in equity markets to counterbalance the effect of the financial crisis. According to Raihan (2010), the crisis affected the export sector negatively and some categories

had to suffer negative growth both in terms of value and volume.

### 3. Empirical Approach

The variables used in this study are discussed first followed by the model applied. Finally, the nature of the data used and its sources are narrated.

#### 3.1 Variables

The dependent variable of this study is described first. Then the explanatory variables applied in this study are discussed.

**3.1.1 Excess liquidity:** The dependent variable in this study is excess liquidity. From the earlier studies, it is generally observed that during economic recession or crisis, there was more excess liquidity and there would be generally an inverse relationship between excess liquidity and the crisis. However, different typologies based on bank-specific characteristics might not be related in the same way and for each classification, there could be variation in the direction, degree and significance of the relationship. To investigate these relationships, excess liquidity will be the dependent variable to see how it was affected by different typologies of banking.

The excess liquidity is calculated by summing up trading securities at fair value (FV) through income, loans and advances to banks, reverse repos and cash collateral, and cash and due from banks. Then mandatory reserves included above are deducted. As there are banks of different sizes according to assets, therefore growth rate of liquid assets is taken to proxy for the excess liquidity to avoid the scale problem. Logarithm values of these are taken and then growth rate is calculated by deducting the log value of the previous year<sup>5</sup>.

**3.1.2 Financial crisis:** The main variable of interest in this study is financial crisis. The main objective is to see how the financial crisis affected the excess liquidity situation and whether different types of banks vary in their excess liquidity situation in relation to the financial crisis. It can shed important light if it found that any particular type of banking has procyclical, counter-cyclical or acyclical relationship with the financial crisis.

There were very few empirical works on the relationship between excess liquidity and the financial crisis. One of the determinants of the excess liquidity studies in general, the deposit volatility, was included in these works. This was measured by Pontes and Murta (2012) for Cape Verde as the moving average of the standard deviation of private sector deposits divided by the moving average of the same variable. Fadare (2011) examined the banking sector liquidity for the economy of Nigeria to see the effect of the financial crisis. A different approach was taken by him where the basis was to see if the actual loan-to-deposit ratio was above or

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<sup>5</sup> As a result, one observation was lost per series.

below the predicted value. If the actual value was above the predicted value, then it implied less liquid assets while less actual value than the predicted value meant more liquid assets. According to Moore (2009), "If the actual loan-to-deposit ratio is above the predicted value this would suggest that commercial banks were less liquid than is consistent with fundamentals, while if the actual ratio is below the predicted value commercial banks were more liquid than what is consistent with economic fundamentals."

The possible final effect of the financial crisis was also ambiguous since it was expected that initially there would be higher excess liquidity in the banks due to lower demand and higher risk. However, as governments and other organisations recapitalise the banking sector during these periods to boost the economy, banks would be able to lend more and thereby reduce excess liquidity situation. Again, there can be higher excess liquidity if banks lend less than they were recapitalised.

Davydov (2013) used crisis dummy variable that equals one in fiscal years 2008, 2009, and 2010. Although the financial crisis started in September 2007, the effect of it reached Bangladesh in 2008 and the effect continued in the following year. Therefore, 2008 and 2009 were the most appropriate years and were given value of 1 during these two years. The interactions of crisis and bank typology dummies were used to see how the excess liquidity situation differed for different types of banks. This was in line with some of the earlier studies (Cull and Peria, 2012) that used dummy variables to see the lending pattern during and after the financial crisis.

**3.1.3 Bank typology:** Some of the standard variables in the literature are incorporated to see the direction and significance of their relationship. Generally it is observed that public banks are less pro-cyclical than the private banks in non-crisis times. In some cross-country studies on non-crisis times, it is commonly found that public banks are less efficient and sometimes lead to lower financial development than the private banks (Barth et al., 2004; Bonin et al., 2005; Duprey, 2013). This view of dissimilarity in lending according to ownership was also supported by various country-level studies. For example, Berger et al. (2008) observed it for Argentina, Lin and Zhang (2009) found it for China, and Omran (2007) witnessed it for Egypt. But in some cases it was observed that public banks and private banks were almost equally efficient (Beck et al., 2005; Kraft et al., 2006).

During the recent financial crisis, the public banks played a positive role for the economy by either acting counter-cyclically or at least less pro-cyclically. Although most of the earlier studies discussed the differences in ownership and their effect, this study addressed the issue using some additional typologies of banking. These include the most common typology of ownership (public versus private banks) along with size (small versus large banks), mode of operation (Islamic versus conventional banks) and age (new versus old banks). It will be

interesting to see if the large banks behaved differently from the small banks about their liquid assets or if there was any pattern for new banks which separated them from the old banks. The growth of Islamic banking worldwide and in Bangladesh made it a very worthy effort to investigate if they differed from the conventional banks.

**Bank ownership** is measured with the help of dummy variable. For the ownership dummy, value of 1 is given if it is a public bank and 0 otherwise. Bank ownership dummy variable has also been used by Van den Heuvel (2002), Gambacorta (2005) and Allen et al. (2013). To examine the effect of bank ownership, the dummy variable is used in an interaction form with the financial crisis. The interactions of crisis and public bank dummies can show how public banks performed in this period relative to private banks. Dummy variable for crisis was also used by Allen et al. (2013).

Another explanatory variable that is used quite often in the earlier studies is the bank size (Vihriala, 1997; Allen et al., 2013; Davydov, 2013). In most cases, the asset values were taken from Bankscope. But it was measured differently in different works. These include: (i) banks average total asset divided by the average total asset of the country, (ii) asset of the bank relative to top 20, and (iii) growth rate of number. Of all these measures, the first measure showed bank size in absolute terms while others indicated the variable in relative term (Cull and Peria, 2012; Duprey, 2013). To examine the effect of bank size, the dummy variable is used in an interaction form with the financial crisis. The asset values are taken from Bankscope to measure bank size.

In country-level studies, **bank age** variables are used (Beck et al., 2005; Lin and Zhan, 2009). Beck et al. (2005) also included the age variable with the notion that it can have positive effect on its performance due to the experience of older banks while it can also have negative effect if newer banks gained more rent in foreign exchange rate market. According to them, older and smaller banks performed poorly than newer and bigger banks. To examine the effect of bank size, the dummy variable is used in an interaction form with the financial crisis where age of bank is calculated from its year of establishment.

Additionally, the **mode of operation** typology is used in this study. According to this criterion, value of 1 is given if it is an Islamic bank and 0 otherwise. Here again, the dummy variable is used in an interaction form with financial crisis.

**3.1.4 Capitalisation:** It is ideal to include the capital variable as one important feature after the financial crisis was to recapitalise the banking sector in order to increase the flow of money in the economy. Therefore, it is important to see how it affected the excess liquidity situation in the banking sector around the time of the financial crisis. Since highly capitalised banks would be able to lend more, therefore it was expected to have a negative relationship with excess liquidity. Capital



is measured by bank equity as ratio of total assets.

**3.1.5 Political motive:** There is also an indication in the literature that excess liquidity might vary during periods of stress relative to normal situations, leading to greater asset price volatility during the former and so disrupting liquidity targets (Cohen and Shin, 2003). Morrison (1966) did a study on bank's demand for excess reserves in both banks' panic and non-panic periods. He concluded that excess reserves were held as a buffer to avoid asset transaction costs emanating from unforeseen and transitory deposit shocks. This sort of excess liquidity could also be interpreted as an insurance against deposit outflows. Al-Hamidy (2013) found that turbulent international markets slowed down domestic credit growth and increased excess liquidity for the economy of Saudi Arabia. Value of 1 was given if the national election has taken place on that year, 0 otherwise.

**3.1.6 Reserve requirement:** Another important variables of excess liquidity that emerged from the previous studies was reserve requirement. With the same amount of deposit available, if the reserve requirement is higher in the banking sector then it is expected that there would be lower excess liquidity and vice versa. Therefore, reserve requirement is expected to have negative relationship with excess liquidity. In their study on Thailand, Agenor et al. (2004) included it as one of the explanatory variables and found it significant. Aikaeli (2011) also studied the excess liquidity problem for Tanzania and found similar result. One point that needs to be noted is that the inclusion (and significance) of this variable depends on how excess liquidity is measured. If, as many studies have done before, excess liquidity is proxied by bank liquidity then reserve requirements should be included as an explanatory variable. But if excess liquidity is measured net of required reserves then it should not be included as an explanatory variable. Since this study used the second type of definition of excess liquidity, therefore this variable is not included in the final regression.

**3.1.7 Inflation:** Inflation can also possibly play a role in the excess liquidity situation of the banks. There can be two possible effects. On one hand, inflation can continuously increase the demand for loans from the banks which would reduce excess liquidity. On the other hand, there can be higher demand for deposits due to devaluation of money because of inflation, forcing banks to keep more deposits which may lead to higher excess liquidity. Among the country-specific studies, Akinboade and Makina (2010) used inflation as one of the variables in their study on South Africa. Bertay et al. (2012), in their study on 111 countries, and Bhaumik et al. (2011), in their study on India, also used inflation as an explanatory variable in their study on lending. However, Bhaumik et al. (2011) found it insignificant<sup>6</sup>.

From the discussion above, it can be observed that different explanatory variables were used in the studies of lending. Of them, some variables may also impact

<sup>6</sup> Our observation is also similar in preliminary estimation. Therefore, inflation is not included in the final regression.

excess liquidity. These include: capital, size, age, reserve requirement, political motive and inflation rate. Of these, the first four are bank-specific variables while the last two are macroeconomic. Among the bank-specific variables, capital is included directly while the reserve requirement variable is not included as discussed in 3.1.6. The size and the age variables are covered under the bank typology variables of bank size and bank age and are applied after interacting with the financial crisis to see how they performed during the crisis. Among the macroeconomic variables, the political motive variable is included while inflation is not included in the final regression due to its insignificance in the preliminary estimates.

### 3.2 The model

There are various methods of estimation for panel data. This include the Fixed Effect (FE) method, the Random Effect (RE) method, and the Generalised Method of Moments (GMM). Among these and other methods, GMM has an advantage if the model includes the lag of the dependent variable as one of its explanatory variables. Since lag of the dependent variable is not one of the explanatory variables, therefore either FE or RE or both can be applied.

The FE method examines the relationship where each individual has its own characteristics that can affect the independent variable. In the RE model, the variation across individuals is assumed to be random and uncorrelated with the independent variable (Torres-Reyna, 2007). According to Greene (2008, p.183):

“...the crucial distinction between fixed and random effects is whether the unobserved individual effect embodies elements that are correlated with the regressors in the model, not whether these effects are stochastic or not.”

To decide which of these tests should be applied, it is a standard practice to use the Hausman test. This test checks whether the unique errors are correlated with the regressor with the null hypothesis being that they are not (Hausman, 1978). The test also checks if both the estimators can be used. If the null hypothesis is rejected then it implies that the RE model will produce biased estimators and therefore the FE model should be preferred. On the other hand, if the null hypothesis is accepted, it is standard to use both FE and RE methods<sup>7</sup> as there should be no systematic difference between the two estimators.

In this study, the Hausman test was applied to compare the FE and the RE methods. Since the null hypothesis was not rejected in this test (not reported here), hence both the FE and RE estimation methods are applied. A similar approach has been taken by others before (Allen et al., 2013; Duprey, 2013). In this study, FE is applied first followed by RE for robustness check. Following Duprey (2013), the model below is used in this study:

<sup>7</sup> Detailed technical explanation is given by Schaffer (2014) in the following link: <http://www.stata.com/statalist/archive/2003-09/msg00595.html> (accessed on 6 August 2014).

$$EL_{it} = \alpha_0 + \beta_1 Cap_{it} + \beta_2 Elec_{it} + \beta_3 FC_{it} + \beta_4 (FC_{it} * BT_{it}) + \varepsilon_{it} \quad (1)$$

Here, *EL* is excess liquidity, *Cap* represents the capitalisation, *Elac* indicates political motive while bank typology variables are represented by *BT* which include ownership, size, mode of operation and age. The financial crisis is shown with *FC*. The subscript *i* represents the banks while *t* is showing years.

Separate regressions are estimated for each typology to identify the effect properly since the characteristics are overlapping in many cases. For example, Sonali Bank Limited is a public bank according to ownership criterion. But it is also a large, conventional and an old bank according to the criteria of size, mode of operation and age.

### 3.3 Data

The main source of data used in this paper is the Bankscope database. For bank-level data, Bankscope contains annual income statements and balance sheet data for individual banks. Some publications from Bangladesh Bank and other government publications were also used.

Although most of the banks had 15 years of data in the Bankscope database but there were some banks for which 15 years of data were not available. In some cases, there was some missing years inside the series. Out of 38 banks (excluding the foreign banks), data were available in Bankscope for 37 banks.

Regarding the form of data available, it was available in both consolidated and unconsolidated forms for 18 banks, available only in unconsolidated forms for 16 banks and available only in consolidated forms for 3 banks. Since the unconsolidated data availability was more, so most of the data were taken from unconsolidated sources. Taking data mainly from the unconsolidated sources is in line with earlier works (Duprey, 2013). Moreover, taking consolidated data along with unconsolidated ones is also in line with some earlier works (Ehrmann et al., 2001; Cihak and Hesse, 2008).

## 4. Empirical Results and Discussion

The empirical results are described first followed by a discussion of them. The FE method is applied here and the results are given in Table 1.

The financial crisis, which is the main variable of interest in this study, is found to be insignificant in all cases. This shows that excess liquidity was not significantly affected by the financial crisis. This demonstrates the strength and resilience of the banking sector in facing the crisis.

Regarding the relationship of different bank typologies and excess liquidity, the results are mostly insignificant with the exception of the bank size variable. In this case, the relationship is positive and significant which imply that large banks lent comparatively less during the financial crisis than the small banks. This can be

either due to the fact that they were more careful or could afford to lend less and still survive at this time of crisis. Or it could mean that a higher fraction of their assets was impaired. Note that the implications are very different depending on which explanation is accepted. However, all other bank typologies showed insignificant result meaning that there was not much difference in the effect of the financial crisis across these typologies.

**Table 1: Excess liquidity estimates applying fixed effect method**

Variable	Ownership	Islamic	Size	Age
	Coefficient	Coefficient	Coefficient	Coefficient
Cap	-0.214*** (0.070)	-0.210*** (0.071)	-0.211*** (0.070)	-0.220*** (0.071)
Elec	0.113* (0.064)	0.108* (0.064)	0.125** (0.064)	0.112* (0.064)
FC	-0.027 (0.063)	0.008 (0.062)	-0.088 (0.071)	0.092 (0.090)
DumO* FC	0.175 (0.162)	---	---	---
DumI* FC	---	-0.098 (0.144)	---	---
DumS* FC	---	---	0.206** (0.096)	---
DumA* FC	---	---	---	-0.146 (0.104)
No. of banks	35	35	35	35
observations	276	276	276	276

Note 1: Standard errors are in parentheses to the right of the respective estimated coefficients.

Note 2: \* Significant at the 10% level, \*\* Significant at the 5% level, \*\*\* Significant at the 1% level.

Among other key variables of interest, the political motive is found to be consistently significant with a positive sign implying that during election years, the banks were not more inclined towards lending. On the positive note, this implies that the politicians do not or cannot force the banks for higher lending during this time to influence the election result by implementing different development works at that time. Conversely, on the negative note, this could imply that the situation became uncertain and banks wanted to move carefully about their lending decisions. This can be particularly true for Bangladesh as election years generally remain tense and borrowers as well as banks take a cautious approach during this time to gauge the situation and lend less<sup>8</sup>.

Capitalisation is found to be negative and significant. Generally it is observed that increased capitalisation can lead banks towards more lending. This is a principle that was applied during the recent financial crisis to bail out the banking sector. This is found to be true here as well.

#### 4.1 Additional Estimate: Application of RE Method

For robustness, the method of RE is applied to the above model. This is reported below.

<sup>8</sup> As Bangladesh went through a period of non-democratic government from 2007 to 2008, hence these two years have been used as a proxy for abnormal years and used as an alternative measure of election years to see the effect of political motive. The result from using this variable shows similar results strengthening the earlier findings using the election years. The results are not reported here due to space.

The results for the financial crisis after applying RE method are found to be similar. The financial crisis variable is again found to be insignificant in all cases and among the typology variables, only the size typology is found significant again like the FE method. The capitalisation variable is observed to be significantly negative while the political motive was found to be positive and significant.

**Table 2: Excess liquidity estimates applying random effect method**

Variable	Ownership	Islamic	Size	Age
	Coefficient	Coefficient	Coefficient	Coefficient
Cap	-0.247*** (0.066)	-0.243*** (0.066)	-0.238*** (0.066)	-0.250*** (0.066)
Elec	0.117* (0.064)	0.112* (0.063)	0.130** (0.063)	0.116* (0.063)
FC	-0.033 (0.063)	-0.008 (0.061)	-0.102 (0.069)	-0.066 (0.089)
DumO* FC	0.129 (0.159)	---	---	---
DumI* FC	---	-0.057 (0.139)	---	---
DumS* FC	---	---	0.214** (0.094)	---
DumA* FC	---	---	---	-0.125 (0.102)
No. of banks	35	35	35	35
observations	276	276	276	276

Note 1: Standard errors are in parentheses to the right of the respective estimated coefficients.

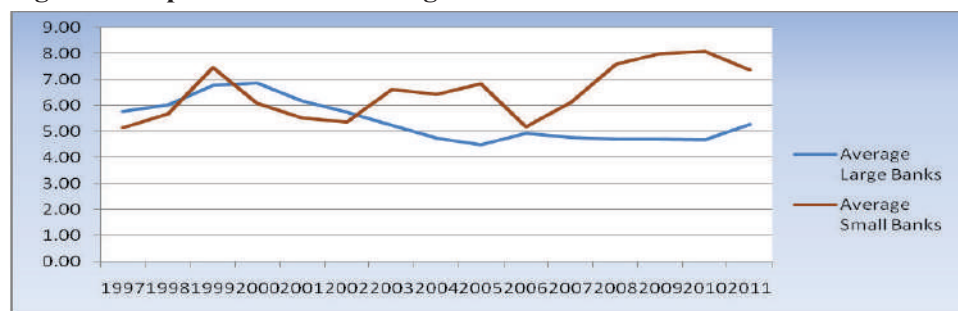
Note 2: \* Significant at the 10% level, \*\* Significant at the 5% level, \*\*\* Significant at the 1% level.

#### 4.2. Possible Explanation of Results: Variation in Capitalisation

Variations in capitalisation can play a significant role in making a difference in excess liquidity. It is observed that there is a significant inverse relationship between capitalisation and excess liquidity as better capitalised banks had easier access to markets and thus held less liquidity (Delechat et al., 2012).

Capitalisation for the bank age typology, where significant variation is observed in this study is presented here. The gap was much smaller at the beginning but gradually increased overtime. This is particularly true from 2002 onwards except in 2005. It can be observed that gap in capitalisation for the size typology and was insignificant for other typologies<sup>9</sup>. The gap increased during this period only for the size typology. This shows that capitalisation and its difference plays a key role in the significant (or insignificant) difference in behaviour according to bank-specific characteristics in times of the financial crisis.

**Figure 1: Capitalisation according to size**



Source: Author's own calculation based on Bankscope database.

<sup>9</sup> Figures for other typologies not reported here due to space.

## 5. Concluding Remarks

In this section, summary of results are described first. Then some policy recommendations are made based on these findings followed by a brief conclusion.

### 5.1 Summary

This study analysed how the financial crisis affected the excess liquidity situation of the banking sector in Bangladesh. The relationship of excess liquidity with the financial crisis was found to be insignificant which supports the strength of the banking sector as well as the economy in Bangladesh in facing this crisis.

Among the typology variables, only the size typology was found to be positive and significant. This implied that large banks had higher amount of excess liquidity due to the financial crisis. For large banks, this could be due to their lack of flexibility relative to the small banks and the diseconomies of scale after a certain threshold level. The relationships were insignificant for other typologies.

Significant and positive value of the political motive variable showed that banks did not lend excessively during election years. This is a good sign since political influence is used in some countries during the election years. This could also be due to the lack of demand during this time due to possible political uncertainty. Capitalisation was another key variable of interest and was found negative and significant, confirming the earlier results. This may support the view that recapitalisation can help banks towards higher lending and thereby reduce excess liquidity.

### 5.2 Policy Implications

This study highlighted a number of policy issues related to excess liquidity with the financial crisis. These are described below in the following paragraphs.

**(i) Tailor-made approach for different bank sizes:** Although most typologies were insignificant but the size typology was found to be significant. Therefore, it is observed that one-size-fits-all approach should not be applied. Rather it highlights the importance of addressing the banking sector improvement with a tailor-made-approach. As only the size typology was found to be positive and significant, more attention is required for size typology (particularly for large banks) during crisis time.

**(ii) Reduction of political uncertainty in the economy:** In this study, political motive was found to be positive and significant. This is also observed by others. For example, one of the reasons mentioned for excess liquidity in Bangladesh is political uncertainty (Dhaka Tribune, 7 November 2013). Therefore, political and other uncertainties need to be especially taken care of to address the problem of excess liquidity.

**(iii) Using capitalisation process and making it symmetric:** This study has

observed that capitalisation played a significant role in terms of reducing excess liquidity. Therefore, this should be used as a policy instrument whenever necessary. However, differences in capitalisation among banks (according to typologies) can lead to different impacts. Therefore, special attention is recommended so that all banks are capitalised in a similar way.

### **5.3 Conclusion**

This bank-level study provides further understanding of the relationship between the financial crisis and excess liquidity in Bangladesh. The result shows that the banking sector faced the financial crisis very well and, as a result, the excess liquidity was not significantly affected. This shows the strength and resilience of the banking sector in Bangladesh.

One limitation of this study was the inability to study if foreign banks performed differently<sup>10</sup>. This was due to unavailability of data of foreign banks in Bankscope, the main database used in this study. Future research on this characteristic can shed further light.

In spite of the above limitation, the inclusion of other various bank typologies captured most of the sector and suggested the need for a tailor-made policy application for the banking sector in Bangladesh. Although the banking sector behaved generally well and across most typologies, separate attention is required for the size typology during crisis time.

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<sup>10</sup> Though in terms of scale, the foreign banks are not significant since the 37 banks included in the study represent the banking sector in Bangladesh very well as they account for more than 99 percent of bank branches. Moreover, they had more than 90 percent of assets and deposits of the possible 47 banks including the foreign banks (Bangladesh Bank Annual Report, 2013).

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## **Regional Connectivity: Current Challenges for Bangladesh**

**Muinul Islam\***

**Abstract:** *Regional connectivity in the eastern South Asia sub-region is a promising aspect of regional cooperation in which Bangladesh has been making big strides since 2010 when a historic joint communiqué signed between Bangladesh and India opened a new chapter of regional connectivity in Bangladesh, Bhutan, north-eastern India and Nepal. The paper is an endeavour aimed at i) examining the merit of the issue of providing transit to India, Nepal and Bhutan through railway networks, roads and highways and inland waterways of Bangladesh from the point of view of existing status of the infrastructure and the need of necessary improvements of the infrastructure, ii) examining the issue of opening up the sea ports of Bangladesh for regional use and strengthening the case for speedy implementation of the proposed steps, iii) examining the issue of developing the proper infrastructure suitable for handling the vastly increased volume of traffic through the roads/highways, railway and inland water communication networks of Bangladesh when the transit/transshipment agreements come into force, and iv) identifying the current challenges facing Bangladesh regarding the regional connectivity issue. The paper has five sections. In Section A, I present an introduction including an historical outline of the regional economy. In Section B, I present the problems and prospects of developing a vibrant network of regional connectivity in the eastern South Asia sub-region in the present context. In Section C, I present the case for widening the scope of regional connectivity to include Myanmar, Thailand and China along with the 'seven sisters' of India, Nepal and Bhutan. In this section, I also discuss the prospects as well as the problems of regionalising Chittagong and Mongla sea ports and the third sea port being developed at Paira of the district of Patuakhali and the proposed deep sea port of Sonadia, which seems to have hit a serious snag because of the geo-political rivalry between China and India. In Section D, I highlight Bangladesh's current challenges regarding regional connectivity. In Section E, the concluding section, I present some recommendations for developing appropriate road, railway and inland water communication networks in Bangladesh for such an extended scale of regional connectivity.*

\* Dr Muinul Islam is a professor in the Department of Economics, University of Chittagong, Bangladesh.

## 1. Introduction

Global and regional connectivity are the new ‘buzzwords’ of the current third wave of globalization gaining momentum since the decade of the eighties of the twentieth century. The new disguise of the world capitalist system (WCS) termed as the ‘open market economy’ started to take the shape of the world’s latest ideological paradigm of neo-liberalism from late seventies of the twentieth century with the advent of ‘Thatcherism’ in Britain since 1977, but the paradigm became the ‘dominant ideology’ since 1981 when ‘Reaganomics’ took over the US economic and political policy regimes after the assumption of office of President Ronald Reagan in the USA. As an overwhelmingly aid-dependent least developed country (LDC) at that stage, Bangladesh had to abide by the neo-liberal prescriptions of the Bretton Woods Institutions (BWIs) like the IMF and the World Bank and the other donor countries and organisations, who were zealously propagating and implementing the so-called structural adjustment program (SAP) formulated in accordance with the ‘Washington Consensus’ of 1979—a tripartite understanding reached among the US Treasury Department, the IMF and the World Bank.

Since the decade of the eighties, Bangladesh’s ready made garments (RMG) industries could grow quite rapidly because of the opportunities opened up by the Multi Fiber Arrangement (MFA) and the Generalised System of Preferences (GSP), the two quota systems introduced by the USA, the European Union, Canada and Japan with the declared aim of limiting RMG imports to those countries from the major exporting countries like China, India, Pakistan, Thailand, Indonesia and Egypt. As Bangladesh was categorised as a least developed country since 1975 by the United Nations Economic and Social Council (UNECOSOC), Bangladesh’s garments were allowed preferential access to markets of these importing countries. Thus, the successful journey of the RMG industry of Bangladesh during the subsequent three decades and a half owed its phenomenal growth primarily to these two quota systems, and not to the liberalisation and globalization processes of the open market economy façade of the world capitalist system per se, as commonly believed. But, MFA was phased out in 2004, and the GSP has also become unimportant because of the trade liberalisation processes of the European Union enshrined in its ‘All but Arms’ (ABA) programme. It is quite commendable that the growth momentum of Bangladesh’s RMG industries was not lost after the phasing-out of MFA in spite of bleak forecasts made by western ‘pundits’. Rather, Bangladesh has now become the second largest exporter of RMG items after China, and the export earnings of Bangladesh from RMG export have crossed \$27 billion in 2014-15. Some other export sectors are also gaining strength, which have pushed the total export earnings of Bangladesh to more than \$32 billion in 2014-15 from only \$820 million in 1981-82. Simultaneously, the flow of overseas migrants from Bangladesh gained momentum over these 35 years, and the resulting remittance inflow into Bangladesh through formal channels has crossed \$15.3 billion in

2014-15. These two dimensions of Bangladesh's economic dynamics have been instrumental in creating an image of Bangladesh as a success story of the process of globalization. I firmly believe that regionalism, regionalisation and regional cooperation also have a bright prospect for Bangladesh, and regional connectivity in the eastern South Asia sub-region is a promising aspect of regional cooperation in which Bangladesh has been making big strides since 2010. In this paper, I propose to analyse this theme in some depth.

During the visit of Bangladesh's Prime Minister Sheikh Hasina to India in January 2010, a historic joint communiqué was signed between Bangladesh and India, which opened a new chapter of regional connectivity in the eastern South Asia sub-region including Bangladesh, Bhutan, north-eastern India and Nepal. In the last six years following that historic event, various steps have been undertaken to implement the various decisions declared in that joint communiqué, and it has to be admitted that some significant ground works have been laid for actually starting the transit/transshipment of goods among the countries in the near future. At the present stage, preparations are underway to let the neighbouring countries use the two sea ports of Bangladesh, Chittagong and Mongla, through the roads and highways, the railway system and the inland waterways of Bangladesh.

India has been provided transit through the inland waterways of Bangladesh quite a long time ago, and Indian cargo vessels regularly use that facility under the existing transit treaty for inland water navigation. Steps are also being taken for starting cross-border transit of goods as well as passengers through the BBIN (meaning Bangladesh, Bhutan, India and Nepal) framework for cross-border movement of vehicles of these four neighbouring countries. But, the other dimension of providing transit or transshipment facilities to India for establishing connectivity between the north-eastern states of India and the rest of India by using the roads/highways and railway networks of Bangladesh seems to be hanging in limbo because of various technical and diplomatic delays. Especially, after the diplomatic debacle faced and the fiasco created during the visit of the Indian Prime Minister Dr Manmohan Singh on 6-7 September 2011 revolving around the issue of the last minute refusal of India to sign the water sharing treaty of the Teesta river with Bangladesh on the plea that the chief minister of the Paschimbanga (West Bengal) state of India had disagreed with the terms and conditions of the finalised draft of the proposed treaty at the last moment, the formal signing of the letter of agreement for providing transit to India by Bangladesh was postponed for the time being. (However, it should be noted that a temporary phase of transit facility given to India by Bangladesh for the Palatana power plant of Tripura state was duly completed. In that arrangement, cargo shipments from the Paschimbanga (former West Bengal) state of India were unloaded at Ashuganj river port of Brahmanbaria district of Bangladesh, and then transported by road to Agartala through the Akhaura land port of Bangladesh. Most of the items of the cargo were categorised as over dimensional

cargo (ODC), which included machinery and heavy equipment needed for the power plant. As the Ashuganj-Akhaura road was not built to transport such ODCs and/or heavy loads, special arrangements had to be made and temporary road construction had to be undertaken, which included building temporary earthen dams and diversions on a few rivers and canals. The resulting inconvenience and adverse impacts in the areas created a hue and cry in Bangladesh: The latest visit of Indian Prime Minister Narendra Modi to Bangladesh in June 2015 may have restored the momentum of the process of implementation regarding transit/transshipment, but the Teesta water sharing issue still remains unresolved, casting a shadow over the issue. As understood from the recent newspaper reports, the two countries are involved in negotiations for determining a) the different fee structures for different types of transit/transshipment and b) the different routes of such transit-transshipment arrangements in phases.

The present paper is designed as an endeavour aimed at:

- i) Examining the merit of the issue of providing transit to India, Nepal and Bhutan through railway networks, roads and highways and inland waterways of Bangladesh from the point of view of existing status of the infrastructure and the need of necessary improvements of the infrastructure;
- ii) Examining the issue of opening up the sea ports of Bangladesh for regional use and strengthening the case for speedy implementation of the proposed steps needed for successfully opening up the existing sea ports of Bangladesh along with the future prospect of opening up the entire sea coast of Bangladesh for countries of the region; and
- iii) Developing the proper infrastructure suitable for handling the vastly increased volume of traffic through the roads/highways, railway and inland water communication networks of Bangladesh when the transit/transshipment agreements come into force; and
- iv) Identifying the current challenges facing Bangladesh regarding the transit/transshipment issue in particular, and regional connectivity issue in general.

### **Chittagong as a Regional Port: a Look at History**

Chittagong is the lone natural harbour of the eastern sub-region of South Asia, which includes Bangladesh, Nepal, Bhutan and the seven north-eastern states of India popularly known as 'seven sisters', i.e. Assam, Meghalaya, Arunachal Pradesh, Manipur, Nagaland, Tripura and Mizoram. Eastern South Asia sub-region and the neighbouring regions of China, Myanmar and Thailand can be legitimately termed as the geographical and economic hinterland of the sea port of Chittagong and the entire sea coast of Bangladesh. Though Kolkata (formerly known as Calcutta) was established by the British East India Company in 1689 as

their trading post and port, it shot into prominence after the Plassy War of 1757 and the subsequent establishment of Calcutta as the capital of the British East India Company's Indian colonial empire. Chittagong, the several thousand year old sea port of eastern South Asia, was relegated to an unimportant status all through the period of rule of the East India Company in India up to 1858. The need for upgrading and modernisation of the sea port of Chittagong was felt in the last quarter of the nineteenth century when tea export from the tea gardens of colonial eastern India gained in importance, and the Assam Bengal Railway network was constructed to link up the tea growing areas of eastern India with the sea port of Chittagong. Thereafter, during the British colonial rule of India up to 1947, Chittagong played the role of a secondary sea port of the eastern part of the British Indian Empire.

In the 24 years of Pakistan era, Chittagong played the role of the main sea port of the eastern wing of Pakistan. But, the economic deprivations faced by the eastern wing and the political tug-of-war within the ruling quarters of Pakistan deprived Chittagong of its legitimate claim of developmental priority and due share of financial allocations for expansion and modernisation all through those 24 years. After the emergence of independent Bangladesh in 1971, Chittagong became the premier sea port of Bangladesh, but the issue of regionalisation of Chittagong port for the benefit of all the countries of the region having potential economic hinterland of the port within their political borders could not be pursued with requisite political will of the stakeholders involved because of the less than friendly relationship and/or lack of mutual trust and lack of a spirit of mutual accommodation among the main neighbours in the region after the bloody political changes of 1975, which brought governments in power in Bangladesh deemed to be less than friendly towards its big neighbour India.

In spite of the establishment of the South Asian Association for Regional Cooperation (SAARC) in 1985, the actual progress in fostering regional economic cooperation among the South Asian countries remains quite insignificant because of a lack of mutual trust among these neighbouring countries, especially between India and Pakistan. However, the issue has got a big boost from the joint communiqué signed in January 2010 after the visit of the Bangladesh's prime minister to India.

The visit of the Indian Prime Minister Dr Manmohan Singh to Bangladesh on 6-7 September 2011 has added significant impetus to the issue of regional cooperation in Eastern South Asia in spite of the setback faced on the issue of water sharing, and the issue of infrastructure has been highlighted during that visit as a major constraint in the way of actually implementing the road and railway transit arrangement in the near future.

### **Organisation of the Paper**

The present paper contain five sections including introduction. In Section B, we



present the problems and prospects of developing a vibrant network of regional connectivity in the eastern South Asia sub-region in the present context. This section is titled as 'The Case for Integrating the Infrastructure Networks and Transport Links of Eastern South Asia Sub-region'. In this section, we also highlight the problems relating to infrastructure development that have to be tackled on an urgent basis now that Bangladesh has decided to provide transit or transshipment facilities to India, Nepal and Bhutan. In Section C, we present the case for widening the scope of regional connectivity to include Myanmar, Thailand and China along with the 'seven sisters' of India, Nepal and Bhutan. This section is titled as 'The Case for Regionalising the Connectivity Issue in Eastern South Asia'. In this section, we also discuss the prospects as well as the problems of regionalising Chittagong and Mongla sea ports and the third sea port being developed at Paira of the district of Patuakhali and the proposed deep sea port of Sonadia, which seems to have hit a serious snag because of the geo-political rivalry between China and India. The prospect of future use of the entire coastline of Bangladesh for the whole region will also be highlighted in this section. In Section D, we highlight Bangladesh's current challenges regarding regional connectivity in the eastern South Asia sub-region. In Section E, the concluding section, we present some recommendations for developing appropriate road, railway and inland water communication networks in Bangladesh for such an extended scale of regional connectivity.

## **2. The Case for Integrating the Infrastructure Networks of Eastern South Asia**

1. Bangladesh, Bhutan and Nepal do not share a common border with each other; they can only have land access to each other through India. Nepal and Bhutan are land-locked countries, which must seek Indian cooperation for approaching the sea port of Kolkata. (Their interest to use Bangladesh's two sea ports of Mongla and Chittagong in addition to India's ports is a long-standing issue in the SAARC discussions. The geographical features noted above make the case of integrating the infrastructure networks of Eastern South Asia more a bilateral issue for Bangladesh, Bhutan and Nepal in essence rather than a multilateral one, with India holding the key to successful negotiations for any multilateral agreement on this issue.
2. On the other hand, the geographical location of Bangladesh has been acting as one of the most serious physical hindrances in the way of economic development of the seven eastern states of India known as 'the seven sisters'. With the disruption of transport linkages through the then East Pakistan (now Bangladesh) after the 1965 Indo-Pakistan War, these Indian states have to use a circuitous and mountainous route to reach the sea port of Kolkata. In Table 1, we present the distances of the six of the seven state capitals of the 'seven sisters' from Kolkata if Bangladesh territory cannot be used. The distances of those six capitals from Dhaka and Chittagong through Bangladesh are presented in the same table to highlight the importance of transit/transshipment. For example, the distance between Agartala of Tripura and Kolkata increases from 350 km to 1,645 km if Bangladesh territory

cannot be used as a part of the land routes. Moreover, road communication through the hills and mountains with heavily loaded vehicles is quite hazardous and very costly too.

**TABLE 1**

**Distance of State Capitals of Six of the ‘Seven Sisters’ from Kolkata, Dhaka and Chittagong (In Kilometres)**

State Capital & State	Distance from Kolkata	Distance from Dhaka and Chittagong	
		(If Bangladesh cannot be used) through Bangladesh Chittagong	
Agartala, Tripura	1680	186	248
Guwahati, Assam	1080	580	675
Shillong, Meghalaya	1180	480	575
Imphal, Manipur	1565	635	735
Kohima, Nagaland	1420	780	880
Aizawl, Mizoram	1550	555	655

(250 km if the river Karnaphuli is used)

*Source: Chowdhury et al. (2004), Enhancing the Trade and Investment between Bangladesh and Northeast India, The Chittagong Chamber of Commerce and Industry Chittagong, Chittagong, Bangladesh, P.5.*

3. Looking at the geography from another angle, it must be admitted that the geographical location of Bangladesh has also irrevocably determined Bangladesh's status as a natural trading partner of the eight bordering Indian states, the 'seven sisters' and Paschimbanga, as Bangladesh has got a long border without any major natural barriers with these states located on three sides of Bangladesh. Nepal, Bhutan and Myanmar have also been naturally linked in trading relationships of the region from time immemorial, though the volume of the trade flows between Bangladesh and Nepal and between Bangladesh and Bhutan were rather small in colonial times as well as in the Pakistan period. Nepal and Bhutan, both land-locked countries, are historically dependent on the port of Kolkata for their access to sea-trade during the British colonial period. The relatively smaller sizes of these two economies compared to the Indian economy have also been crucial in determining the peripheral status of their trading needs with countries other than India in the post-colonial period. Rather, it can be safely argued that their geographical locations have created a classic dominance-dependence syndrome in inter-state politico-economic relationships of these two countries vis-à-vis India. India virtually holds the key to economic development of these two countries, and there is a perception that India skilfully manoeuvres its regional policies to maintain this dominant status vis-à-vis these two of its smaller neighbours.<sup>2</sup>

4. Before the end of the British colonial rule in 1947, the regional economy of the eastern side of the Indian sub-continent was functioning as a reasonably integrated economic entity, where the agricultural export, plantation and forestry-oriented economic activities were organised around the concept of transportation through the regional metropolis-cum-port Kolkata and the natural harbour of Chittagong in the south east corner of the sub-continent. Even after the political division of 1947, the cross-country transport and communication networks between Bangladesh and India were allowed to function to some extent through treaties and arrangements till 1965, but most of the formal channels of trading were severely restricted or totally closed down after the Indo-Pak War of 1965. This politically-imposed disruption of legal trade between the two neighbouring countries tended to create and strengthen the flow of illegal trade of a number of agricultural and industrial goods across the porous land border as well as through the river and sea routes of the neighbouring areas of the two countries. Most of these items of smuggling used to cater to the demand patterns of the local economies on both sides of the border in particular.

5. Immediately after the independence of Bangladesh in 1971, Bangladesh legalised border trade for a brief period within a narrow band around the international border. But, the experience did not prove very beneficial for the war-ravaged country; and it brought a lot of criticism for the government from the opposition groups in Bangladesh, especially because of the fact that the severe disruption in the Bangladesh economy caused by the liberation war could not be mitigated much through that short-lived liberalisation phase of border trade. Rather, smuggling of raw jute, hides and skin, fish, etc. from Bangladesh was highlighted by the opposition groups in Bangladesh to discredit the post-liberation Awami League Government as an Indian stooge. In those crisis-ridden days of Bangladesh, that propaganda campaign was very effective to bring out 'raw nerves' on both sides of the then political divide in Bangladesh. The political changes of 1975 brought forth political forces to power in Bangladesh, which could be termed as more friendly to Pakistan. Therefore, at least in political rhetoric, the jingoistic tenor of anti-Indian propaganda of successive governments in Bangladesh gained in momentum in the late seventies. But, the uneven pace of economic development of India and Bangladesh was gradually unfolding newer trends of legal and illegal international trade between the two countries, where one could easily notice a fast changing pattern of cross-border exchanges. In spite of the diatribes against India coming from Bangladesh's rulers since 1975, the flows of both legal and illegal trade between Bangladesh and India increased steadily almost every year since 1972 till the present days of 2016. The added momentum to this lopsided and almost one-sided trade flow was provided by the markedly uneven pace of import liberalisation policies pursued by the two neighbours starting from the mid-eighties. About a decade earlier than the birth of the World Trade Organisation (WTO), Bangladesh launched a vigorous drive of import liberalisation since the year 1986-87 as a part of the structural adjustment program

(SAP) prescribed by the donor organisations like the IMF and the World Bank as aid conditionality. From then on, the whole complexion of legal trade as well as smuggling between these two neighbours changed very rapidly, especially in the cases of illegal exports from and imports into Bangladesh. For detailed analysis of the pattern of change, the seminal study on illegal international trade of Bangladesh by Gafur , Islam and Faiz (1990 and 1991) should be immensely helpful. The liberalisation drive was further accelerated in the early nineties in Bangladesh. On the other hand, India also quickened the pace of import liberalisation since 1991. But, the fact remains that the asymmetry of these two liberalisation regimes continues to be quite substantial till today in 2016.

6. As described in South Asia Development and Cooperation report 2004, analytically, there are two prime effects of transport infrastructure on intra-regional trade. First, its development could be viewed as a trade facilitation mechanism in terms of movement of tradable items among the members of a regional grouping. Secondly, the evolution of an efficient and low-cost transport infrastructure could contribute towards improving export competitiveness, resulting in trade-creation on a regional basis. Adequacy of infrastructure helps determine one region's success and another's failure—in diversifying production, expanding trade, coping with population growth, reducing poverty, and improving quality of life. Such effects need to be viewed in a broad perspective of a two-way causality running between trade and economic growth on the one hand, and income and infrastructure on the other. (RIS 2004, P. 63)

7. In Table 2, we present the official figures of the yearly flows of legal imports from India to Bangladesh and the yearly flows of exports from Bangladesh to India in recent years.

**TABLE 2**  
**BANGLADESH-INDIA LEGAL TRADE FLOW:**  
**FROM FINANCIAL YEAR 2002-3 TO 2013-14**

Financial Year	Import from India (In million US dollars)	Export to India (In million US dollars)
2002-3	1,355	84
2003-4	1,560	89.2
2004-5	2,007.1	143.6
2005-6	1,848.7	242.1
2006-7	2,226	289
2007-8	3,375.1	358
2008-9	2,863.6	276.5
2009-10	3,215	304.6
2010-11	4,560	512.5
2011-12	4,759	490.4
2012-13	4,777	564
2013-14	6,036	456.6

*Source: Foreign Trade Statistics published by the Bangladesh Bank, Dhaka, Bangladesh through the internet.*

From the figures presented in Table 2, we can say that Bangladesh's yearly legal import flow from India is more than ten times the legal export flow to India from Bangladesh on average. (It was more than thirteen times in 2013-14.) Knowledgeable quarters claim that the flows of smuggling of goods from India to Bangladesh carry almost the same type of imbalance compared to the value of smuggled goods from Bangladesh to India, though the actual values of the two flows cannot be accurately gauged for obvious reasons. Increasing proportions of both the legal and the illegal trade between Bangladesh and India are conducted through land ports, customs stations as well as through other points of land border and rivers and canals flowing from India to Bangladesh. Therefore, development of legal trade through proper arrangements and improved infrastructure can be considered as a vital prerequisite for curbing smuggling through the Indo-Bangladesh border points.

8. The issue of integrating the road, rail and inland water infrastructure of eastern South Asia boils down to overcoming the all-pervading lack of genuine political will and mutual trust among the countries of South Asia. The region remains one of the more 'internally disconnected' regions of the world. Physical integration of transport infrastructures would only involve, to a substantial extent, the restoration, improvement and consolidation of old transport links in the context of the expanded transport demand and the modern technological standards. In many areas, the original transport infrastructure has fallen into disuse or needs upgrading. Therefore, such re-integration would require relatively modest investment from the countries of the region. It should be noted at this stage that the existing transport infrastructures of the different regional countries have certain technical incompatibilities, which can be suitably corrected in a planned way if concrete agreements can be reached on the issue of sharing of the infrastructures. The cost of such technical changes is not prohibitive, and the costs can be shared on the basis of amicable sharing arrangements. For example, Indian trucks are built with axle load limit of 10.2 tons each, but the Bangladeshi roads, highways and bridges are not suitable to bear such heavy burden for long periods, which will lead to frequent damage of such structures. So, there is a technical glitch against the idea of allowing Indian trucks to use Bangladesh's roads and highways system. The technical solution to this problem ranges from the proposal of transshipment of Indian goods through the Bangladesh territory by using Bangladeshi trucks for the distance to longer-run option of building heavier load-bearing roads, highways and bridges in Bangladesh. There are several other incompatibilities, which need to be corrected.

In the following paragraphs, we briefly outline the present conditions of the existing transport and communication networks:

## Railway

There are five railway links between Bangladesh and India:

1. Birol/Radhikapur Meter Gauge Rail Link;
2. Rohanpur/Shinghabad Broad Gauge Rail Link;
3. Darshana/Gede Broad gauge Rail Link;
4. Benapole/Petrapole Broad Gauge Rail Link; and
5. Shahbazpur/Mahishashan Meter Gauge Rail Link.

Four of the five rail links are currently used; the Shabazpur/Mahishashan Meter Gauge Rail Link is not in use. But, lack of coordination between the railway authorities of the two countries and the incompatibility of the two railway systems have already created the following technical problems:

- Bangladesh railway wagons cannot be connected to Indian rolling stock without reducing the speed and efficiency of the trains.
- Indian and Bangladeshi railway wagons have different coupling and braking systems.
- Present rating of Jamuna Bridge (43.7 KN per meter) does not allow Indian fully loaded goods wagons to pass through.
- Lengths of Indian goods trains and Bangladeshi goods trains are different. India follows the rule of connecting 33 BCX wagons, whether Bangladesh allows only 30 BCX wagons because of the shorter passing loop length of 1850 meters in Bangladesh Railway. Therefore, every time three wagons are left out of Indian trains at border junctions. New goods train is formed with required number of such left out wagons, which creates unnecessary delay in movement of goods between the two countries.
- Lack of coordination between gauge conversion in Indian Railway and in Bangladesh Railway's dualisation of gauges currently going on may be killing the prospect of uninterrupted inter-country train movement in the future.

From the list given above, it can be easily understood that the technical problems are not insurmountable if the political will can be created. One interesting episode supports our contention: During the construction of the Jamuna Bridge in Bangladesh, Indian railway wagons were allowed to be brought up to the bridge site carrying boulders from India. Bangladesh has recently completed its dualisation of railway gauge up to Dhaka Kamalapur Railway Station. A passenger train between Dhaka and Kolkata has been operating since 2007, and preparations are underway

to start another train service between Khulna and Kolkata. Another prospective route will be developed from Kolkata to Mongla now that the Rupsha Bridge is completed. This planned extension of broad gauge railway will open up the possibility of using the Benapole (Bangladesh)-Bongaon (India) railway line to reach Mongla port for Bangladesh-India bilateral trade as well as for third country trade of Nepal and Bhutan. Therefore, the accelerated development of Bangladesh-India railway cooperation and sub-regional railway cooperation can no longer be postponed by its detractors on technical grounds only. The requisite changes can be achieved within a short time if political agreements are reached, and the cost of such changes does not seem prohibitive.

### **Proposed Railway-based Transit Routes**

In the aftermath of the joint communiqué signed in January 2010, hectic ground works are undertaken for implementing the transit arrangements through the railway networks of Bangladesh. The following routes are being proposed by the expert committees formed in Bangladesh as core transit routes through railway networks:

<b>Users</b>	<b>Route</b>
India & Bangladesh	<b>Route 1:</b> Silchar-Mahishashan/Shahbazpur-Dhaka ICD (Dhirasram)-Bangabandhu Bridge-Darsana/Gede-Kolkata
	<b>Route 2:</b> Silchar-Mahishashan/Shahbazpur-Chittagong Port
	<b>Route 3:</b> Agartala-Akhaura-Dhaka ICD (Dhirasram)- Bangabandhu Bridge-Darsana/Gede-Kolkata
	<b>Route 4:</b> Agartala-Akhaura-Chittagong Port
	Route 5: Kolkata-Petrapole/Benapole-Khulna-Mongla Port
Nepal & Bangladesh	<b>Route 6:</b> Birganj-Raxaul-Katihar-Singabad/Rohanpur-Khulna- Mongla Port
	<b>Route 7:</b> Jagbani, Biratnagar-Radhikapur/Birol-Parbatipur- Khuna-Mongla Port
Potential Railway Routes for future Development:	
India & Bangladesh	<b>Route 1:</b> Agartala-Akhaura-Dhaka ICD (Dhirasram)-Padma Bridge-Benapole/Petrapole-Kolkata
Bhutan & Bangladesh	<b>Route 2:</b> Hashimara-Holdibari/Chilahati-Parbatipur-Khulna- Mongla Port

The proposed routes can be made operational in less than two years with very modest investments in most cases if political agreements for transit are signed.

### **Roads and Highways**

At present, Bangladesh has got 16 official land ports and 92 land customs stations at different points of its international border. The land ports are: 1. Bhomra in Satkhira district, 2. Benapole in Jessore district, 3. Sonamasjid in Chapai-Nawabganj district, 4. Hili in Dinajpur district, 5. Burimari in Lalmonirhat district, 6. Haluaghat in Mymensingh district, 7. Tamabil in Sylhet district, 8. Chatlapur in Moulvi Bazar district, 9. Akhaura in Brahmanbaria district, 10. Bibir Bazar in Comilla district,

11. Muhurighat-Belonia in Feni district, 12. Teknaf in Cox's Bazar district, 13. Banglabandha in Panchagarh district, 14. Birol in Dinajpur district, 15. Darsana in Chuadanga district and 16. Nakugaon in Sherpur district. Out of these 16 land ports, only one land port, Teknaf, is used for Bangladesh-Myanmar trade. Another land port, Burimari, is largely used for Bangladesh's trade with Nepal and Bhutan in addition to Indo-Bangladesh trade. The other land port used for Bangladesh's trade with Nepal and Bhutan is Banglabandha, which has recently been opened as an immigration check-post. All the other land ports and land customs stations are solely used for Indo-Bangladesh trade. (Two other land ports are going to be opened in the near future in consequence of the joint communiqué signed between Bangladesh and India in January 2010 during the visit of the prime minister of Bangladesh. One of these two land ports will be established at Ramgarh in the hill district of Khagrachari and the other will be established at Thegamukh of the hill district of Rangamati.) The rates of growth of border trade through the different land ports mentioned above and also through the land customs stations are very high. In fact, Benapole Land Port has become the second largest port of Bangladesh, vastly surpassing the flow of trade through the second sea port of Bangladesh, Mongla. Even, trade through Bhomra, Sonamasjid, Akhaura and Hili land ports are also rising substantially every year, though knowledgeable quarters claim that the major proportions of the flows of trade through some of these land ports are deliberately kept unrecorded by the government officials and/or private operators of these land ports in order to deprive the government from tariff and tax revenues in collusion with corrupt personnel of various government agencies working in the land ports and the importers using the land ports. The following points are mentioned as very pertinent issues and significant recent developments:

- The dilapidated condition of highways in Bangladesh is the largest road-block in the way of early implementation of road transit arrangements through the road networks of Bangladesh. The load bearing capacity of roads, bridges and culverts in Bangladesh is also inadequate to take the burden of Indian trucks at the present stage. Most of the highways are



two-lane roads, and therefore, will not be suitable to handle the extra traffic generated by transit vehicles. Therefore, the issue of providing road transit to India, Nepal and Bhutan will have to wait for significant improvement and modernisation of the highway system of Bangladesh. Only transshipment remains as a viable option for the near future.

- Transshipment of goods can start quite rapidly if political decisions are made. In that case, a designated trucking company can be formed as a joint venture of Bangladesh, India, Nepal and Bhutan to transport goods from one country to another without hassle. Another suitable method may be to use sealed containerised cargo. Electronic scanning of goods carried in the containers can be used to ascertain the true nature of goods in the sealed containers.
- Benapole has been handling the bulk of imports of Bangladesh from India. So, the facilities of Benapole will need substantial improvement if it is used as a transit port. Sonamasjid land port has gained in importance after the opening of the Jamuna bridge, and the condition of the road is satisfactory. But, the facilities of the port remains very poor, and goods transshipment may not be very satisfactory there if modernisation of the land port is not undertaken on an emergency basis.
- Bibir Bazar, Akhaura and Tamabil land ports on the eastern border of Bangladesh are currently carrying the major load of goods movement between Bangladesh and the 'the seven sisters' of India. Tamabil is the point through which coal and fruits are imported from India to Bangladesh. It is supposed to be the entry point of the proposed Asian Highway from India to Bangladesh. But, the prospect of the opening of the Asian Highway for cross-country movement of traffic through Tamabil seems quite bleak, though the highway is developed in recent years on both the Bangladesh and Indian sides to cater to the future expansion of traffic. Through Akhaura and Bibir Bazar, 'the seven sisters' of India indirectly use the services of Chittagong sea port of Bangladesh. Actually, the whole eastern border of Bangladesh is conveniently used by the smugglers of Bangladesh and India to smuggle out legally and illegally imported goods to the 'seven sisters' as well as some Bangladeshi goods like cement, C.I.Sheet, M.S. Rod, construction materials obtained from ship breaking yards of Chittagong, etc.
  - Two routes were initially targeted for giving transit to India:
    - 1) Benapole-Jessore-Dhaka-Kanchpur-Sylhet-Tamabil Route (AH-1); and
    - 2) Banglabandha-Hatikumrul-Dhaka-Kanchpur-Sylhet-Tamabil Route (AH-2).

The third route can be used for giving transit facilities to Myanmar, which is Dhaka-Kanchpur-Chittagong-Cox's Bazar-Teknaf-Myanmar (AH-41). This route will be crucial if the deep sea port at Sonadia can be established, because, then it can be used to link up China and Thailand with Bangladesh through Myanmar.

- The proposed land port of Ramgarh linking with Sabrum of Tripura can be a major transit point after the completion of the bridge over the Feni river, which is currently under construction, if a new highway is built on the coastal embankment from Chittagong to Baraiarhat point in Mirsarai linking with the highway to Ramgarh exclusively for use by trucks. This new road can be constructed as a joint venture of Bangladesh and India. Needless to say, this route will solve the problem of future traffic congestion in the relevant portion of the existing Dhaka-Chittagong highway, (which is already a problem), if and when road transit agreements are signed.
- There are 22 border posts on the India-Nepal border, out of which 15 check posts are authorized to handle transit traffic. But, only six border posts are consistently used for transit traffic. These are: Dhangadhi, Nepalganj, Bhairahawa, Birganj, Biratnagar and Kakorvitta. Out of these six, Birganj, Bhairahawa and Biratnagar handle 80-85 per cent of Nepal's international traffic of goods and passengers. Indian trucks can enter Nepal without hindrance, but they must return to India within 72 hours. Nepalese trucks need permit for every trip to India, and the permit remains valid for three months.
- India allows Kakorvitta-Panitanki-Fulbari-Banglabandha corridor for Nepal-Bangladesh bilateral trade. But, this corridor cannot yet be used for third country trade in spite of the fact that formal decisions for allowing third country trade have been made in early 2011.
- Bhutan can use Phuntsholing-Changrabandha- Burimari corridor for its bilateral trade with Bangladesh. But, yet this corridor can not be used for third country trade of Bhutan.
- Between Bangladesh and India, there are several direct bus services: 1) Dhaka-Kolkata bus, 2) Dhaka-Agartala bus, 3) Dhaka-Shiliguri bus. All the check posts between Bangladesh and India are frequently used by passengers for cross-country travel; Benapole handles the majority of passenger traffic. The proportion of Bangladeshi passengers in the total flow of passengers is more than 85 per cent. However, the Dhaka-Agartala bus service has become a losing concern because of the difficult road journey
- From the Petrapole (Gurudaspur) point of India, the roads are not wide

enough nor are these adequately maintained, and there is no direct bus service to Kolkata from Petrapole. This negative attitude of the Paschim-banga (West Bengal) government seems quite strange, because, Paschim-banga earns huge income from the Bangladeshi passengers using this route for their Indian visits.

- It takes 45 days to transport a container from Delhi to Dhaka, because the container first moves from Tughlakabad ICD, then to Mumbai and Singapore. From Singapore, the container is shipped to Chittagong port, and then to Dhaka. The distance of around 2000 km could be covered in two to three days if direct rail or road transportation would be allowed for such container movement.
- Bhutanese buses are allowed up to certain towns of Paschim-banga and Assam of India. Vehicles carrying Bhutanese goods are allowed up to some rail heads. But, Bhutanese third country cargo often faces long delays in Kolkata port.

Regarding the issue of functioning of the land border crossings of South Asia before the January 2010 joint communiqué, Rahmatullah (2004a) rightly pointed out the major problems at the land border crossings of South Asia in the following words:

“Considerable inefficiencies exist at the land border crossings between SAARC countries. The basic constraints are the lack of efficient customs operations, including lack of transparency of procedures for inspection, informal payments, and inadequate preparation of customs documents by the shipper, etc. An unusually long time is taken for scrutiny, checking and completion of documents and for completion of formalities with the banks. Banking facilities are inadequate; medical, communication, warehousing, security and fire fighting facilities are deficient; wayside amenities are absent. For want of truck terminals, vehicles are parked on the road creating acute congestion. In most of the border points there is only one exit for both passengers and goods creating considerable inconvenience for users.” (Rahmatullah 2004a, P. 61)

The situation has not improved much in the intervening 12 years from 2004 to 2016. From the list of inadequacies in the land border crossings noted above, it should be clear that these shortcomings can be easily overcome if sincere efforts are undertaken by the countries. Especially, with the fast development of information and communication technologies, the modernization of operation of border posts has become very cost-effective in recent times. Good sense should prevail without any further delay!

The Asian Land Transport Infrastructure Development (ALTID) project endorsed by the UN Economic and Social Commission for Asia and the Pacific (ESCAP) in 1992 focuses not only on physical integration of South Asian road and rail trans-

port systems through the development of the Asian Highway (AH) and the Trans-Asian Railway (TAR) projects, but also, on the importance of accession to various international facilitation conventions to ensure efficient movement of goods and people across national boundaries. But, formidable challenges remain in the implementation process of the ALTID project in the South Asian region because of mutual lack of trust between Bangladesh and India in the eastern South Asian region and India and Pakistan in the western South Asian region, which is harming the proposed transit and transshipment arrangements needed for successfully using the facilities being created under the ALTID project. For example, during the BNP-led alliance rule of 2001-2006, Bangladesh refused to sign the protocol facilitating the use of the Asian Highway portions situated in Bangladesh on the ground that if Tamabil border point in the eastern border of Bangladesh and the Benapole and Sonamasjid border points on the western border were opened up for cross-country transit traffic then India would use the route as a corridor between its eastern states and the rest of India. Therefore, Bangladesh proposed an alternative connection with the Asian Highway through Teknaf of Bangladesh and Myanmar. No other member country of the Asian Highway project agreed to this alternative proposal of Bangladesh; even Myanmar did not agree. As a result, Bangladesh was cut off from the agreed route of the Asian Highway for the time being. Virtually, Bangladesh temporarily withdrew itself from the Asian Highway project!

### **Proposed Road-based Core Transit Routes**

As follow-up of Prime Minister Sheikh Hasina's visit and the joint communiqué signed during that visit some expert committees are working to formulate the proposed routes for road transit. The following routes are chosen as the proposed routes:

<b>Users</b>	<b>Routes</b>
India & Bangladesh	<p><b>Route 1:</b> Kolkata-Petrapole/Benapole-Dhaka-Akhaura/Agartala</p> <p><b>Route 2:</b> Agartala-Akhaura-Chittagong Port</p> <p><b>Route 3:</b> Silchar-Sutarkandi-Chittagong Port</p> <p><b>Route 4:</b> Silchar-Sutarkandi-Paturia Ferry-Benapole/Petrapole-Kolkata</p>
India, Bangladesh & Bhutan	<p><b>Route 5:</b> Samdrup Jonkhar (Bhutan)-Guwahati-Shilong-Tamabil-Sylhet-Chittagong Port</p>
Nepal, India & Bangladesh	<p><b>Route 6:</b> Kathmandu-Kakarvita/Phulbari-Banglabandha-Mongla Port/Chittagong Port</p>

Bhutan, India & Bangladesh

**Route 7:** Thimpu-Phuentsholing-Joygaon/Burimari  
-Mongla Port/Chittagong Port

**Other potential Land routes for future development:**

India & Bangladesh

**Route 1:** Subroom-Ramgarh-Chittagong Port

**Route 2:** Demagiri-Thegamukh-Rajsthali-  
Chittagong Port

**Inland Water Transport**

Bangladesh has got a world famous river system, the Ganges-Brahmaputra-Meghna (GBM) system, flowing through the land with more than two hundred and thirty rivers and tributaries. Inland waterways used to dominate the transportation of goods as well as passengers in the colonial past, but insufficient investment in the maintenance and development of the waterways during the last sixty years has been playing havoc in this field, which is causing a gradual loss of the inherent advantage of the waterways in Bangladesh. The eastern states of India are still linked with Bangladesh through the waterways, but they are scantily used by India in spite of the existence of a transit agreement with Bangladesh for the use of the inland waterways of Bangladesh by Indian vessels. In this regard, the following points are highlighted:

- Sea ports like Chittagong and Mongla of Bangladesh and Kolkata and Haldia of India may be integrated by inland waterways to form an economically lucrative transportation system, which will greatly reduce the cost as well as time of transporting goods to and from the land-locked ‘seven sisters’ of India.
- Now that containerization of shipping has made customs clearance of cross-country movement of goods redundant and/or unnecessary at the transit points for the sealed containers, the ‘seven sisters’ can use Chittagong and Mongla ports through the inland waterways of Bangladesh if suitable protocols are signed between the two countries for movement of sealed containers on coasters and barges plying the rivers of Bangladesh up to some convenient river ports of eastern India like Karimganj or up to Ashuganj river port of Bangladesh at the least. (Ashuganj has been declared as a port of call in the January 2010 joint communiqué.
- India has extensive inland waterways too, three of which have been declared national waterways. The Ganges and Brahmaputra waterways of India can be linked up with the waterways of Bangladesh, and can even be extended up to the Nepalese river ports if regional protocols can be signed among the three countries involved. Nepal has been showing interest about the development of waterways between the Koshi and Gandaki (Narayani) rivers of Nepal and the

Ganges waterways of India with a link up with the waterways of Bangladesh, which will open up Chittagong and Mongla ports of Bangladesh for Nepalese export and import goods traffic. India seems to be uninterested about this proposal.

- ESCAP initiated the Development of Inland Water Transport (IWT) Infrastructure and Services project in 1999 to study the regional integration of inland waterways of Eastern South Asia as well as transit along international waterways. But, no agreement could yet been reached on the issue of integration of the relevant waterways.

### **Inland Water Routes for Transit**

#### **Users**

#### **Route**

Tripura & Mijoram

**Route 1:** Kolkata-Namkhana-Sheikhbaria-Mongla-Kawkhali-Barisal-Chandpur-Bhairab Bazar/Ashuganj-Sherpur-Zakiganj-Karimganj

Guwahati region of Assam

**Route 2:** Kolkata-Namkhana-Sheikhbaria-Mongla-Kawkhali-Barisal-Chandpur-Mawa-Paturia-Sirajganj-Chilmari-Daikhawa-Dhubri Pandu-Silghat

Tripura & Mijoram (proposed route)

**Route 3:** Kolkata-Namkhana-Sheikhbaria-Mongla-Kawkhali-Barisal-Chandpur-Ashuganj (by waterway) then Ashuganj to Akhaura by road as a multimodal route

#### **Potential Routes for Future development:**

Southern part of Assam (proposed route)

**Route 1:** Dhulian-Godagari-Rajshahi-Pakshi-Daulatdia-Mawa-Bharab Bazar/Ashuganj-Sherpur-Zakiganj-Karimganj

Eastern part of Bhutan

**Route 2:** Mongla-Kawkhali-Barisal-Chandpur-Mawa-Paturia-Sirajganj-Chilmari-Daikhawa-Dhubri (then by road to Bhutan)

### **3. The Case for Regionalising the Connectivity Issue in Eastern South Asia: Problems and Prospects**

1. As already stated in the introductory section, Chittagong is the lone natural harbour of the eastern sub-region of South Asia, which includes Bangladesh, Nepal, Bhutan and the seven north-eastern states of India popularly known as 'seven sisters', i.e. Assam, Meghalaya, Arunachal Pradesh, Manipur, Nagaland, Tripura and Mizoram. Eastern South Asia and the neighbouring regions of China, Myanmar and Thailand can be legitimately termed as the potential economic hinterland of the sea port of Chittagong and the entire sea coast of Bangladesh. From many areas of Myanmar, Thailand and China the sea coast of Chittagong and Cox's Bazar of Bangladesh is geographically the nearest (and/or more easily accessible) compared to the sea coasts of those three countries. This unique advantage of the geographical location of Bangladesh should not remain unappreciated and/or unutilised because of political hindrances standing in the way of regional sharing of connectivity networks, we contend.

2. The issue of regional trade in the eastern South Asia sub-region is entangled with the issue of bilateral versus multilateral arrangements for trading and economic co-operation. India is the dominant trading partner in its bilateral trading arrangements with Bangladesh, Nepal and Bhutan, especially in respect of legal trade. But, if only the eastern states of India are considered in the evaluation of the economic benefits of trading and transport cooperation arrangement in the region, the mutuality of positive benefits arising out of such cooperation becomes much more apparent. The 'seven sisters' of eastern India — Assam, Meghalaya, Arunachal Pradesh, Manipur, Nagaland, Tripura and Mizoram — have been badly suffering because of their land-locked geographical locations, and Bangladesh may help significantly in alleviating their predicament by opening up the least costly avenues for sea-trade for these relatively less developed and remotely placed Indian states. These states are lavishly endowed with a number of natural resources including minerals (limestone, for example), but those resources remain largely untapped due to cost considerations arising out of difficult terrain and geographical distance from the heartland of India through the narrow Shiliguri corridor, popularly known as 'the chicken neck'. The geographical location of Bangladesh has been the main contributing factor in cutting off these states from the mainstream economic development process of India. It is to be appreciated that this hindrance needs to be overcome as soon as possible through a formal arrangement of regional cooperation and sharing in the field of transport infrastructure among all the stakeholders in the region, and we submit that the basis of such cooperation should be multilateralism within the ambit of regionalism rather than bilateralism. We further submit that along with Bangladesh, India and the two smaller countries of Nepal and Bhutan efforts should be initiated to include Myanmar, Thailand and China in such arrangements for sharing connectivity networks

in order to make such cooperation truly regional in character, because, we believe, such regionalisation of cooperation arrangements may be a way-out to circumvent the perceived notions of mutual mistrust and apprehensions about each other's hidden agenda among the neighbouring countries of the region.

3. At present, the seven eastern states of India neighbouring Bangladesh—Assam, Meghalaya, Arunachal Pradesh, Manipur, Nagaland, Tripura and Mizoram—account for a very small proportion of the value and volume of legal trade between Bangladesh and India. A more substantive proportion of illegal trade is conducted through the long land borders between Bangladesh and these states. Empirical observation shows that these states are already using the Chittagong port through the services of the smugglers of the two countries. Liberalisation of legal trade of Bangladesh with these seven states would be mutually beneficial, but as this issue is always entangled with the over all trade issue of Bangladesh with India, these seven states are constantly been subjected to a 'rough deal'.

4. It is also strategically dangerous (and unfortunate) that all the eastern states of India are experiencing local insurgencies around some ethnic or sub-national issues. The Indian and Bangladeshi governments were frequently accusing each other of harbouring and covertly helping insurgents in each other's soil. After the signing of the Chittagong Hill Tract Peace Treaty in 1997, Bangladesh seemed to have achieved a temporary respite in its insurgency situation. But, the 'seven sisters' continue to suffer from insurgency operations, which were allegedly using the Bangladesh coastline for their clandestine arms deliveries. (The ten-truck arms case has proven this allegation.) More importantly, these continuing troubles in the Indian states are used by the anti-Indian political parties of Bangladesh to frustrate any attempt to embark on the path of transit or transshipment cooperation with these states on the plea that India would be using the facilities to use Bangladesh as a corridor for military counter-insurgency operations, which will expose Bangladesh to counter-attacks and sabotage operations from the insurgents. The issue remains an explosive and highly divisive one in Bangladesh. It is, however, heartening to note that the present government of Bangladesh under Sheikh Hasina has vowed not to allow any insurgent groups of the 'seven sisters' to use Bangladesh as sanctuaries, and has shown its earnestness on the issue by handing over several leaders of ULFA to the Indian authorities in the last six years and by dismantling a number of camps formerly used by the insurgent groups.

5. Moreover, the fact that Indian producer goods as well as consumer goods have successfully penetrated a sizeable section of the domestic market of Bangladesh through both legal trade and smuggling has created the spectre of neo-colonial domination and dependency syndrome in the relationship between these two neighbours too. The perceived notion of Indian hegemony is vitiating the political scene of Bangladesh.



6. The issue of illegal migration and subsequent settlement of Bangladeshis in the neighbouring Indian states has also been acting as a highly contentious issue between the two neighbours in almost all forums of communication and dialogue. The Indian side claims that these states have been faced with the spectre of an impending demographic disaster because of these huge migratory movements. But, the Bangladesh side denies any such huge outflow in the recent times, and contends that the political exigencies of the neighbouring Indian states are largely instrumental in making big issues out of this long-drawn historical phenomenon, which has almost died down in recent years. The recent decision of India to build border fencing in the Indo-Bangladesh border has badly hurt the sentiments of all Bangladeshi citizens. It is a particularly vitiating factor impeding the prospects for transit or transshipment arrangements between the two neighbours. It is, however, significant to note that this issue has been deliberately played down by India since the visit of the Bangladesh prime minister in January 2010. It proves that the issue of illegal migration is not that critical after all, at least in recent times!

7. We emphasise that transit or transshipment is an issue where Bangladesh's unique geographical location has given it a truly prospective opportunity for achieving economic benefits from regional cooperation. But, understandably, this is a politically sensitive issue in Bangladesh because of India's dominant economic and 'military power' status in the region. Bangladesh's anti-Indian political forces used various 'bogies' to deny India transit facility in the last 41 years since 1975. Even, an alternative proposal for transshipment of Indian goods to the 'seven sisters' by Bangladeshi trucks, presented by a commerce minister of the Bangladesh Government of 2001-2006, was successfully blocked by the anti-Indian lobbies in 2002! Therefore, we suggest that this issue should be tackled on a regional basis, including Nepal, Bhutan and China in the process

8. Most unfortunately, the issue of border killings of Bangladeshis by the Border Security Force (BSF) of India has been constantly vitiating the political atmosphere of Bangladesh in recent years in spite of the apparent change of heart of both the governments of India and Bangladesh about establishing friendly neighbourly relations since January 2010. It must be said that this issue often presents India as a cruel neighbour and a big brother bully in the minds of average Bangladeshis. (Especially, after the inhuman killing of a teenager girl named Felani in 2011 and the video footage of an unbelievably cruel torture of a bare-naked Bangladeshi citizen after stripping him naked before the camera by the personnel of the Border Security Force (BSF) of India telecast in almost all the television channels of India and Bangladesh in January 2012, the anti-India sentiments among the common people of Bangladesh reached an all-time high, which has damaged the goodwill of India as a friendly neighbour. It is particularly disturbing that after the assurance given by the Indian home minister in 2011 that such killings would be gradually brought to zero the Director General of the Border security Force (BSF) of India

has re-iterated in January 2012 that border shooting would continue!

Another recent issue that has created antagonistic feelings against India among the common people of Bangladesh is the deliberate hindrances put in the way of transport of cattle from India to Bangladesh, which has been going on since time immemorial.) In this context of deeply hurt feelings of the people of Bangladesh, I am afraid that the issue of providing India transit or transshipment through Bangladesh in the near future will also raise virulent anti-India sentiments in the minds of a significant proportion of Bangladeshis, which has definitely got a boost from all these senseless killings and incidents of cruelty in the Bangladesh-India borders as well as from creating an unnecessary issue over cattle smuggling. Regionalisation of the transit issue, therefore, will be a good alternative way for the near future.

#### **4. Current Challenges for Bangladesh Regarding Regional Connectivity**

##### **Integrating the Information and Communication Systems**

The world is fast becoming an increasingly seamless global village because of the ongoing revolution in information and telecommunication technology (ICT). This revolution has opened a wonderful window of opportunity for South Asia because of the fact that the ICT revolution favours the countries with large pools of highly educated human capital who can gain the expertise to master the fast changing hardware and software of the ICT technology. South Asia has an added advantage in the form of a vast reservoir of low-cost English-speaking workforce, which can out-perform the experts with non-English language background in taking advantage of the ICT revolution. As a consequence of human element of the ITC revolution, India has emerged as the world leader in providing the largest pool of software experts and computer technologists in the world, and the export of ICT experts has made India the focal point of multinational companies in the field of outsourcing jobs from the rest of the world and as a regional hub for off-shore software development.

Needless to say, India has out-performed China in the ICT field. Lately, Sri Lanka and Pakistan have accelerated their drives of achieving large pools of specialists in the ICT field, though they still remain far behind India in the race. Bangladesh had been lagging behind in the field in spite of its large population because of some blunders committed by the BNP government of 1991-96. But, the present government has been trying hard to catch-up through its 'Digital Bangladesh' programme, and the results are very encouraging.

There is an increasing awareness in the South Asian countries that the ICT revolution has probably brought the golden chance to the countries of this region to achieve the emancipation of their common people in their struggle to break the shackle of poverty and deprivation. It is no accident that India's GDP growth rate has increased to almost 9 per cent in recent years, and that some Indian multinational companies in the ICT field have emerged as world leaders in the competition

for supremacy with giant multinational companies like the Microsoft, Intel, Del, etc.

Considering the fact that India is far ahead of other South Asian countries in the field of ICT, a spirit of rivalry and competition may be dominant in the region rather than the spirit of cooperation. We humbly submit that in spite of the scope of rivalry, the people of South Asian countries will gain immensely from creating an environment of free flow of information in the whole region with the help of this ongoing ICT revolution. This technology has strong spread effects and linkages, both forward and backward linkages. E-governance, E-commerce, E-learning, internet throughout the country, etc. have become much more achievable targets for developing countries in recent years, and the so-called 'digital divide' may not be as impregnable as it was thought a decade earlier! Especially, mobile telephone networks have become so affordable that even low income people can hope for accessing the communication services at quite cheap rates. South Asian countries have recently become one of the fastest growing regions in the world regarding the spread of network coverage and number of mobile telephone users.

The economic effects of such a revolutionary spread of the cost-effective telephone communication should be quite spectacular too. Regional cooperation in integrating the communication links of South Asia becomes doubly imperative when one considers the following sad realities of South Asia:

- Satellite television networks of Bangladesh, Pakistan and Sri Lanka are not yet accessible to the viewers of India.
- Newspapers, magazines, journals and periodicals of different countries are not freely allowed in all countries of South Asia. Exchange of cinemas and cultural troupes among the countries is also discouraged.
- The rates of telephone calls to receivers of different countries of South Asia are higher in some countries of the region compared to the rates charged for overseas calls to more distant destinations.
- Mobile telephone networks are not allowed in many areas of South Asian countries on grounds of insurgency, terrorism, national security and secessionist movements.
- Though South Asia is now the largest source of overseas migrants working in different countries of the world the nationals of different South Asian countries do not maintain close contacts with each other in their overseas work stations, towns or cities.
- The financial transactions among the South Asian countries take longer times for completion compared to the transactions of the South Asian countries with other countries of Asia, Europe and North America. This delay is one of the

factors for the continued flourishing of informal money markets in all countries of South Asia.

The reality of the region speaks a volume about the real nature of the acute problem of 'disjointedness' among the South Asian countries. Technology is not the problem. The real problem lies in the political realm.

### **Regionalisation of Chittagong Port and the Sea Coast of Bangladesh**

Inter-port connectivity in the South Asia region is one of the lowest in the world. This is quite unusual given the fact that India is the second largest source of legal imports of Bangladesh. The overwhelming proportion of Nepalese and Bhutanese third country exports are transported through Kolkata and Haldia ports of India, which often face congestion, thereby causing long delays in handling the import and export items of Nepal and Bhutan. But, India is seen to be less than enthusiastic to accommodate Nepal's requests for allowing them to use Bangladeshi ports as alternative routes for their international trade. Nepal has been complaining for long about India's non-cooperation on the issue. The same is the case with Bhutan, though Bhutan is not yet very vocal in expressing their grievances on the issue. South Asian exports are suffering for long because of the operational inefficiency of the sea ports of the region, though some recent steps of privatization of certain port operations have been quite successful in overcoming major deficiencies in the operational fields. The Sri Lankan port of Colombo is an example of such modernization success story. Some Indian ports like Jawaharlal Nehru and Mumbai have also been successful in improving operational efficiency in recent times. But there are certain peculiar features hampering the co-operation efforts in the field of sharing of the sea ports of the region as 'regional ports' rather than as 'national ports'. For example:

- Ships moving from Bangladesh to the ports of India's east coast levy higher freight charges than for the movement to Singapore or Hong Kong.
- There are regular feeder services between Colombo or Singapore and most South Asian ports, but there are no direct regular calls among the ports of Bangladesh, India and Pakistan in spite of recent efforts to link up the regional ports.
- Due to poor performance of Kolkata and Haldia ports of India, cargo has to be diverted to distant ports like Vizag (or Vishakapatnam) port located some 650 km away or to Jawaharlal Nehru port located 1780 km away from Kolkata, but India regularly used to torpedo all efforts of allowing Nepal or Bhutan to use Bangladeshi ports of Mongla or Chittagong lying nearby.

Actually, Chittagong has got the prospect to become a regional trading and transport hub of the eastern South Asia. If concerted efforts are undertaken by Bangladesh, India, Nepal, Bhutan and China for developing Chittagong port and the

proposed deep sea port at Sonadia of the district of Cox's Bazar for their wider economic hinterlands located in eastern Indian states, Nepal, Bhutan and even China, Thailand and Myanmar, Chittagong and Cox's Bazar can be the '**second Singapore**' of Asia. The costs of proper infrastructure building for such an endeavour can be jointly shared by all the stakeholders. But, here again, politics seems to be the only major road-block.

Regrettably, on this issue, the track record did not speak of an 'open mind' approach from India before January 2010. For instance, Nepal signed a transit agreement with Bangladesh a long time back for transit of Bangladeshi goods to Nepal through Banglabandha border crossing on the Bangladesh-India border, but the delay tactics of India in providing a corridor and the hurdles put on the regular use of the Indian 'chicken-neck' corridor made the transit arrangement ineffectual and virtually dysfunctional. Moreover, India did not allow third country trade of Nepal through this corridor. (However, a new beginning was made on this issue in January 2011 when the Banglabandha and Fulpur land ports on Bangladesh-India border were opened up for Bangladesh-India trade, Bangladesh-Nepal trade and for third country trade of Nepal through Bangladesh. Banglabandha has recently been opened as an immigration check-point in 2016.)

### **The Deep Sea Port of Sonadia**

In the immediate aftermath of the Indian tour of Bangladesh's prime minister came the visit of Bangladesh's prime minister to China in 2010. During that tour, she requested for Chinese help for developing a deep sea port at Sonadia Island of the district of Cox's Bazar in south eastern Bangladesh for the proposed use by all the neighbouring countries of the region. It should be mentioned at this stage that the district of Cox's Bazar holds a major portion of the eastern coastline of Bangladesh with comparatively more advantageous geographical proximity of some areas of India, Myanmar, China and Thailand. The Chinese government responded very positively to her proposal; and within a short time, the then vice president of China Xi Jin Ping (the present president of China) came for a visit to Bangladesh to take forward the discussions on that issue. It should be mentioned that a feasibility study on Sonadia had been concluded earlier by a Japanese firm, and they had recommended a phase-wise development of a deep sea port at Sonadia. The behind the scene negotiations progressed rapidly and the two countries agreed to sign a memorandum of understanding (MOU) during the visit of Prime Minister Sheikh Hasina to China in 2014. But, immediately before her journey to China, India put diplomatic pressures on Bangladesh to call-off that signing. So, the signing of the MOU was shelved at the last minute. Obviously, India's geo-political rivalry with China regarding China's access to the Bay of Bengal sabotaged the deep sea port of Sonadia for the time being. The prospects of strengthening regional connectivity through Myanmar have also suffered lasting blows from the changed geo-political bias of Myanmar wherein the country's rulers seemed to have abandoned their

preference for China and have been responding warmly to the efforts of the USA and India to woo them for developing friendly relations with the western capitalist countries, India and Japan in stead. It seems that the Sonadia deep sea port project has no prospect of early implementation in the near future.

### **BCIM and BIMSTEC**

The on-going efforts to build a regional economic cooperation and connectivity arrangement called as Bangladesh-China-India-Myanmar (BCIM) Economic Corridor, popularly termed as the Kun Ming Initiative, have also been stalled significantly because of India's changed geo-political perspective regarding providing the Chinese access to the Bay of Bengal. For Bangladesh, the proposed railway line from Dohazari to Gundhum, situated at the Bangladesh-Myanmar border, through Ramu of Cox's Bazar has become a victim of this loss of interest of India and Myanmar regarding BCIM Economic Corridor. In spite of the occasional rhetoric and events surrounding the Kun Ming Initiative, the real enthusiasm has died down in recent times. So, it may become another failed proposition like SAARC.

The future of BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation) also seems to be hanging in limbo in spite of establishing the BIMSTEC headquarters at Dhaka. This loss of steam also has its roots in the changed geo-political interests of Myanmar's rulers and the political upheavals in Thailand. Currently, India does not take much interest in BIMSTEC either in spite of its earlier interest in the cooperation arrangement, because, it has established alternative cooperation arrangements with ASEAN.

### **The Indian Visa Conundrum**

Rather than gradual easing of visa restrictions for cross-border movement of people of the countries of the region, the actual trend in the visa regime is in the opposite direction. India has significantly tightened the visa arrangements for Bangladeshi visitors to India. The fees for obtaining a visa have been raised; the time of processing has inexplicably been lengthened; and corruption and fraudulent practices seem to have taken over the whole process. These moves belie the lip-services of the governments of the countries given to friendly ties reaching historic heights!

### **The Kaladan River Project**

India has almost completed the Kaladan River Project of the 'Seven Sisters' states of the north-east, linking those states with Myanmar's deep sea port at Sitway (formerly known as Akyab). This project will provide an alternative sea-link to those mountainous states through excavation for widening and deepening of the Kaladan river.

## 5. Conclusion

The issue of regional connectivity in the eastern South Asia sub-region has reached a crucial stage at the present juncture in spite of the 'Pakistan-India syndrome' of the political polarisation in Bangladesh. There is an under-current of sentiments that Bangladesh has already given too much to India in spite of India's about-turn on the sharing of water of the Teesta river. However, the anti-Indian political quarters have expressed their political stand that they would not oppose any future 'regional arrangements' for economic cooperation involving other countries of the region besides India and Bangladesh.<sup>3</sup>

We emphasize that the eastern South Asia sub-region is one of the least developed areas of the whole world with the majority of the people of the countries of the area living in abject poverty and economic deprivation. But, if the whole area is considered as one economic entity, it will emerge as a vastly potential candidate for achieving rapid economic progress with proper institutional and policy changes. At one end of the spectrum, there are areas with vast natural resources waiting to be judiciously harnessed. At another end, the uneven density of population in different constituent areas or countries creates a different assortment of development problems. A well-developed process of economic integration of the countries of the region through institutional arrangements for cooperation is the crying need of the hour.

In light of the existing political realities noted above, we like to make some recommendations for the policy makers of the countries of the region, if they really mean to carry forward the mission of building up a viable infrastructural arrangement for enhancing regional connectivity in the near future.

1. The road network between Ashuganj and Akhaura should be completely rebuilt to make it truly adequate for handling the heavy trucks and tractor trailers to be used for the transit of Indian goods. India should finance the whole project.
2. The river port of Ashuganj should be developed on a priority basis with the construction of suitable jetties, provision of loading/unloading equipment, truck terminals and other port facilities.
3. A heavy load-bearing road exclusively for trucks and tractor trailers should be constructed on a priority basis along the coastal embankment from Chittagong up to Barairarhat point of Mirsarai in order to link up with the Barairarhat-Ramgarh road. India should participate in financing this project.
4. A tunnel should be built at some suitable point of the Karnaphuli river to open up the opportunity to build exclusive jetty facilities for transit cargo on the southern bank of the river. The tunnel should be linked up with the proposed road along the coastal embankment between Chittagong and Barairarhat point. In future, the tunnel can be linked with the coastal road project from Chit-

tagong to Cox's Bazar and Sonadia through Anwara, Banskhali and Chakaria, for which finance is already allocated. (Arrangements are progressing fast for building such a tunnel.)

5. The construction of the Dohazari-Ramu-Cox's Bazar-Gundhum railway line should be expedited.
6. The construction of the deep sea port at Sonadia should not be shelved because of Indian pressure. Bangladesh and the South Asia sub-region will badly need such a facility for expediting their economic development in the future. If India has objections regarding Chinese financing, then alternative financing can be arranged from other countries at suitable terms and conditions. The proposed third sea port of Paira in Patuakhali will be a good addition to the country's port facilities, but its prospect for becoming a suitable deep sea port of the country is not bright, as learnt from experts. Now that a government agency is created in Bangladesh for the Sonadia project, the works of the first phase should not be unnecessarily delayed in the name of the grandiose project of the future needing a fantastic amount of investment (Tk. 600 billion, according to the figures quoted by the newspapers from the preliminary feasibility report already completed by a Japanese firm!)
7. The Laksham-Narayanganj-Dhaka chord railway line project should be undertaken as a priority project to reduce the Dhaka-Chittagong distance through railway by about 63 miles. It should be a double-track, dual-gauge railway line. The proposed railway line for electric trains between Dhaka and Chittagong should be built in this project.
8. Containerised and sealed cargo should be preferred for transit traffic wherever feasible in order to avoid customs formalities as well as security risks. Modern scanning facilities should be arranged to ascertain the true nature of the cargo.
9. The transit fee structure should be determined on the basis of the principle of equitable sharing of cost-saving (or sharing of benefit principle) by the countries enjoying the transit facilities. For example, if transit through Bangladesh leads to a transport cost-saving for India of \$100, then Bangladesh should get a fair share of that \$100 in addition to the specific fees for specific services rendered and for specific costs incurred for giving transit facilities to India. That means, provision of transit facilities should be made an attractive and equitable proposition for all the countries involved.



**Notes**

1. The British economist John Williamson coined the term ‘Washington Consensus’ in 1989 to describe the famous understanding among these three organizations in 1979 to jointly pursue the implementation of the neo-liberal agenda of the ‘open market economy’.
2. The road blocks erected in the India-Nepal borders in 2015 have reminded everyone of the role of India as a regional hegemony. Nepal faced a serious economic disruption, and had to bow down to Indian pressures to accommodate the demands of the Madeshi people of Indian origin regarding the Nepalese constitution.
3. This may be a convenient escape route to be used by those political parties if and when they come to power in Bangladesh. Their anti-Indian postures are significantly mellowed down in reality when they run the government!

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## **Farm size and productivity in rice farming: recent empirical evidence from Bangladesh**

**M. Saidur Rahman\***

**M. A. Sattar Mandal\***

**Kei Kajisa\***

**Humnath Bhandari\***

**Abstract:** *Productivity in rice farming has been increasing since adoption of modern inputs and techniques in the production systems. However, farm size still remains as a concern for estimating productivity in developing countries. In this study, primary data were collected from 958 households situated at 96 villages of 48 upazilas under 31 districts of Bangladesh in boro season, 2013. Upazilas, unions, villages and households were randomly selected from five rice growing regions where shallow tubewell (STW) irrigation is prevalent. The study has covered landless farmers (18.68 percent), marginal farmers (36.53 percent), small farmers (37.27 percent), medium farmers (7.20 percent) and large farmers (0.32 percent). In terms of farm productivity, medium farmers have the highest yield of 6818 kg/ha followed by the small farmers with 6359 kg/ha, marginal with 6258 kg/ha, landless farmers with 6127 kg/ha, and large farmers with 5495 kg/ha. Net return from rice farming is minimal and medium farmers have the highest net earnings of Tk 27033 /ha where as small, marginal, landless and large farmers' net earnings are Tk 20716/ha, 15601, Tk 1278/ha and Tk -1094/ha, respectively. Farm-specific technical efficiency was calculated using translog stochastic frontier production function and estimated by the maximum likelihood estimation model. It has found that medium and small farmers have the higher level of efficiency and marginal farmers are the least among the farm types. This is due to marginal farmers are resource poor and they have cash capital constraints as well. According to the perception of majority farmers, cheaper price of rice during harvesting season is one of the main reasons of fewer net returns in rice farming. In addition, government policy in paddy procurement and increasing trend of*

\* Professor & Head, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh, Professor, Department of Agricultural Economics & former Vice-Chancellor, Bangladesh Agricultural University, Mymensingh, Professor, School of International Politics, Economics and Communication, Aoyama Gakuin University, Japan and Agricultural Economist, International Rice Research Institute (Bangladesh Office), Dhaka

*farm input prices are also reasons for fewer margin. It is suggested that early declaration of procurement price of rice and lower farm input prices policy can be good incentive for farmers to involve in rice farming in the long run.*

**Key words:** Rice farming, productivity, farm size, technical inefficiency, Bangladesh

## 1. Introduction

The supply of rice, a staple food for half of the world's population and the primary source of income and employment of one-fifth of the global population, is therefore strongly determined by small farmers' incentives for rice production. More than 200 million small farmers with an average of less than 1 hectare of land produce 90% of the total rice in the world (Tonini and Cabrera, 2011). Small farm households are believed to face a lower opportunity cost of labour than large farm households (Carter and Wiebe, 1990; Hunt, 1979; Sen, 1966). In Bangladesh, rice is the staple food of 149.8 million people and supplies 76% of the total calorie intake and more than 65% of the protein intake of the people (Dey, et. al., 1996). The agricultural sector is also characterized by the traditional subsistence small-scale farming. This country has shortage of all factors of production except labour, obviously cannot afford to make an inefficient use of resources. It is therefore important to estimate the level of technical efficiency at the farm-level, and to identify the sources of such efficiency and inefficiency. Such information is important for formulating appropriate policies for reducing the level of technical inefficiency. Measurement of technical efficiency could also help decide whether to improve efficiency first or develop a new technology in the short run. Technical efficiency is used as a measure of a farm's ability to produce maximum output from a given set of inputs under certain production technology.

Farm efficiency is examined by comparing the economic efficiencies of various types of farm holders (landless, marginal, small, medium and large). The majority of studies of agricultural productivity in developing countries support the view that there is an inverse relationship between productivity and farm size (Berry, et. al., 1979; Barrett, 1996). The relationship between farm size and efficiency is found to be non-linear, with efficiency first falling and then rising with size (Helfan, et. al., 2004). High technical efficiency will not only enable farmers to increase the employment of productive resources, but it will also give a direction of adjustments required in the long run to increase food production. This present paper examines technical efficiency with emphasis on farm size in Bangladesh in order to suggest the ways to increase the levels of rice production in Bangladesh. Previous studies in Asia have tested for relative efficiency differences by farm size, with conflicting results. Lau and Yotopoulos (1971) and Yotopoulos and Lau (1973) found that small wheat farms in the Indian Punjab were more technically efficient than large farms. In Pakistan, Khan and Maki (1979) found that large farms are

more technically efficient than small farms. In Cote d'Ivoire, et. al. (1996) found no differences in the technical efficiency of small and large farms. Onyenweaku (1997) examined the technical efficiencies of two groups of farms in Kaduna state, Nigeria. The results showed higher level of technical efficiency for large scale farms. The above results on relative technical efficiency suggest the need to avoid generalizations in this regard as what obtains in one country may not follow in another country due to differences in agricultural and institutional settings. The definition of farm size has been variable in the efficiency literature, as what is considered "large" or "small" is relative depending on the agricultural system settings. In Pakistan agriculture, Khan and Maki (1979) classified large farms as those having 12.5 acres or over 5 hectares. Using Indian data, Yotopoulos and Lau (1973), and Sidhu (1974) classified "large" farms as those with at least 10 acres (i.e., 4 ha). In Nigeria, Olayide et al. (1980) described small farms as those farm holdings less than 10 hectares. In a similar study in Cote d'Ivoire, Adesina and Djato (1996) defined large farms as farms of at least 4 hectares. Ohajianya and Onyenweaku (2002, in a similar study, defined large farms as farms of at least 4 hectares. In this study, large scale farmer has been defined as farmers that have more than 3.04 ha (i. e., 7.50 acres) of land. This study investigates the productivity, technical efficiency and their determinants among different rice farmers based on farm size in Bangladesh. Necessary policies are suggested based on the findings of this study.

### **Methodology**

A multi-staged sampling technique was employed to select a representative sample in this study. Five divisions were selected since they are the major rice growing divisions in Bangladesh. Forty eight upazilas were selected proportionately from the total rice areas of those five divisions. Unions and villages were selected randomly from the list of unions and villages then irrigated rice growing households were selected randomly. Based on the category of farm size, there were five categories of farmers identified. They were landless (<0.20 ha), marginal (0.20 – 0.40 ha), small (0.40 – 1.01 ha), medium (1.01 - 3.03 ha) and large (>3.04 ha) and their sample size were 17, 350, 357, 69 and 3 respectively. Data were collected using structured and validated questionnaire administered on the farm families using Surveybe CAPI software during the 2013 boro rice season by trained enumerators under the supervision of the researcher. Data were collected on the socioeconomic characteristics of the farmers, production activities in terms of inputs, outputs and their prices.

The methods to estimate farm household technical efficiency include parametric and nonparametric methods i.e., stochastic frontier analysis (SFA) introduced by Farrell, 1957 and data envelopment analysis (DEA) introduced by Charnes et. al., 1978. There are debates on which one is more appropriate approach for the technical efficiency estimation. DEA, the non-parametric approach, does not impose the

restrictions on the production function and distribution assumption of error terms and is suitable to deal with the multiple outputs (Chavas et. al., 2005). However, the measurement errors can influence on the shape and positioning of the estimated frontier largely (Coelli and Battese, 1996). Instead, in SFA, the two error terms, i.e. technical inefficiency and random error term are specified explicitly (Coelli and Battese, 1996; Battese and Coelli, 1995). In this study, focus will be on only one single specific crop and SFA would be applied which is suitable for this research.

To apply SFA approach, it actually includes two regressions. The first one is to estimate the technical efficiency coefficient based on the input-output data at farm level by using production function, and the second one is to evaluate the effects of determinants for inefficiency in different payment systems. It is proposed that one-stage regression is more appropriate than the two separate stage regression because the assumption of technical inefficiency coefficient is not hypothesized to be independent and affected by the covariates in the efficiency model (Battese and Coelli, 1995). One-stage approach is thus applied in the study i.e., a stochastic production frontier based on the factors of production was estimated simultaneously with the determinants of inefficiency using maximum likelihood estimate following the methodology of (Battese and Coelli, 1995).

Technical efficiency and the determinants of technical inefficiency are calculated by first estimating a score for technical efficiency and then that score is used to determine influencing factors. The output or yield of the stochastic production frontier is considered to be a function of input variables (Aigner et. al., 1977). Following Coelli et. al., 1998, a stochastic production function is specified as:

$$Y_i = f(X_i) \exp(\epsilon_i) \dots \dots \dots (1)$$

Where  $Y_i$  is the yield for farmer  $i$ ,  $X_i$  are the input variables used by the farmer  $i$ ,  $\epsilon_i$  is the error term, and  $f$  is the functional form to be specified. The error term is assumed to be composed of two separate errors, such that:

$$\epsilon_i = v_i - u_i \dots \dots \dots (2)$$

Where  $v_i$  is the stochastic error term with a two-sided noise component and  $u_i$  is the one-sided error component. Within the error term,  $v_i$  accounts for random noise that is outside of the farmers' control as well as measurement errors. The second component,  $u_i$ , captures the absolute distance between farmers' yield and production possibility frontier. The first component,  $v_i$  is assumed to be normally distributed  $v \sim N(0, \sigma^2 v)$  with a mean of zero and variance of  $\sigma^2 v$ . The second component,  $u_i$  is representing technical inefficiency (TI). If  $u=0$ , production lies on the stochastic frontier and production is technically efficient; if  $u>0$ , production lies below the frontier and is inefficient. Lastly, the two components of the error term are assumed to be independent of each other.

Farmers' individual technical efficiency scores are estimated to show the differ-

ence in the actual production to the potential production for each farm (Greene, 1980). The measurement of the technical efficiency is constructed using the observed deviation of output from individual farmers and the production frontier, the most efficient point obtainable by the farmers. Farmers with observed technical efficiency that lies on the production frontier are considered to be perfectly efficient. Conversely, any farmers with technical efficiency scores that are lying below the production frontier are considered to be technically inefficient. The index of technical efficiency is specified as:

$$\frac{Y_i}{f(X_i)e^{v_i}} = \exp(-\mu_i) \dots \dots \dots (3)$$

Model specification

Both descriptive and inferential statistics have been used to analyze the pattern of inputs of production and the socioeconomic characteristics of the farm households. The Cobb-Douglas and Translog functional form have been used for this study. The empirical model of the Cobb-Douglas functional form (Gujarati, 1995) is as follows:

$$\ln Y_i = \beta_0 + \sum_{j=1}^n \beta_j \ln X_{ij} + v_i - \mu_i \dots \dots \dots (4)$$

Where:

- ln = natural logarithmic form
- $Y_i$  = rice production (yield) in tons ha<sup>-1</sup>
- k = number of input variables
- $\beta_0$  = intercept or constant term
- $\beta_j$  = unknown parameters to be estimated
- $X_{ij}$  = vector of production inputs (j) of the farmer  $i$
- $v_i$  = random error term
- $\mu_i$  = inefficiency component

**Translog production function:**

$$\ln Y_i = \beta_0 + \sum_{i=1}^k \beta_i \ln X_i + \frac{1}{2} \sum_{i=1}^k \sum_{j=1}^k \beta_{ij} \ln X_i \ln X_j + v_i - \mu_i \dots \dots \dots (5)$$

It can be written in the following form like as,

$$\ln Y_i = \beta_0 + \beta_1 \ln X_{1i} + \beta_2 \ln X_{2i} + 0.5 \beta_{11} (\ln X_{1i})^2 + 0.5 \beta_{22} (\ln X_{2i})^2 + \beta_{12} \ln X_{1i} \ln X_{2i} + \dots \dots \dots + v_i - \mu_i \dots \dots \dots (6)$$

While the technical inefficiency model is given as:

$$\mu_i = \delta_0 + \sum_{i=1}^k \delta_{ij} Z_{ij} \dots \dots \dots (7)$$



Where,

- $\mu_i$  = technical inefficiency
- $\delta_0$  = intercept or constant term
- $\delta_j$  = parameters to be estimated
- $Z_j$  = determinants of inefficiency

To determine the appropriate functional form for the model specification, a likelihood ratio test (LR test) is conducted. This test compares the translog function and the Cobb-Douglas. The null hypothesis is  $H_0$ : Cobb-Douglas functional form and  $H_1$ : Translog functional form. We run both the model and LR test as well. The test rejects the null hypothesis,  $H_0$ . This LR test proves that the translog functional form for estimating inefficiency with the current data set is the appropriate form of model.

Table 1. Model selection test results

Hypothesis and decision	Criteria	LR value and probability
$H_0$ : Cobb-Douglas	Likelihood-ratio test	LR $\chi^2(58) = 92.95$
$H_1$ : Translog	(Assumption: Cobb-Douglas nested in Translog)	Prob $> \chi^2 = 0.0024$
Decision: Null hypothesis is rejected with $\leq 1$ percent level of significance	Translog is the appropriate form for this data set.	

Given a flexible and interactive production frontier for which the translog production frontier is specified, the farmer specific technical efficiency (TE) of the  $i$ -th farmer is estimated by using the expectation of  $u_i$  conditional on the random variable  $e_i$  as shown by Battese (1992). That is,

$$TE = \exp(-u_i) = e^{-u_i} \dots \dots \dots (8)$$

So that,  $0 \leq TE \leq 1$ . Farm specific technical inefficiency index (TI) is computed by using the following expression:

$$TI = [1 - \exp(-u_i)] \dots \dots \dots (9)$$

In the production function, zero values were also observed in cases where farmers did not apply other fertilizer. As proposed by Battese, 1997, the following methodology was applied to account for the zero values.

$$\ln Y_j = \beta_0 + (\alpha_0 - \beta_0)D_{2j} + \beta_1 \ln X_{1j} + \beta_2 \ln X_{2j}^* + V_j; i = 1, 2, \dots, n \dots \dots \dots (10)$$

Where,

$$D_{2j} = 1 \text{ if } X_{2j} = 0 \text{ and } D_{2j} = 0 \text{ if } X_{2j} > 0; \text{ and } X_{2j}^* = \text{Max}(X_{2j}, D_{2j})$$

The model in equation 3 implies that  $X_{2j}^* = X_{2j}$  is true for  $X_{2j} > 0$  but if  $X_{2j} = 0$  then

$$X_{2j}^* = 1.$$

Empirical models specification: Translog

$$\ln Y_i = \beta_0 + \beta_1 \ln X_{1i} + \beta_2 \ln X_{2i} + 0.5 \beta_{11} (\ln X_{1i})^2 + 0.5 \beta_{22} (\ln X_{2i})^2 + \beta_{12} \ln X_{1i} \ln X_{2i} + \dots + v_i - \mu_i \dots (11)$$

Table 2. List of variables and interaction factors are as follows:

Input variables	Interaction factor variables
1. Seed	12. 0.5*Seed <sup>2</sup> , 13. Seed*Human labour, 14. Seed*Tillage, 15. Seed*Irrigation, 16. Seed*Chemical fertilizer, 17. Seed* Insecticide & herbicides, 18. Seed* Other fertilizer dummy, 19. Seed* Other cost dummy, 20. Seed* marginal farm dummy, 21. Seed* small farm dummy, 22. Seed* medium farm dummy
2. Human labour	23. 0.5*Human labour <sup>2</sup> , 24. Human labour*Tillage, 25. Human labour*Irrigation, 26. Human labour*Chemical fertilizer, 27. Human labour*Insecticide & herbicides, 28. Human labour*Other fertilizer dummy, 29. Human labour*Other cost dummy, 30. Human labour*marginal farm dummy, 31. Human labour* small farm dummy, 32. Human labour*medium farm dummy
3. Tillage	33. 0.5*Tillage <sup>2</sup> , 34. Tillage*Irrigation, 35. Tillage*Chemical fertilizer, 36. Tillage*Insecticide & herbicides, 37. Tillage*Other fertilizer dummy, 38. Tillage*Other cost dummy, 39. Tillage*marginal farm dummy, 40. Tillage*small farm dummy, 41. Tillage* medium farm dummy
4. Irrigation	42. 0.5*Irrigation <sup>2</sup> , 43. Irrigation* Chemical fertilizer, 44. Irrigation* Insecticide & herbicides, 45. Irrigation*Other fertilizer dummy 46. Irrigation*Other cost dummy, 47. Irrigation*marginal farm dummy, 48. Irrigation*small farm dummy, 49. Irrigation*medium farm dummy
5. Chemical fertilizer	50. 0.5*Chemical fertilizer <sup>2</sup> , 56. Chemical fertilizer*Insecticide & herbicides, 51. Chemical fertilizer*Other fertilizer dummy, 52. Chemical fertilizer*Other cost dummy, 53. Chemical fertilizer*marginal farm dummy, 54. Chemical fertilizer*small farm dummy, 55. Chemical fertilizer*medium farm dummy,
6. Insecticide & herbicides	56. 0.5*Insecticide & herbicides <sup>2</sup> , 57. Insecticide & herbicides* Other fertilizer dummy, 58. Insecticide & herbicides*Other cost dummy, 59. Insecticide & herbicides*marginal farm dummy, 60. Insecticide & herbicides*small farm dummy, 61. Insecticide & herbicides*medium farm dummy
7. Other fertilizer dummy	62. Other fertilizer dummy*Other cost dummy, 63. Other fertilizer dummy*marginal farm dummy, 64. Other fertilizer dummy*small farm dummy, 65. Other fertilizer dummy*medium farm dummy
8. Other cost dummy	66. Other cost dummy*marginal farm dummy, 67. Other cost dummy* small farm dummy, 68. Other cost dummy*medium farm dummy
9. Marginal farm dummy	-
10. Small farm charge dummy	-
11. Medium farm dummy	-

## Results and discussion:

Some descriptive statistics which ensure the selected farm specific socioeconomic variables used to see the variations among the farm size groups.

Table 3. Distribution of households by farm size

Category of farm holdings	Frequency	Percent
Landless	179	18.68
Marginal	350	36.53
Small	357	37.27
Medium	69	7.20
Large	3	0.32
All	958	100.00

Source: IRRI-BAU field survey, 2013

The table reveals the category of farmers' according to their farm holdings. Most of the farmers are small and marginal farmer. The small and medium farmers are 37.27% and 36.53%, respectively. The study shows that only 3 farmers are large farmer, which is about 0.32 percent of the total farmers.

Table 4. Well category and frequencies of the irrigation service provider

Sl. No.	Types of well	Frequencies	Percent
1	Shallow Tube well (STW)	255	95.15
2	Deep Tube well (DTW)	13	4.85

Source: IRRI-BAU field survey, 2013

The study shows the extensive use of STW in the study area along with few DTW, because majority of the farmers (95 percent) have STW and remaining 5 percent have DTW.

Table 5. Well Ownership and frequencies by the well types

Types of Well	Pattern of Ownership	Frequencies	Percent
STW	Single ownership	237	92.94
	Joint ownership	18	7.06
	Total	255	100
DTW	Single ownership	6	46.15
	Joint ownership	7	53.85
	Total	13	100

Source: IRRI-BAU field survey, 2013

Two types of well ownership were found in the study area namely single ownership and joint ownership in both cases of STW and DTW. Single ownership is preferable in case of STW. About 92.94 percent farmers' have single ownership on

STW, whereas only 7.06 percent farmers have joint ownership. The phenomena indicate that in case of STW, majority of the farmers have their own STW for irrigation. Joint ownership is preferable in case of DTW since it is capital intensive irrigation technology. Single ownership also has the similar trend. About 54 percent farmers have joint ownership and about 46 percent farmers' have single ownership.

Table 6. Ownership patterns on the basis of farm category

Farm category	Single ownership (Frequency)	Percent	Joint ownership (Frequency)	Percent
Landless	8	3.29	2	8
Marginal	44	18.12	5	20
Small	138	56.79	13	52
Medium	49	20.16	5	20
Large	4	1.64	-	-
Total	243	100	25	100

Source: IRRI-BAU field survey, 2013

The study shows that the ownership of well (i.e., both single and joint) is highly concentrated among the small farmers. More than one-half of the small farmers captured the ownership market. Similar to the small farmers the medium farmers are in the second best position. The contribution of large farmers is insignificant and they have no contribution in joint ownership. The landless farmers are contributing more in joint ownership than single ownership. They are trying their level best which is ensured by their contribution in joint ownership. Due to the lack of capital they can hardly cope with the ownership market in irrigation technology. On the other hand, marginal farmers are in significant range in the both cases. The table also shows that both small and medium farmers are in highly significant range in this regards and their ownership is as like as duopoly.

Table 7. Patterns of joint ownership by farm category

Farm category	Frequency (If No. of Owner =2)	Frequency (If No. of Owner =3)	Frequency (If No. of Owner =4)	Frequency (If No. of Owner =5)	Frequency (If No. of Owner >5)
Landless	2	-	-	-	-
Marginal	3	1	-	-	1
Small	6	1	1	2	3
Medium	1	-	2	2	-
Total	12	2	3	4	4

Source: IRRI-BAU field survey, 2013

As the farm size increases ownership also increases when the number of owner is two except medium farmers. The small farmers' incentive to invest is higher when the number of owner is two or more than five. In other cases they only invest to keep themselves into the ownership market of irrigation. When the number of owner is four and five then the medium farmers' dominance is highly significant than others. In this situation marginal farmers have incentive to invest. The table shows that the joint ownership market is captured by the marginal and small farmers.

Table 8. Major inputs used by farm category (kg/ha)

Farm category	Seed	Urea	TSP	MP	DAP	OF	Insect & herbicide
Landless	30.87	251.24	77.44	83.89	67.73	657.81	5.52
Marginal	32.21	249.55	80.65	83.75	69.24	185.08	5.42
Small	36.09	255.02	77.84	85.60	68.50	279.60	4.81
Medium	33.57	231.80	91.27	98.44	69.85	260.85	3.95
Large	46.53	260.72	124.12	124.12	24.95	37.42	1.13
All	33.55	250.66	79.91	85.65	68.59	313.63	5.09

Source: IRRI-BAU field survey, 2013

There is a positive correlation between farm category and seed requirements, except medium farmers. The small farmers are the second highest user of seed. The fertilizer application varied due to lack of capital and proper knowledge about the fertilizer dose. The study finds the extensive use of Urea by the large and small farmers. The large farmers use the highest amount of Urea, TSP and MP because they have more financial solvency and easy access to fertilizer dealers. Landless farmers are in disadvantageous position in using fertilizer. Their financial inability is the main reason in this regard but they extensively use other fertilizers of which prices are lower. Di Ammonium Phosphate (DAP) is highly used by the medium farmers. As the farm size increases insecticides and herbicides application decreases which means the small farmers use more insecticide and herbicides to produce more crops in their field.

Table 9. Major input costs by farm category (Tk./ha)

Farm category	Seed cost	Urea cost	TSP cost	MP cost	DAP cost	Other fertilizer cost	Insect & herbicide	Other cost	Total input cost
Landless	2350.96	5366.12	2198.63	1477.38	1967.80	1527.33	1724.41	1122.64	17735.27
Marginal	2177.37	5074.56	2227.41	1410.76	2092.81	790.63	1567.32	1539.27	16880.13
Small	2014.03	5016.65	2069.49	1426.55	2046.58	715.94	1418.24	1589.74	16297.22
Medium	1991.83	4651.39	2399.09	1500.66	2040.19	812.79	1292.35	2471.67	17159.97
Large	2644.65	5244.38	3228.47	2198.05	698.59	1122.73	1243.26	1202.11	17582.24
All	2137.04	5077.51	2178.68	1438.03	2044.07	903.08	1520.30	1546.33	16845.04

Source: IRRI-BAU field survey, 2013

The seed cost and Urea cost decrease with the increase in the size of the farms except large farm size. Medium farmers incur more cost for TSP, MP and other fertilizers. As the farm size becoming larger the farmers use less insecticides and herbicides. Small farmers' miscellaneous costs are high compare to others except medium farmers. The study shows that the landless farmers incur more costs (i.e., Tk. 17,735.27/ha) and the small farmers incur less costs (i.e., Tk. 16297.22/ha) for their input use. The expenditure pattern reveals that small farmers are more rational in their expenditures on inputs as mentioned earlier small farmers are major share holder in all aspects. In order to maximize their output, the landless irrationally incur more cost for inputs.

Table 10. Operation-wise labour used by farm category (Man-day/ha)

Farm category	Land preparation	Transplanting	Cultivation	Harvesting	Irrigation	Tillage
Landless	19.32	28.17	36.57	41.23	47.26	1.26
Marginal	18.43	26.82	31.08	40.52	44.05	1.25
Small	15.22	25.61	24.76	37.98	42.13	1.18
Medium	10.41	25.91	26.11	42.50	41.66	0.85
Large	25.03	29.69	24.77	21.71	22.58	1.20
All	16.84	26.56	29.37	39.79	43.69	1.19

Source: IRRI-BAU field survey, 2013

On an average the number of labour requirements for small and medium farmers is low, but during the harvesting times, medium farmer use more labour than others. So the per hectare labour requirements ensure that the small and medium farmers are more rational. But landless farmers use more labours for different activities of farm but the small and medium are in convenient situation in this regards.

Table 11. Per hectare cost of production of boro rice by farm category

Farm category	Input cost (Tk/ha)	Labour cost (Tk/ha)	Service cost (Tk/ha)	Other cost (Tk/ha)	Total cost (Tk/ha)
Landless	16612.64	44530.33	25952.54	1122.64	79456.11
Marginal	15340.87	46570.60	27080.78	1539.27	80914.52
Small	14707.47	44523.32	24151.75	1589.74	74135.23
Medium	14688.29	45769.30	17482.14	2471.67	67252.65
Large	16380.11	48880.60	21560.45	1202.11	74700.24
All	15298.71	45375.98	25069.84	1546.33	77112.25

Source: IRRI-BAU field survey, 2013

Per hectare production cost of boro rice is higher in case of marginal and landless farmers and the medium farmers incur low cost for production practices. The small farmers' production costs are higher than the medium farmers' but lower than others. Service cost (including irrigation cost and tillage cost) is lower for medium and small farmers but higher for marginal and landless farmers. Large farmers use more labour and the labour requirement is low for small farmers. Compost, diesel, electricity, and animal feed costs, wages, and tilling costs increased nearly twofold in 2010 for small households compared with large farm households (Mottaleb et al., 2014). For the higher wage rate small farmers use less labour. Finally it is clear from the expenditure pattern on cost that the medium and small farmers make wise use of scarce resources to maximize their farm production. Their rational cost allocation has positive effect on their overall farm production.

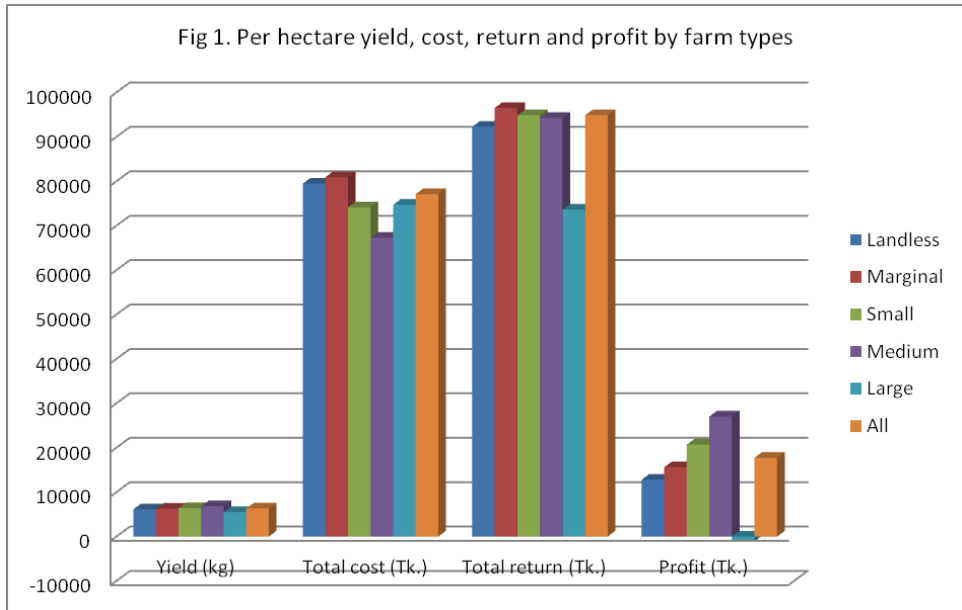
Table 12. Per hectare cost and return of boro rice by farm category

Farm category	Yield*** (kg)	Price (Tk./40 kg)	Total cost (Tk.)	Total return (Tk.)	Profit (Tk.)
Landless	6127	569	79456	92254	12798
Marginal	6258	574	80915	96515	15601
Small	6359	565	74135	94851	20716
Medium	6818	522	67253	94286	27033
Large	5495	533	74700	73606	-1094
All	6309	566	77112	94867	17754

Source: IRRI-BAU field survey, 2013

\*\*\*Significant at 1% level of significance

The study shows that medium and small farmers enjoy higher yield (i.e., 6818 kg and 6359 kg, respectively) and their profit is comparatively higher than other farm holders. On the other hand the large farmers have negative return in their farm practices. Small farmers tend to be more productive and profitable than large farmers (Barrett, 1996; Berry and Cline, 1979; Sen, 1975). In the similar fashion the study also reveals that medium and small farmers tend to be more productive and profitable than large farmers. The findings of this study indicate positive relationship between farm size and profitability except landless and large farmers.



The loss in profitability is generally larger for small farms than for large farms, as small farms use more labour and other inputs than large households to earn higher rice income and profit (Mottaleb et al. 2014). But the findings of this study represent the loss in profitability is generally for large farm and landless farm holders than medium and small farm holders. And finally their production costs are low compared to large and landless farm holders.

Table 14. Per hectare yield (kg/ha) in different tenure status

Sl. No.	Tenure status	HH Number	Yield (kg/ha)
1.	Own land	715	6360
2.	Rented in land (Crop share)	97	6136
3.	Rented in land (Fixed cash)	53	6286
4.	Mortgaged in land	85	6120

Source: IRRI-BAU field survey, 2013

It is clear from the above Table 11 that average yield of own land is higher than



other tenure status. Yield of rented in land under fixed cash is slightly higher than the yield of rented in land under share cropping. Statistically insignificant yield difference (t-test) of various land tenure status clearly indicated that the previous idea of higher yield under own cultivated land has lost importance. It may be due to the less family labour and higher labour wages of agricultural activities. Besides, new policy of providing bank loan with easy terms and conditions to the tenant farmers has great impact on higher yield.

The study shows that the medium and small farmers are in advantageous position, because they enjoy higher yields. On the contrary, large farmers are in disadvantageous position. Their returns from production are low compare to other farm holders. The number of large farmers in the study area is not satisfactory, which is only 0.32 percent, as mentioned earlier. The phenomena indicate that large farmers are not intensively involved in agriculture. It is found that agriculture is their secondary occupation and they have some other non-farm businesses. The large farm holders always searching for new innovative non-farm businesses and finally migrate themselves to the urban and peri-urban areas (Al-Hassan, 2012).

### Yield influencing factors

The following table shows the results of the stochastic frontier analysis. The model fits well with the variables here. The variables those have significant influences on yield are irrigation, seed-tillage, seed-irrigation, seed-insecticides and herbicides, labour-irrigation, irrigation-other fertilizer, irrigation-small farm dummy, chemical fertilizer-other fertilizer, other fertilizer-marginal farm dummy. Most of the coefficients of those variables or interactive factors are significant at 1 and 5 percent level of significance. Different cross product or interaction factors have robust influence on yield which means the interaction factors need to be taken care intensively to explain the yield variation of the farmers.

Table 15. List of significant variables in the translog model

	Number of observation =955 Wald chi-square =3.48e+11 Probability > chi-square = 0.0000 Log likelihood = -223.48184	
Input variables and integration variables	Coefficient.	Std. Err.
Irrigation	-0.48**	0.20
Seed-tillage	-0.09***	0.03
Seed-irrigation	0.03**	0.02
Seed-insecticides and herbicides	0.02*	0.01
Labour-irrigation	0.11***	0.03
Irrigation-other fertilizer	-0.05**	0.02
Irrigation-small farm dummy	0.05*	0.03
Chemical fertilizer-other fertilizer	0.11**	0.15
Other fertilizer-marginal farm dummy	0.11*	0.06

Constant term	13.29	1.58
/lnsig2v	-4.33	0.15
/lnsig2u	-1.89	0.07
sigma_v	0.15	0.01
sigma_u	0.39	0.01
sigma2	0.16	0.01
Lambda	3.39	0.02
Likelihood-ratio test of sigma_u=0: chibar2(01) = 2.2e+02Prob>=chibar2 = 0.000		

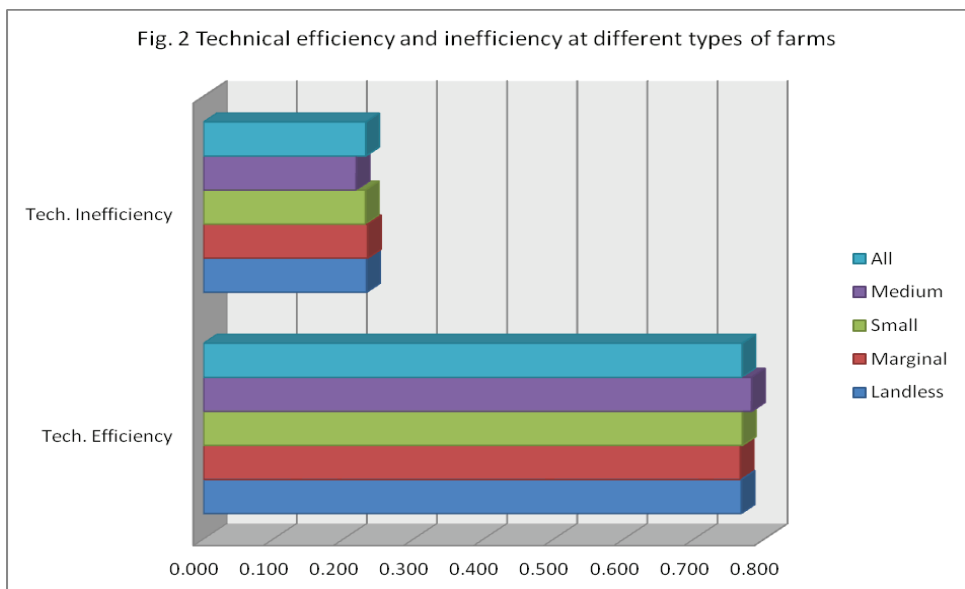
Note: \*\*\*, \*\* and \* indicate significant at 1%, 5% and 10% level of significance

Table 16: Efficiency level of the households by farm category

SL. No.	Category of Farm holdings	Technical Efficiency*	Technical Inefficiency*	Ranking by TE	Ranking by TI
1.	Landless	0.767	0.233	III	II
2.	Marginal	0.766	0.234	IV	I
3.	Small	0.769	0.231	II	III
4.	Medium	0.782	0.218	I	IV
5.	All	0.768	0.233	-	-

\*Significant at 10% level of significance

Differences in technical efficiency in the study area imply that some farmers are more successful compare to others in using technology efficiently. The table shows that medium farmers are technically efficient (i.e., 0.782), whereas small, landless and marginal farmers achieved 0.769, 0.767 and 0.766 levels of technical efficiency.



The study shows that there is a positive relationship between farm size and technical efficiency except for marginal farms. On the other hand, there exists inverse relationship between farm size and technical inefficiency again except marginal farm meaning that farm size is a key determining factor for productivity. Higher technical efficiency of the medium farmers will not only enable them to increase the employment of productive resources, but also give them a direction of adjustments required in the long run to increase food production. On the other side, the low levels of technical efficiency of the marginal farmers suggest that the presence of random shocks (production risks) is negatively affecting the use of the technologies available to them due to the resource and cash capital problems of marginal farmers.

### **Conclusions and policy implications**

In terms of farm productivity, medium farmers have the highest yield of 6818 kg/ha followed by the small farmers with 6359 kg/ha, marginal with 6258 kg/ha, landless farmers with 6127 kg/ha, and large farmers with 5495 kg/ha. Net return from rice farming is minimum and medium farmers have the highest net earnings of 27033 Tk./ha; whereas small, marginal, landless and large farmers' net earnings are 20716 Tk./ha, 15601, 1278 Tk./ha and -1094 Tk./ha, respectively. Farm-specific technical efficiency was calculated using translog stochastic frontier production function and estimated by the maximum likelihood estimation method. It is found that medium and small farmers have the higher level of efficiency and marginal farmers are the least among the farm types. It is seen that medium farmers have more options in choosing technologies and cash capital availability than any other categories of farm. On the other hand, marginal farmers are resource poor and they have cash capital constraints as well and due to that their technical inefficiency is higher. Medium farm owners deserve more attention from the government side and they should get priority to receive new technologies in agricultural production particularly rice production. Cheaper price of rice during harvesting season is one of the main reasons of fewer net returns in rice farming as perceived by most of the farmers. In addition, the farmers perceptions from focus group discussion (FGD) at village level is that the government policy in paddy procurement and increasing trend of farm input prices are also reasons for fewer margin. It is suggested that early declaration of procurement price of rice and lower farm input prices policy can be good incentive for farmers to be in rice farming in the long run.

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## **Human Development Disparity and North- West Region in Bangladesh**

**Dr. Md. Morshed Hossain\***

**Abstract:** *Human development is a well-being concept within a field of international development. It refers to human condition with its core being the capability approach. It involves not only expanding capabilities to live healthy, productive and safe lives. It also ensures the choices to future generations. Traditionally development efforts of Bangladesh government aimed at achieving equitable economic growth. The present study examines, among others, relationship between economic growth, development disparity, income inequality and poverty in Bangladesh and suggests to achieve sustainable development. Disparity between North- West zone and other parts of Bangladesh has increased over-time as a result of uneven human development and access to opportunities that inhibits growth. Among all the divisions the poverty rate is highest (46.2 percent) in Rangpur division. Using the upper poverty line, at the national level recorded the Poverty Gap (PG) at 6.5 percent in 2010. The same was highest for Rangpur division at 11.0 percent in 2010. The Squared Poverty Gap (SPG) measures the severity of poverty. Using the upper poverty line, at the national level has recorded the lowest SPG which was 1.3 percent in 2010. The same was highest for Rangpur division 3.5 percent. The division wise distribution of households receiving benefits from Social Safety Net Programs shows that the highest percentage of households receiving benefits from SSPNs are located in Khulna Division (37.30%) , followed by Barisal division (34.43%) and Rangpur division (33.65%). Policy initiative to address regional disparity a separate fund in the framework of the annual development program for supporting the development of the Rangpur division is suggested.*

### **1. Introduction**

Human development is a well-being concept within a field of international development. It involves studies of the human condition with its core being the capability approach. The inequality adjusted Human Development Index is used as a way

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\* Professor, Department of Economics, Begum Rokeya University, Rangpur



of measuring actual progress in human development by the United Nations. It is an alternative approach to a single focus on economic growth, and focused more on social justice, as a way of understanding progress.

United Nations Development Programme has been defining human development as "the process of enlarging people's choices", said choices being allowing them to "lead a long and healthy life, to be educated, to enjoy a decent standard of living", as well as "political freedom, other guaranteed human rights and various ingredients of self-respect." [https://en.wikipedia.org/wiki/Human\\_development](https://en.wikipedia.org/wiki/Human_development) %28humanity%29- cite note- Programme1997-1

Human development is about equal life chances for all. It involves not only expanding capabilities to broaden people's present choices—to live healthy, productive and safe lives—but also ensuring that these choices do not compromise or restrict those available to future generations. The focus on people has implications for measuring progress and formulating policies. It calls for a broader frame of analysis and a re-examination of the policy tools available. Measurement and policy are inextricably linked since "what we measure affects what we do; and if our measurements are flawed, decisions may be distorted". Since 1990 the Human Development Index (HDI) has been an important measure of progress—a composite index of life expectancy, years of schooling and income. Human Development Report 2014 presents HDI values for 187 countries. The global HDI is now 0.702, and most developing countries are continuing to advance, though the pace of progress remains highly uneven. One of the main drags on development is deep and chronic inequality, which restricts choices and erodes the social fabric. Large disparities in income, wealth, education, health and other dimensions of human development persist across the world, heightening the vulnerability of marginalized groups and undermining their ability to recover from shocks. People clustered at the bottom of the socioeconomic distribution are not there randomly. They lack a sufficient range of capabilities to enable them to live a fulfilling life, and they typically are the most vulnerable to health risks, environmental calamities and economic shocks.

Bangladesh with the population of 150 million and the land area of 148 thousand square km, extending 820 km north to south and 600 km east to west. It is bordered mostly by India, and the southern part of Bangladesh faces the Bay of Bengal. In 2010, the country is divided into 7 administrative divisions, and these divisions are further divided into 64 districts. In terms of socioeconomic conditions and physical and human geography, there are large differences between regions. In order to formulate better policies to promote sustainable and equitable development, it is imperative to examine inequality and poverty in a spatial context. North-West Bangladesh is the northernmost area of the country, known as greater Rangpur-Dinajpur in Rangpur Division. Its current working area covers 37 Upazilas (sub-districts) of 8 districts namely Dinajpur, Thakurgaon, Panchagarh, Nilphamari, Kurigram,

Gaibandha, Lalmonirhat and Rangpur in the greater Rangpur-Dinajpur region in the northwest part of Bangladesh. Presently this includes 307 Unions – the lowest tier of local government and extends into the riverine belt to include the islands and sandbars in the River Brahmaputra. The area is generally very low-lying, and crisscrossed by river systems. The total area is 5,498 sq. with a population of 6.2 million. The northwest Bangladesh is historically more neglected and poor. The soil tends to be sandy and water tables deeper than in other regions. Rangpur division is vulnerable to frequent natural disasters. People face catastrophe like cyclones during summer, floods and river-bank erosion in the rainy season, drought in summer, spring and cold wave in winter. Lacking any significant industrial development agriculture is the mainstay of the economy and main source of employment. The spread of irrigation has reduced the extent of the lean season but remains problematic.

Inequality in the distribution of income has increased. Rising economic inequality (which may be manifested in different ways, e.g., through inequality in the distribution of income, wealth, assets, etc.) is a major challenge that the world faces today. Both developed and developing countries are facing this challenge although the nature and magnitude of the problem varies from country to country.

Traditionally development efforts of Bangladesh government have aimed at achieving “equitable economic growth.” The concept is an overriding factor in formulating national policy strategies of poverty alleviation. In this context, the objectives of poverty alleviation are mostly designed with social development factors, particularly improvement in health and education indicators. One of the most important policy documents of Bangladesh 6th Five Year Plan (2011-2015), in 7th chapter “*Managing Regional Disparities for Shared Growth and Sustained Poverty Reduction*” ‘state that, the Government is very much concerned about regional disparities and is committed to take all necessary steps to reduce disparities and the Sixth Five Year Plan provides a strong platform to develop a strategy for lowering regional disparities over the longer term and to provide a policy framework for initiating proper actions. Here also state that as a reflection of its concern and strong commitment, the Government has decided to put special focus on this subject in the Sixth Plan.

Though there has been a declining poverty trend in the recent past, a major emerging concern has been the growing regional disparity, between North -West and other parts of Bangladesh. Poverty level in North- West zone tended to be significantly higher compared to others zone in Bangladesh.

Therefore, the present study has analyzed development disparity for north- west zone in Bangladesh and focused various issues. Analyze the nature, extent and trends in growth, poverty and income inequality in Bangladesh. Document and examine relationship between economic growth, development disparity, income

inequality and poverty in Bangladesh provide some policy suggestions to foster growth, reduces development disparity and income inequality and poverty in Bangladesh.

This paper is divided into six sections, Section 1 introduction, Section 2 discussed literature review. Section 3 describes objectives of the study, section 4 discussed methodology. Aspects of poverty are discussed in section 5. Section 6 discussed about conclusion and policy recommendation.

## **2. Literature Review**

There are few studies which have focused the issue of human development disparity from both macro and micro perspective has done a comprehensive work on regional inequality.

A recently published report by Bangladesh Institute of Development Studies (BIDS), (Sen, Ahmed, Ali, & Yunus, 2014) looked into the factors behind the recent decline of the regional inequality know as East-West divide. This paper tried to capture the persistent regional disparity and the trend of it, and if there is a decline, how quantitatively and econometrically can those be measured. There are number of reasons came out in the paper for the decline of the inequality gap between the east and west region of Bangladesh.

The Background Study Paper for Preparation of the Seventh Five-Year Plan (Khondker & Mahzab, 2015 ) on Lagging Districts Development Bangladesh, the culture and history that it exhibits, gives a picture of a homogenous nation in many aspects. However, when we look deep into the development of the country, historically it can be seen that there is a disparity within the country when it comes to socio-economic prosperity. Regional disparity within Bangladesh has now been a well established fact in the economic discourse. Specially the term “East-West divide”, which has been coined in the early years of this century, points out the gap of progress between the eastern districts to that of western districts of Bangladesh. The river Jamuna is thought to divide the country’s two distinctive districts, where the ‘East’ is thought to be the more progressive region, which includes the Dhaka, Chittagong and Sylhet divisions. On the other hand, the less progressive “West” constitutes the Rajshahi, Rangpur, Khulna and Barisal divisions.

The background paper (Khondker & Wadud 2010) on urbanization management and emerging regional disparity in Bangladesh for the sixth five year plan also revealed a number of important aspects of regional heterogeneity of development. The paper mainly looked regional disparity by digging deep into the development pattern of the seven major divisions in a number of economic and non-economic indicators.

Zohir (2011) states that the issue of regional differences was overshadowed by geographical targeting of the poor and more recent focus on Monga- affected

people in the north- west. Thus, pockets of high ecological vulnerability (including river erosion) and higher incidence of poverty were identified- largely following exercises based on Household Income Expenditure Survey (HIES) data; and fine-tuned further with 'small area' poverty mapping under the initiative of the World Food Programme (WFP). Much later, commitments for munga eradication were voiced, more concertedly, by the Palli Karma Shahayak Foundation (PKSF). On both counts, prevalence of poverty in the northwest of Bangladesh has long been recognized. Prevalence of extreme poverty in the northwest Bangladesh has long been recognized. Prevalence of extreme poverty in the northwest was also accounted for in the WFP poverty and vulnerability maps which proved a basis for resource allocations.

CPD (2008) conclude that there are centre- periphery aspect of regional disparity (disparity between Dhaka, the centre and other districts, the peripheries) rather than the east- west divide. This required an emphasis on development of areas where poor people are concentrated rather than looking at the relevant issues at divisional level. This was also particularly because divisions are not homogeneous and there is heterogeneity in terms of poverty and level of development even within each of the districts.

Afser Rita (2010) states that weak governance as a result of clientelist practice is often considered as the single- most important factor behind the growing inequality and persistent poverty in Bangladesh. Using rights- based approach (RBA), this article examines regional disparity, central- local relations and the scope for peoples' participation under the existing rules and practices. It also sheds light on the cultural aspects of governance constituted of trust, social solidarity and institutional connectivity using an empirical data set generated from a census of six villages in Bangladesh backed by a triangulation of the qualitative and quantitative research tools.

Sen and Ali (2005) tracks spatial inequality in social progress in Bangladesh as evidence from the district- level data. It uses a multivariate framework to explore the differential pace of social progress at the spatial level. The paper concludes that the extent of spatial inequality in social development has decreased over the second half of the nineties although the overall level of inequality remains considerable. Policy implications are drawn for attacking spatial chronic poverty.

Mujeri (2010) argues that significance disparity exists in literacy rate between rural and urban areas, between females and males and among different administrative divisions of the country. Similarly, geographical disparity exists in access to and participation in primary education.

Chowdhury and Osmani (2010) show that comparison of per capita public spending on health expenditure across districts reveals a mixed picture of horizontal equity. The overall distribution happens to be biased against the poorer districts in

that the richer districts have traditionally enjoined a higher per capita spending than the poor ones.

Titumir and Rahman (2011) states that there is no denial that geography, culture and politics have been historically intertwined to result in differences across region. Therefore, a different result is also found in case of the incidence of poverty according to the division.

Gafaru Abdulai (2014) argues that prospects for overcoming spatial inequalities in the clientelist-driven political environments of developing countries depend substantially on the ways in which elites from lagging regions are incorporated into ruling coalitions, and how such forms of incorporation shape their influence over resource allocation decisions and policy agenda more broadly. The paper also departs from much of the existing literature on spatial inequality by emphasizing the need to understand 'powerlessness' on the part of lagging regions as stemming not necessarily from their political exclusion from political decision making structures, but also from their incorporation into such structures on terms that potentially underpin their poverty. Based on this argument, the paper proposes a new framework for exploring the deeper and more structural underpinnings of spatial inequality in developing countries.

Zaman, Narayan and Kotikula (2012) narrowing the economic gap between the growing and lagging regions of the country would require interventions to improve endowments and returns to the endowments in the lagging parts of the country. To raise returns to endowments, improving the investment climate for non-farm enterprises in lagging regions would be crucial. This would require improving infrastructure including roads and electricity, improving links to markets, and more broadly, improving the links between the isolated parts of the country (primarily in the west and south-west) to the urban growth centers that are mainly in the east.

In September 2000, the United Nations came up with the eight Millennium Development Goals. The eight millennium development goals are to: eradicate extreme poverty and hunger, achieve universal primary education, promote gender equality and empower women, reduce child mortality, improve maternal health, combat HIV/AIDS and other diseases, ensure environmental sustainability, develop a global partnership for development. The United Nations made a commitment to accomplish these goals by 2015 and thus make an attempt to promote human development. The Sustainable Development Goals (SDGs) are a new, universal set of goals, targets and indicators that UN member states will be expected to use to frame their agendas and political policies over the next 15 years. The SDGs follow, and expand on, the Millennium Development Goals (MDGs).

The Sustainable Development Goals (SDGs), also called Global Goals, and Agenda 2030 are an inter-governmentally agreed set of targets relating to international development. They will follow on from the Millennium Development Goals

once those expire at the end of 2015. The SDGs were first formally discussed at the United Nations Conference on Sustainable Development held in Rio de Janeiro in June 2012 (Rio+20). On 19 July 2014, the UN General Assembly's Open Working Group on Sustainable Development Goals (OWG) forwarded a proposal for the SDGs to the Assembly. The proposal contained 17 goals with 169 targets covering a broad range of sustainable development issue. These included ending poverty and hunger, improving health and education, making cities more sustainable combating climate change, and protecting oceans and forests. The Intergovernmental Negotiations on the Post 2015 Development Agenda (IGN) began in January 2015 and ended in August 2015. Following the negotiations, a final document was adopted at the UN Sustainable Development Summit September 25–27, 2015 in New York, USA. The expected deadline for the SDGs is 2030. The title of the agenda is Transforming our world: the 2030 Agenda for Sustainable Developments. The 17 Sustainable Development Goals are to: 1. End poverty in all its forms everywhere, 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture, 3. Ensure healthy lives and promote well-being for all at all ages, 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all, 5. Achieve gender equality and empower all women and girls, 6. Ensure availability and sustainable management of water and sanitation for all, 7. Ensure access to affordable, reliable, sustainable and modern energy for all, 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all, 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation, 10. Reduce inequality within and among countries, 11. Make cities and human settlements inclusive, safe, resilient and sustainable, 12. Ensure sustainable consumption and production patterns, 13. Take urgent action to combat climate change and its impacts, 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development, 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss, 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels, 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development

### **3. Objective and Methodology**

Thus the objective of this paper is to analyze the nature, extent and trends in human development disparity especially north- west region in Bangladesh and to some policy suggestions reducing disparities in Bangladesh.

The study was conducted mainly based on the data of Household Income and Expenditure Survey (HIES) of 2000, 2005 and 2010 conducted by the Bangladesh Bureau of Statistics (BBS). Different statistical reports, relevant research papers,

books and many national and internal journals were also reviewed for conducting this research. Finally, bi-variate analysis is conducted to determine association of different variables with poverty and inequality.

In this study, analysis has been carried out the basis of available secondary literature and data. Important sources include secondary data in form of official statistical information collected from the Bangladesh Bank, Bureau of Manpower, Employment and Training (BMET), International Migration Report of IOM, World Bank Report, IMF Report, ADB Report, Journals etc.

#### **4. Aspects of Regional Disparity and Factors Affecting Regional Disparity**

##### **4.1 Poverty Situation**

Typical measures of poverty are based on income or consumption, which register important dimensions of deprivation but provide only a partial picture. People can be deprived of many things beyond income. They may have poor health and nutrition, low education and skills, inadequate livelihoods and poor household conditions, and they may be socially excluded. Some of these broader aspects of poverty are captured in the concept of multidimensional poverty. In 104 developing countries 1.2 billion people had an income of \$1.25 or less a day. But the multidimensional poverty headcount for 91 developing countries was an estimated 1.5 billion people—as measured by the Multidimensional Poverty Index (MPI).

The proportion of multidimensionally poor people is usually higher than the proportion living on less than \$1.25 a day. In Cambodia 47 percent of the population were in multidimensional poverty in 2010, but only 19 percent lived on less than \$1.25 a day.

In a recent report by Bangladesh Bureau of Statistics (BBS) and the World Food Programme (WFP) and the World Bank, the district level poverty mapping has been updated for 2010- the latest available year of the household budget survey. The following table identifies the fifteen districts with highest rates of head count poverty measured in terms of the upper poverty line. This has been done by using small area estimation technique. The poverty mapping has been calculated using the income-consumption data of Household Income Expenditure Survey (HIES) 2010 and population data of Census 2011. According to the estimate half of the districts have poverty rates greater than the national average of 31.4% suggesting a high degree of disparity among districts in terms of poverty measures (i.e. as many as 32 districts out of 64 districts have higher poverty rate than that of the national poverty rate).

<b>Table 1. a: Head Count Poverty Rate by Districts (%) District</b>	<b>Poverty rate % (Upper poverty line)</b>	<b>Rank</b>
Kurigram	63.7	1
Barisal	54.8	2
Shariatpur	52.6	3
Jamalpur	51.1	4
Chandpur	51.0	5
Mymensingh	50.5	6
Sherpur	48.4	7
Gaibandha	48.0	8
Satkhira	46.3	9
Rangpur	46.2	10
Magura	45.4	11
Pirojpur	44.1	12
Bagerhat	42.8	13
Gopalganj	42.7	14
Rajbari	41.9	15

Source: 2013 Bangladesh Poverty Assessment, World Bank

Bangladesh has been successful in achieving significant reduction in poverty since 1990. But the commendable performance in terms of poverty reduction at the national level has not been equally shared among its different components at the sub national level. This is evident that the pace of poverty reduction differed among different divisions.

Although higher poverty incidence has been found in the districts of Rajshahi and Rangpur divisions, there are also districts from the east region which has poverty rate higher than the national level. An important observations is that the three CHT districts - with high degree deprivations in other indicators - did not make the above list with relatively moderate of poverty rates. Further investigation with other data sources may suggest that poverty rate could have been higher than what is reported in the WFP/WB report.

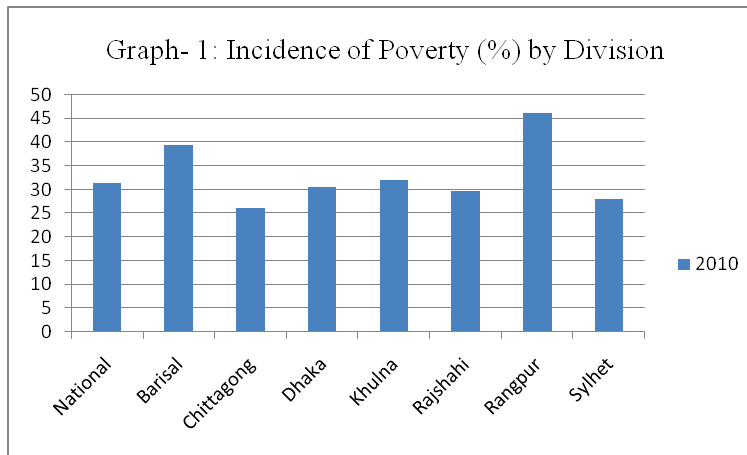
**Table: 1. b. Incidence of Poverty (Head Count Rate, using upper poverty line) by Divisions, 1995- 96 to 2010**

	Poverty Map	2010	2005	2000	1995-96
National	30.7	31.5	40.0	48.9	53.1
Barisal	39.4	39.4	52.0	53.1	59.9
Chittagong	26.2	26.2	34.0	45.7	44.9
Dhaka	30.5	30.5	32.0	46.7	52.0
Khulna	32.1	32.1	45.7	45.1	51.7
Rajshahi	29.7	29.8	51.2	56.7	62.2
Rangpur	42.3	46.2	-	-	-
Sylhet	28.1	28.1	33.8	42.4	-

Source: BBS, HIES Reports (1995- 96, 2000, 2005 and 2010), 2013 Bangladesh Poverty Assessment, World Bank



From Table-1. b, the estimate of HCR of poverty by divisions using the upper poverty line in 2010 reveal that Rangpur division has the highest incidence of poverty (HCR) at 46.2 percent, followed by Barisal division 38.4 percent and Khulna division 32.1 percent. On the other hand, Chittagong division has the lowest HCR of incidence of poverty at 26.2 percent followed by Sylhet division at 28.1 percent and Rajshahi division at 29.8 percent.



Source: BBS, HIES Reports (2010)

Between 2005 and 2000, the poverty head count rates fell less rapidly for the divisions of Barisal, Khulna and Rajshahi and in some categories, these rates even increased. This is in sharp contrast to the case of other three divisions, namely, Dhaka, Chittagong and Sylhet, which have experienced faster poverty reduction. Among all the divisions the poverty rate is highest (46.2 percent) in Rangpur division. The trend in poverty reduction rates between 2005 and 2010 suggests that regional disparity observed in previous household surveys with respect to head count poverty has narrowed significantly.

A conventional way to measure poverty is to establish a poverty line, defined as the threshold level of income needed to satisfy basic minimum food and non- food requirements and determine the number of households (People) below that line as a percent of the total households (Population). This Head- count Index (HDI) is a measure of the incidence of poverty. This measure is easily understood by general public and hence is popular with policy makers and development practitioners. The limitation of the measure is that it is insensitive to change in the level and distribution of income among the poor. The other measures of poverty commonly used to take into account the distribution issue are a) the Poverty Gap Index and b) the Squared Poverty Gap Index. The Poverty Gap Index measures the average (of poor and non- poor households) of the percent of income gap of the poor households from the poverty line, and is used as a measure of intensity of poverty. It measures the percent of total income needed to be transferred from the non- poor

to poor households to lift the poor above the poverty line. However, if the society is averse to inequality in the distribution of income among the poor, the poverty measure must be sensitive to income transfers from the moderate to the extreme poor. It means that higher priority must be given to the improvement in the economic conditions of the extreme poor compared to the moderate poor. The Squared Poverty Gap Index satisfies this condition, and is used as a measure of the severity of poverty.

Poverty situation at the national and regional level is reported in Table- 2. Poverty Gap and Squared Poverty Gap by seven administrative divisions are presented in this Table.

**Table-2: Poverty Gap and Squared Poverty Gap by Divisions**

Poverty Line and Division	Poverty Gap in percent (using upper poverty line)	Squared Poverty Gap in percent (using upper poverty line)
National	6.5	2.0
Barisal	9.8	3.4
Chittagong	5.1	1.5
Dhaka	6.2	1.8
Khulna	6.4	2.0
Rajshahi	6.2	1.9
Rangpur	11.0	3.5
Sylhet	4.7	1.3

Source: BBS, HIES (2010)

The Poverty Gap (PG) estimates the depth of poverty of the population. The HCR of poverty gives only the percentage value of poverty incidence, but it does not measure the distance of the poor households from the poverty line. Using the upper poverty line, at the national level recorded the PG at 6.5 percent in 2010. The same was highest for Rangpur division at 11.0 percent in 2010.

The Squared Poverty Gap (SGP) measures the severity of poverty. Using the upper poverty line, at the national level has recorded the lowest SPG which was 1.3 percent in 2010. The same was highest for Rangpur division 3.5 percent.

#### **4.2 Social Safety Net Receiving Households**

Social Safety Net Programmes (SSNPs) are a set of public measures, which a society provides for its members to protect them from various types of economic and social hardships, resulting from a substantial decline in income due to various types of contingencies such as loss of cultivable land, crop failure, land and home-stead loss, due to river erosion, unemployment, sickness, invalidity, old age or death of earning household members. Social Safety Nets Programme (SSNP) is generally targeted to the poor. The division wise distribution of households receiving benefits from Social Safety Net Programs shows that the highest percentage of households receiving benefits from SSPNs are located in Khulna Division

(37.30%) , followed by Barisal division (34.43%)and Rangpur division (33.65%) (Table-3)

**Table -3: Distribution of Households Receiving Social Safety Net Program Benefits by in percent by Divisions, 2010**

Division	National	Rural	Urban
National	24.57	30.12	9.42
Barisal	34.43	37.20	20.66
Chittagong	19.99	24.50	7.44
Dhaka	18.87	27.80	5.99
Khulna	37.30	43.27	16.66
Rajshahi	20.66	22.85	10.17
Rangpur	33.65	35.11	23.68
Sylhet	23.51	26.06	10.50

Source: BBS, HIES (2010).

### 4.3 Income and Expenditure of Households

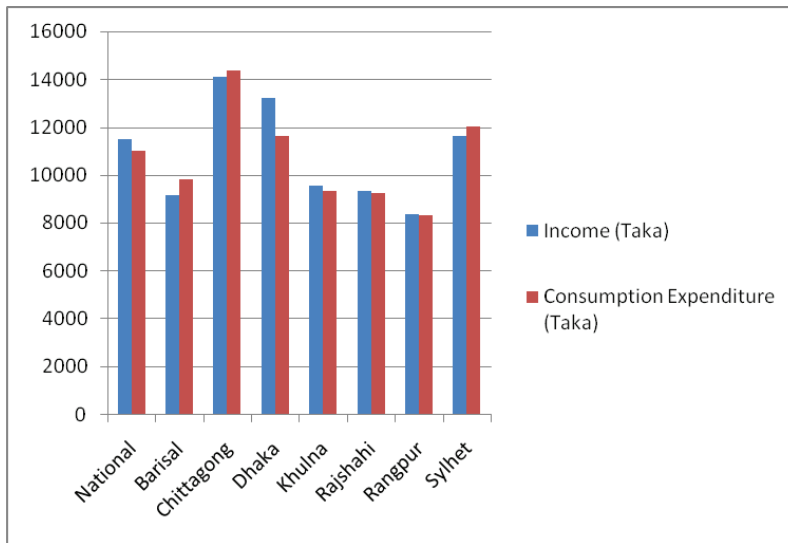
The highest average monthly household nominal income was recorded at Tk. 14092 for Chittagong Division followed by Dhaka Division at Tk. 13226 and Sylhet Division at 11629 and all of these exceeded the national average of Tk. 11479 in 2010. The four Divisions, which recorded monthly household income below the national average, were Barisal Division at Tk. 9158, Khulna Division at tk. 9569 and Rajshahi Division at Tk. 9342 and Rangpur Division 8359 (Table- 4).

**Table- 4: Monthly Household Nominal Incomes and Consumption Expenditures by Divisions- 2010**

Division	Income (Taka)	Consumption Expenditure (Taka)
National	11497	11003
Barisal	9158	9826
Chittagong	14092	14360
Dhaka	13226	11643
Khulna	9569	9304
Rajshahi	9342	9254
Rangpur	8359	8298
Sylhet	11629	12003

Source: BBS. HIES (2010)

**Graph-2: Monthly Household Nominal Incomes and Consumption Expenditures by Divisions- 2010**



Source: BBS. HIES (2010)

The highest average monthly consumption expenditure was recorded in Chittagong Division at Tk. 14360 followed by Sylhet Division at Tk. 12003 and Dhaka division at Tk. 11643 and their income exceeded the national average of monthly household consumption expenditure at tk. 11003 in 2010. On the other hand, the average monthly household expenditure of Barisal Division, Khulna Division and Rajshahi division and Rangpur Division fell well below the national average and were estimated at Tk. 9826, Tk. 9304 Tk. 9254 and 8298 respectively.

#### 4.4 Public Expenditure and Regional Inequality

The public expenditure in capabilities has always been less than the required level. The public expenditure in education, health and housing has a bearing on the poverty. Though, Tk. 86,891 crore (53.12 percent of total budget) is proposed as poverty reducing expenditure in the fiscal year 2011-12, as a percentage it was 3.55 percent less than of the revised budget of the previous fiscal year 2010-11 in Bangladesh. The government has expenditure in social safety net programmes to the tune of about 13.79 percent of the total budget and 2.51 percent of GDP. This is, however, is not adequate, given the magnitude of the problems.

Infrastructure is an important determinant of level of development and intensity of disparity. Physical connectivity, gas, electricity are of crucial importance to stimulate the process of industrialization. The Jamuna Multipurpose Bridge played an important role behind some poverty reduction in the northern Bangladesh, but its worth will perhaps take more time to materialize fully. Agriculture- dominated

regions tended to develop at a slower pace compared to regions where growth was engineered by industrial and service sectors.

Public investment has a critical role in development. Estimates show that, per capita public expenditures were higher in Dhaka, Chittagong and Sylhet compared to the four other divisions (Rajshahi, Barisal, Khulna and Rangpur).

It is commonly acknowledged that public expenditure can play a significant role in reducing poverty. If spent unequally public expenditure can exacerbate the existing imbalance in growth and poverty reduction. Therefore, it is a reasonable concern among the development practitioners to investigate the issue of regional distribution of public spending. It has been alleged that inequality in the distribution of political power has often led to some extent to a disproportionate public spending, which in turn may hinder prospects of poverty reduction.

**Table- 5: Per Capita Government Expenditure 2009-10 (up to March)**

District	Development Expenditure (Taka in thousands)	Revenue Expenditure (Taka in thousands)
Barisal	1.102	3.991
Chittagong	1.421	3.912
Dhaka	1.377	12.370
Khulna	1.481	5.459
Rajshahi	1.942	2.894
Rangpur	0.865	3.991
Sylhet	1.325	5.049

Source: Ministry of Finance, Bangladesh

A considerable regional disparity exists in ADP allocation in the Rural Development and Institutions (RDI) sector in Bangladesh. Table- 5 lists the ranking of different districts according to amount of ADP received in this sector in a descending order. Based on the district-wise disaggregation, among the greater districts Patuakhali enjoyed the largest amount of ADP Road Per Capita (Adproadpc) Tk. 2259.47 from year 1995/96 through 2007/08.

**Table- 6: Ranking of Districts in Terms of Rural Development and Institutions ADP (1995-96 to 2007-08)**

District	Adproadpc (Taka per capita)
Patuakhali	2259.47
Jamalpur	1518.81
Noakhali	1056.97
Tangail	951.43
Barisal	658.61
Rangpur (15 th)	445.46

Source: CPD Occasional Paper Series- 71, 2008

The ADP allocations exhibit widespread fluctuations with regard to distribution among the greater districts. Jamalpur is the highest total per capita road ADP allocation recipient over the reference period, while Rangpur is the 15th position.

**Table- 7: Ranking of Districts in Terms of Road ADP ( 1995/96- 2007/08)**

District	Adproadpc (Taka per capita)
Jamalpur	3020.50
Khulna	2218.74
Dhaka	1473.42
Faridpur	498.27
Rangpur (15 th)	492.67

Source: CPD Occasional Paper Series- 71, 2008

#### 4. 5 Education

In the past few years, Bangladesh has achieved substantial amount of progress in education. The literacy rate has increased by 6 percentage points to 57.9 % in 2010 from 2005. The enrollment rate in primary education is 84.75 % and the ratio is higher in favour of girls in both urban and rural areas.

However, there is serious persistence of spatial differences in the achievement of education when it comes to literacy rate. The range in literacy rate among the 64 districts is 35.5 and the standard deviation is almost 8, suggesting high level of disparity among the districts. The following table will shed light on the districts which are under achiever of education in Bangladesh. Other two indicators used to assess district level deprivation in education are number of primary and secondary schools.

Education develops human skill for providing quality services to the community. Education is also termed as a human capital and it makes people fit for professional jobs. Education is recognized as one of the basic human needs. It has direct bearing to overall welfare of individuals as well as households and society.

Although a significant change in terms of primary education is found across income groups, considerable disparity linked with economic background is observed in secondary education enrollment. Poor people are mostly absent at the tertiary education level. In Bangladesh children in the rural areas are lagging behind significantly in terms of getting quality education.

**Table-8: Literacy Rate (7 years and over) by Gender and Administrative Division (Percent)**

Division	National	Male	Female
National	57.91	61.12	54.80
Barisal	57.90	60.62	55.29
Chittagong	60.54	63.40	57.90
Dhaka	57.73	60.01	55.54
Khulna	59.28	63.84	54.61
Rajshahi	57.37	60.45	52.04
Rangpur	54.68	59.88	49.36
Sylhet	55.22	58.98	51.67

Source: BBS, HIES (2010)

The divisional level literacy rates have been provided in Table-9. At the aggregate level, the highest literacy rate 60.54 percent is observed in Chittagong division and the lowest of 54.68 percent in Rangpur division.

At the tertiary level education, the highest number 17 public and 54 private university is observed in Dhaka division and the lowest only 2 public and no private university in Rangpur division (Table- 9).

**Table- 9: University by Administrative Division**

Division	Public University	Private University
Barisal	02	01
Chittagong	05	10
Dhaka	17	54
Khulna	04	02
Rajshahi	03	05
Rangpur	02	01
Sylhet	02	04

Source: UGC Website

#### 4.6 Access to Electricity, Telephone, Mobile phone and Computer

Infrastructure is crucial to promote socio-economic progress of a district. Two important infrastructure indicators namely: (i) percentage of paved road to total road; and (ii) percent of households with electricity connection have been used to assess the status of infrastructure across the district of Bangladesh.

Distribution of households with access to electricity, telephone, mobile phone, and computer is presented in Table-10. It is observed that, in 2010, 55.26% households reported to have access to electricity at the national level, 63.4% access to mobile phone. 2.07% access to telephone and 3.01% access to computer. But in Rangpur Division only 30.07% access to electricity, 41.59% access to mobile phone, 1.25%

access to telephone and 0.70% access to computer.

**Table-10: Percentage of Households Having Electricity and Other Facilities by Administrative Divisions**

Division	Electricity	Mobile phone	Telephone	Computer
National	55.26	63.74	2.07	3.01
Barisal	40.12	59.56	1.14	1.41
Chittagong	60.34	70.84	3.02	3.62
Dhaka	67.34	71.71	2.38	4.70
Khulna	54.13	61.09	1.65	1.84
Rajshahi	51.88	59.85	1.33	1.33
Rangpur	30.07	41.59	1.25	0.70
Sylhet	47.22	60.63	2.76	4.51

Source: BBS, HIES (2010)

#### 4.7 Wage gap

There are wage gap between Rangpur and Dhaka division. Male Wage rate at Dhaka division in August 2012 was Taka 250- 300 per day. At that time in Rangpur division male wage rate was Taka 211.20 per day. (Table- 11).

**Table - 11:- Wage Gap**

Wage Rate	Rangpur Division August 2012 (Per day/ Taka)	Dhaka Division August 2012 (Per day/ Taka)
Wage Rate (Male)	211.20	250-300
Wage Rate (Female)	150.00	200-250
Wage Rate( Child)	107.00	100-150

Source: NBI, RDRS, Bangladesh 2012

#### 4.8 Access to Energy/ Gas Connectivity

Availability of energy plays a critically important role in helping develop regional economics. Due to the primacy of Dhaka and Chittagong, the availability of electricity has been more pronounced in the eastern districts than in the western and southern districts. Similarly, there are substantial differences in terms of availability of natural gas. Large areas of northern and the southern parts of the country still do not have natural gas coverage.

**Table-12: Grouping of Division by Gas Connectivity**

Division	Gas Connectivity
Dhaka	1968
Sylhet	1977
Rajshahi	1999
Khulna	-
Chittagong	1976
Barisal	-
Rangpur	-

Source: Zohir (2011)



#### 4.9 Access to International Migration and Foreign Remittances

Inflow of foreign remittances is the single most important informal safety net program in Bangladesh. It has been a major factor in helping Bangladesh to reduce poverty since the 1990s. According to Ministry of Expatriates Welfare and Overseas Employment 5.575 million Bangladeshi workers were working abroad as of June 2009 and every year around 0.5 million people are migrating with overseas employment. Remittance is now contributing 11.15% to the GDP which is 6 times higher than the ODA and 13 times higher than the FDI. Such growth of workers' remittances contributed to the well being of remittance receiving households. Since households having expatriate workers highly concentrated in some areas of the country relative to others, the exclude or marginally included regions have gained little from inward foreign remittances of the country. (Table -13 ). Chittagong and Dhaka divisions dominate the share of expatriate workers; around 78 percent of total expatriate workers belong to these two divisions. In terms of total population Chittagong division has the highest proportion of its population working abroad (7.7%) followed by Sylhet division (4.28%), both surpassing Dhaka division (4.04%). On the other hand, less than 1 %of Rangpur division's and little less than 1.5 % of Khulna division's population are working abroad. Barisal does better, but still lags behind the more prosperous eastern divisions.

**Table- 13: -: International Migration (2005-2009)**

District	International Migration
Comilla	11%
Chittagong	9%
Tangail	6%
Rangpur	1%

Source: BMET 2009

Empirical evidence shows that there is a significant correlation between district level poverty headcount rates and share of expatriate workers. Data pertaining to district wise distribution of migrant workers shows that most of districts of Rajshahi divisions have less than one percent of their population working abroad. Though Chittagong division has the highest share of expatriate workers, the three hill districts of these divisions have very small number of expatriate workers. Indeed, a key factor underlying the more favourable poverty outcomes in Sylhet is the large inflow of remittances that have helped finance consumption even though per capita income flows have grown below the national average. Remittance is one of the major driving factors in reducing poverty level. Areas with higher incidence of remittance are less likely to be poor.

**Table- 14: Percentage of Remittance Share by Division**

<b>Division</b>	<b>Percentage of Total Remittances</b>
Dhaka	35.47
Sylhet	7.08
Rajshahi	7.16
Khulna	5.64
Chittagong	39.82
Barisal	4.07
Rangpur	0.76

Source: BBS, HIES (2010)

#### 4.10 Financial Infrastructure

Financial institutions (e.g. banks, MFIs) can play an important role in reducing poverty and regional inequality. High density of branches is indicative of vibrant economic activities. In general, the spread of banking activities tend to be much more concentrated in Dhaka and Sylhet divisions as compared with Rajshahi, Khulna and Rangpur.

Table- 15 shows per capita deposits and advances as on June 2010. The table shows that there are large differences among the divisions in terms of both per capita advances and deposits. Advances and deposits in all the other divisions are very low relative to Dhaka and Chittagong indicating the low level of depth of financial intermediation in the lagging districts. Sylhet division exhibits high per capita deposits but low per capita advances. This is explained by the fact that Sylhet receives huge amount of remittances from abroad and possibly require less loans from banks in relation to available economic opportunities.

**Table- 15: Per Capita Deposits and Advances by Division, 2009 and 2010**

	30th June 2010		30th June 2009					
	<b>Per Deposits</b>	<b>Capita</b>	<b>Per advance</b>	<b>Capita</b>	<b>Per deposits</b>	<b>Capita</b>	<b>Per Advance</b>	<b>Capita</b>
National	23483		17854		19622		14681	
Barisal	5807		2831		5037		2464	
Chittagong	23036		18240		19274		14714	
Dhaka	48286		38170		39891		31502	
Khulna	8239		6618		7112		5621	
Rajshahi	6863		4985		4800		3531	
Rangpur	3803		3641		-		-	
Sylhet	17187		4461		15605		3703	

Source: Scheduled Bank Statistics, Bangladesh Bank, Various Issues

#### 5. Concluding Remarks

Improvement of infrastructural facilities is one of the key interventions that can open the door of economic opportunities in the lagging districts. Following meas-

ures are can be taken: Communication system between the better off districts and lagging districts should be improved in order to increase economic activities in the lagging districts. Supply of electricity should be increased in the lagging districts in priority basis since development of manufacturing sector demands access to electricity supply. Construction of gas transmission line to the laggard districts should be expedited. Both inter district and intra district road communication system should be developed to increase economic mobility within the laggard districts. Storage facilities for agricultural and fisheries should be increased according to the demand of such facilities in laggard districts where economic activities are mostly agricultural in nature. Such facilities should be enhanced in the remote areas so that farmer gets most benefit from such facilities. Intensity of bank branches should be increased in the laggard divisions to increase financial services for general people as well as investors of the districts. Communication system in three hill districts should be developed to create economic opportunities for these areas.

Manufacturing activity has to be promoted in the lagging districts. Since private investment has less of an incentive to locate itself in the lagging districts, this process has to be implemented with the help of government support at least in the initial stage. Industrial policy should incorporate enough flexibility for investment in lagging districts. Industrial zones should be established in lagging districts with all adequate infrastructural facilities so that entrepreneurs can get benefit from economies of scale. Promulgation of special incentive for prospective investors should proceed simultaneous to encourage faster investment in this industrial park. Small and medium enterprises should be encouraged with low cost financing facilities. Rate of interest for bank finances should be lower in the laggard districts which will increase investment, Special fiscal incentive such as tax holidays should be offered for investment in lagging districts.

Even though the share of agriculture in GDP is declining over time, still this is the focus point of the rural economy. Special emphasis has to be given to development of agro-processing, non-farm economic activities in the laggard districts. Following steps can be taken: Rural areas of lagging districts should get special priority in agricultural credit disbursement and agricultural subsidy program. Microfinance institutions should be encourage to operate in poverty prone areas by providing special incentives, e.g. providing fund to MFIs at low rate of interest if they disburse this fund in poor districts.

Policy measures are required to attract microfinance in environmentally vulnerable areas such as cyclone prone coastal areas, land logged and other flood prone areas and Monga prone areas.

Non-farm economic activities should be promoted in the laggard districts through providing training and financing facilities. Partnership building between the

government and MFIs/NGOs can play an important role in this regard.

Local government institutions such as Union Parishads should be strengthened to conduct development activities of the government through these institutions.

The flow of remittance earnings is emerging as a crucial source of resources to improve local economy. We notice that flow of remittance earnings is low towards the lagging districts, which is causing further backwardness of these districts. Following measures need to be taken: Number of migrants working abroad should be increased in lagging districts which receive meager share of foreign remittances. Technical and vocational training institutions should be established in the laggard districts as per the demand of other countries. • Special financing scheme should be directed towards prospective migrants from laggard districts.

To stimulate investment facilities and employment opportunities in the Rangpur division special incentives will not be enough. Along with these support in the form of adequate infrastructure, access to utilities, services and other forms of support will be required to be provided to the Rangpur division. A comprehensive plan for exploitation of natural resources such as coal resources of the Rangpur division is needed.

To minimize the yield gap in the western side, more investment has to be provided in the lagging region for improved technology. Further investment in agriculture research, dissemination of agricultural technology such as use of power pump and power tillers and locally available high yielding varieties of crops should be encouraged.

Access to quality education and creation of employment opportunities are needed to reduce regional inequality. Women empowerment and creation girl's education are important factors to be considered in this connection. Human resources development strategies such as development of tertiary level educational institutions and private universities need to be encouraged in the Rangpur division.

Initiatives to send more people from Rangpur division for overseas employment would have positive impact to reduce regional inequality. Special skill development programmes and credit support programmes should be developed towards this. Remittances should be encouraged to be used to stimulate productive ventures.

Higher rate of public expenditure and extended coverage of social safety net programmes in the Rangpur division should be the norm. Ownership of productive assets by low income and land less households will need to be supported and opportunities will need to be created for them to take part in income generating activities. Micro- credit facilities should be expanded to the share croppers in the Rangpur division. Construction of gas transmission line to the Rangpur division would be expedited.

Industrialization would be promoted in the Rangpur division to create jobs. Since private investment has less of an incentive to locate itself in these regions, this process needs to be implemented with the help of government support at least in the initial stages. Industrial policy would be made flexible to support investment in Rangpur division. Construction of industrial park and industrial zones would be established. Small and medium enterprise would be encouraged with low cost financing facilities. Rate of interest for bank finances would be lower in the Rangpur division which will increase investment. Special fiscal incentive such as tax holidays would be offered on a selective basis for high priority private investment in the Rangpur divisions industries.

The farmers in the Rangpur division would get priority in terms of agricultural subsidy. The Government will explore the possibility of increasing the provision of agricultural loan at a lower interest rate in the Rangpur division.

Efforts are needed to expand BR- 33 and Pariza rice in Rangpur division. Emphasis will be given to support the expansion of storage facilities for the poor and marginal farmers to for preserving their fish and agricultural products in order to get suitable price for their product in the market.

Logistic support and technical advice should be provided to potential migrant workers through establishment of foreign employment exchanges in the lagging districts in cooperation with private sector.

Priority be given to the lagging Rangpur division in the location of school and health facilities. Additionally, policies will be taken to ensure the availability of teachers and medical personnel in the remote area.

Special emphasis be placed on girl's education in Rangpur division. This will help increase female labour participation as well as improve family welfare.

The design of social protection schemes including employment guarantee schemes would consider the location issue very carefully, putting priority to the availability of these schemes in the Rangpur division.

The eradication of poverty and inequality and meeting of basic needs are the primary goals of the government. The present government of Bangladesh is very much hopeful in achieving the target of Sustainable Development Goals (SDGs) as well as the targets of Vision-2021 related to poverty and inequality. This target may be fulfilling equally every region in the country- this is expectation of all.

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## **Situation of Household Food Security in the Context of National Scenario: A Case Study on Three Northern Districts of Bangladesh**

**Md. Elias Hossain\***

**Tithy Dev\***

**Md. Khairul Islam\***

**Abstract:** *Improved food security is considered to be instrumental for reducing hunger, improving human health and enhancing economic development in the developing countries. However, it is mostly considered at national level in these countries, although food security at the national level does not necessarily ensure food security at household level. The objective of this study is to investigate the food security status at both national and household level focusing on the rural areas of the Northern Bangladesh. In analyzing food security at national level, three components- availability and access and utilization of food, are analyzed briefly using aggregate data obtained from secondary sources. For analyzing food security at household level, survey data on rural households from three northern districts are used. Food security indices for both national and household levels, and other conventional statistical attributes were calculated and comparative analysis between national and regional level have been done. It is found that, Bangladesh has achieved food self-sufficiency at national level through domestic production, imports and food aid but scenario of household level is different. It is found that there is difference between per capita daily availability of food grain at national level and that consumed at household level. Actual food expenditure was found to be less than required food expenditure and at the household level, from district wise analysis, it is found that food access gaps differed among the sample districts- Rajshahi, Natore and Naogaon. It is observed that Bangladesh has achieved just threshold level food security in 2010, as shown by the food security index value of 1.02, although the calorie intake differed between rural and urban people. The mean value of food security indices is 0.979 in the study area, whereas the individual values are 0.942, 0.996 and 0.999 for Natore, Rajshahi and Naogaon districts. This pattern is different from the food secure and food*

\* Professor, Department of Economics, University of Rajshahi, Rajshahi-6205, Assistant Professor, Department of Economics, University of Rajshahi, Rajshahi-6205 and Lecturer, Department of Economics, University of Rajshahi, Rajshahi-6205



*insecure households for the sample households.*

**Keywords:** Food Security, Bangladesh, National and Household Level, Northern Bangladesh.

## 1. Introduction

Despite growing abundance of food in several countries of the world, food related crises are frequently occurring in many developing countries. Improved food security is important in these countries for reduction of hunger, improvement of human health and promotion of economic development. According to a study published in 2012, about 820 million people are affected by hunger in the developing countries and the number of hungry people in the world is growing at an alarming rate, and the trend is not falling quickly enough to achieve the goal of food security particularly in African and Asian countries(von Braun,2012). Food security is a complex issue and its definition has evolved over time as it has number of dimensions that go beyond production, availability and demand for food. Although initially food security was taken as a global concern related to volume and stability of food supplies, recent views on food security are

different.In 2002, FAO again held that food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life(FAO, 2002).

There are three major components of food security such as food availability, food access and food utilization, which are hierarchical in nature. However, food availability is necessary but not sufficient for food accessibility and access is necessary but not sufficient for utilization (Omonona and Agoi, 2007; Kuwornuet al., 2013).Food availability is a function of the combination of domestic food stocks, commercial food imports, food aid and domestic food production as well as the function of underlying determinants of each of these factors. Food availability refers to the existence of food stocks for consumption at both household level and aggregate (regional and national) level. Food access is influenced by the aggregate availability of food through the impact of the latter on supplies in the market and on market prices (Omonona and Agoi, 2007).Food access is determined by physical and financial resources, as well as by social and political factors. Food utilization which is typically reflected in the nutritional status of an individual is determined by the quantity and quality of dietary intake, general childcare and feeding practices, along with health status and its determinants(Omonona and Agoi, 2007; Kuwornuet al., 2013).

At the national level, food security means availability of sufficient stocks of food to meet domestic demand, and at the household level, it means that all members of the household have access to the food. An individual may consume food from their

own production or they buy it from market or they may receive from the government's transfer payment programmes. In this viewpoint, Bangladesh has achieved food security at national level but at household level the country has not achieved food security in terms of access to food (Clay et al., 1988). The country experienced famine in 1974 due to the destruction of infrastructure during the liberation war against Pakistan in 1971 and successive natural disasters which caused reduction in rice and other crops production. In view of that experience, long run food security and achieving self-sufficiency in rice production was an important policy issues of Bangladesh government (Doroshet al., 2004). According to a report of the ministry of food, by the end of the 1990s food grain production in Bangladesh has exceeded the target requirements based on 454 gram per person per day. However, food security has not been achieved yet now and the progress that has been achieved was found difficult to sustain because of growing pressure of population in the context of extremely scarce natural resources. Moreover, Domestic food grain production of Bangladesh remains vulnerable due to floods, droughts and other climatic change events which may continue to cause production shortfalls and inadequate food availability. Increases in cereals production have not been accompanied by significant increases in availability of other foods (Hossain et al., 2005).

Poverty and food security are intertwined as poverty is considered as the major cause of food insecurity in the country. The incidence of poverty, as measured by the headcount ratio, is 31.5% in 2010. Over the 1984-2010 periods, total population increased by about 52.0 million and the number of rural poor stood 38.7 million in 2010. The number of urban poor, however, increased by 2.0 million over the same period (BBS, 2011). The persons who are living in chronic poverty are most vulnerable nutritionally. The incidence of absolute poverty (in terms of percentage of total population with less than 2,122 kcal/person/day) was 40.4% in 2005 (BBS, 2005) while the incidence of hardcore poverty (with less than 1,805 kcal/person/day) increased during the late eighties (1988-89) and is remained as 20% in 2010. However, food security is tried to be achieved by increasing the production of rice both by employing modern agricultural technology as well as by increasing the area under rice production in Bangladesh. Some time efforts and policies to expand production of other cereals were also taken. The rapid expansion in the production of cereals was partly achieved through reductions in area for production of pulses, oilseeds and sugarcane. Pulses and oilseeds are important sources of protein and micronutrients, especially for the poor. The decrease in the production of these crops has had adverse impact on nutritional balance among the people. There has been perceptible decline in the production of pulses and sugarcane, and somewhat of oilseeds. The productions pulses, oilseed and sugarcane have either remained stagnant or has declined. The production of oilseeds has picked up in recent years due to favorable prices, some progress in the development of higher yielding varieties. The dependence of Bangladesh on the world

market for the availability of pulses, edible oil and sugar and milk has been growing.

Despite the impressive gains in increasing domestic food grain production, problems of food and nutrition security still remain. Bangladesh is yet to achieve comprehensive food security that resolves the problems of inadequate food intake and chronic malnutrition among those who are poor and vulnerable. Addressing these problems satisfactorily would not only require rethinking of strategies and policies to promote food security in the country but also require decisive actions by all stakeholders- the government, the NGOs, the private sector and individual households. In fact, ensuring food security through physical availability and economic access to food would continue to be a major challenge for Bangladesh in the coming years. To meet these challenges, an integrated strategy encompassing major aspects of comprehensive food security namely, (a) adequacy of food supply through increased domestic production and imports (b) access to food through public distribution and expanded safety net programs and (c) improved food utilization and nutrition is required.

As food insecurity has multidimensional interrelationship with development issues, ensuring food security for population in the country is a crucial step of development policy. So, the issue of food security in Bangladesh needs to be studied with great care. Therefore, the main objective of the present study is to analyze the food security status of Bangladesh at national level in terms of availability, access and utilization as well as at household level focusing on food intake in relation to calorie and protein received by people in the rural areas.

The paper is organized as follows: giving an introduction on the research issue, the paper provided a literature review in Section 2. The methodology is presented in Section 3. Section 4, discusses the results of the study and Section 5 provides the conclusion.

## 2. Literature Review

In this paper has reviewed several studies, which have dealt with different aspects and issues of food security. Most of the study are found to have focused mainly on measuring the status and level of household food security, and investigating the determinants of food security (Babatunde *et al.*, 2007; Hossain and Rashid, 2009; Ahungwa *et al.*, 2013; Iorlamente *et al.*, 2014; Omonona *et al.*, 2007; Hossain *et al.*, 2005; Kuwornu *et al.*, 2013; Khan and Gill, 2009; Sultana and Kiani, 2011; Kazalet *et al.*, 2010) while some others dealt with other related aspects of food security (Chowdhury, 2009; Rahman and Islam, 2012; Salam *et al.*, 2009). Moreover, food security in Bangladesh is one of the important issues to be analyzed comprehensively by different researchers.

Babatunde *et al.* (2007) investigated the factors influencing food security status of rural farming households in Kwara State of Nigeria. Using the calorie intake

approach, they found that 36% and 64% households in the study area are food secure and food insecure, respectively. They estimated a Logistic regression model which found that total annual income, household size, educational status of household heads and quantity of food obtained from own production are the significant factors of food security status of farming households in the study area. Hossain and Rashid (2009) explained that the food security status of marginal farmers of a village under Basailupazila in Tangail district of Bangladesh. They found that marginal farmers obtained much lower per hectare yields of modern variety of Boro (4940 kg./ha.) due to financial capital constraint compared to the yield achieved by well-to-do farmers (6175kg./ha.). This has significant impact on the food security of the marginal farmers of that village. Ahungwaet *al.* (2013) examined the food security status of farming households in Benue State of Nigeria. The study assessed the socio-economic characteristics of the households using descriptive statistics and it measured the household food security status using the 'food security index' followed by the FAO benchmark of 2500 kcal per capita per day. They profiled the households into food secure and food insecure where 36.67% were food secure while 63.33% were food insecure. Iorlamenet *al.* (2014) assessed expenditure on food among urban households in Benue State of Nigeria. The study found that 67.3% of the households were food secure while 32.7% were food insecure. The study revealed that size of household, income of the household head and price of food commodities are major factors influencing household food demand decisions in the study area. Omononaet *al.* (2007) analyzed the food security situation among the urban households in Nigeria. They found that food insecurity incidence for the study area is 49%. Using regression model they found that food insecurity incidence increases with increase in age of household heads, household size and dependency ratio. The study also revealed that food insecurity incidence is higher in case of female-headed households than male-headed households and food insecurity incidence decreases with increase in level of education and household income.

Kuwornuet *al.* (2013) examined the food security status of farming households in the forest belt of the Central Region of Ghana. The study revealed that 60% farming households in the study area are food insecure. The binary logistic regression results revealed that an increase in household's income, having access to credit as well as increase in the quantity of own farm production may have the probability of improving the food security status of farming households in the study region. Khan and Gill (2009) examined the determinants of three aspects of food security in rural areas of Pakistan, i.e. food availability, accessibility and absorption. For that purpose a series of models applied on district level data of rural areas of Pakistan. The study found that the production of wheat, rice, maize, pulses, oilseeds, poultry meat and fish at the district level is found to affect food availability positively. They also found that all the district except of Sindh are more probable to be food insecure in availability and electrification and adult literacy emerged as

the factors having negative effect in the food accessibility. Sultana and Kiani (2011) examined the determinants of food security in Pakistan using a logistic regression technique. They found that three factors are statistically significant with expected signs. The analysis found that place of residence (urban) has a significant and negative effect on household's food security status. Dependency ratio has a significant impact on food security and has expected sign that is negative. Level of education of household's has also significant and positive impact on food security status of household. While social capital and employment do not effect household's food security.

Kazalet *al.*, (2010) analyzed the determinants of food insecurity and formulated the strategies to overcome the food insecurity problem obtaining in the haor area in Bangladesh. They used descriptive and inferential statistical tools and techniques to measure household's food security condition and socio-economic condition, to determine the predictors of food insecurity using both multiple binary and logistic regression models. The results found that the decrease in landholdings increase the risk of food insecurity very significantly irrespective of scale and the level of education of the household head also shown similar trend. Hossainet *al.* (2005) examined the progress of food and nutrition security in Bangladesh. The study also found that 40% population live below the poverty line and income inequality has been worsening which affect food production, availability of food and their impact on nutrition outcomes. Chowdhury (2009) investigated physical and economic access to food by households in rural Bangladesh. The study revealed that even though 75% food production comes from the rural areas, due to landlessness and some associated factors, the small and marginal farmers in the rural areas are still deprived from their access to food. Rahman and Islam (2012) explored the nutritional status and food security of farm households under different land use patterns in Bangladesh. The study revealed that households of alternate shrimp and rice farming consumed the highest amounts of food followed by year round shrimp farming whereas the highest per capita calorie intake was observed in households of alternate rice and wheat production. Talukder (2005) studied food security and food self-sufficiency status of Bangladesh. He found that although aggregate and per capita food availability in the country have increased over the years, resulting from increased domestic production and improved food management about 40% people live below the absolute poverty line defined by food intake of 2122 kilo calorie per person per day. Salam et al. (2009) explained that self sufficiency in food production in Bangladesh is considered as an important strategy of the government. They concluded that it is necessary to adopt high yielding varieties and others modern agricultural technology which will increase the productivity of existing land. Thus, the increase in production will help ensuring food security of the country.

From the review of available literature it is found that the existing studies are

focused on different issues of food security and the methods of analysis have also varied from study to study. Most of the studies carried out in the context of Bangladesh have analyzed the food security situation at national level using production, import and aid based data of food grains and studies of food security at household are rare. From regional perspective, food security situation of the northern part of Bangladesh, which is a relatively backward region as considered by the economists, has hardly drawn any attention by the researchers. Considering these, it is necessary to investigate the food security situation at household level in the Northern part of Bangladesh.

### **3. Methodology**

The study is based on primary and secondary data. The required national level data have been collected from secondary sources such as various issues of Bangladesh Economic Review, the Household Income and Expenditure survey and other related publications. The primary data are collected from the households of three northern districts- Rajshahi, Natore and Naogaon, of Bangladesh using multistage sampling procedure to select the respondents for the survey. Collected data have been analyzed through simple mathematical and statistical techniques. With a view to fulfilling the objectives of the present study of determining the food security status and drawing a comparison among the different households belonging to different living standard and different socioeconomic characteristics, the sample has been selected in such a way that it covers all such households. For assessing food security status of Bangladesh at national level the situations on aggregate availability of food, access to food by households and utilization of food by households in terms of protein and calorie intakes are analyzed based on secondary data. A comparison of individual level scenario is also provided in this connection. To investigate food security status at household level, the researchers have used food security indices for the households and comparisons are made between food secure and food insecure households.

A two step procedure suggested by (Keenan, 2001; Coates, 2006) is followed to construct a food security index such as identification of the minimum level of food necessary to maintain a healthy life and this is known as the food security line which is 2280 kcal, and aggregation of household's information to derive the food security statistics for the households. The household daily calorie intake is obtained from the questionnaire and from there the quantity of food consumed by the household is estimated in the 7 days period. The quantities are converted to gram and the calorie content is estimated by using the nutrient composition table of commonly eaten foods in Bangladesh (GoB, 2005; BIDS, 1997).

#### **3.1 Food Security Index**

For measuring food security status of households two methods have been widely used in earlier studies (Maxwell, 1996). The first method was used by Omonona

and Agoi (2007) or expenditure method. The index that was used by Omonona is: Food security = (food expenditure of *i*th household ÷ two-third of the mean per capita food expenditure of all study households). The second method was used by Fakiyesi (2001) and Olayemi (1998) or calorie intake method. Daily calorie intake method is better than food expenditure method because daily calorie intake method represents the actual food consumption pattern of households. Therefore, this study used the daily calorie intake method. Food security status of each household is measure based on the food security line using the daily calorie intake recommended by FAO (2005). The average daily calorie requirement for a moderately active adult is 2850 kcal and a safe minimum daily intake should not fall below 80% of the above calorie requirement, which means that the minimum intake should be about 2280 kcal per adult equivalent per day. This food security line is used in this study after converting of all household members into adult equivalent unit (May, 1996; Swindale, 2005). The formula for converting all household members into adult equivalent is as follows.

$$AdE = (A + 0.5C)^{0.9} \dots\dots\dots(1)$$

Where, AdE= adult equivalent unit, A = number of adults above the age of 15 years, and

C = number of children below the age of 15 years in a household,

Weekly per capita calorie is calculated by dividing estimated total household calorie intake by the family size (all adult equivalent) and to get the household's daily per capita calorie intake we divided the household's per capita calorie intake by seven (Babatunde et al., 2007). A household whose daily per capita calorie intake is at least 2280 kcal is regarded as food secure, while those with less than 2280 kcal are food insecure. The food security index as applied in Fakiyesi (2001) is given by the formula as

$$F_i = Y_i / R \dots\dots\dots(2)$$

Where,  $F_i$  = Food security status of *i*th household (food security index of the *i*<sup>th</sup> household)

$Y_i$  = Daily per capita calorie intake of the *i*th household, and

R = Recommended per capita daily calorie intake (2280 kcal per day per adult equivalent).

When,  $F_i \geq 1$ , the *i*<sup>th</sup> household is regarded as food secure [ $Y_i \geq R$ ]

$F_i < 1$ , the *i*<sup>th</sup> household is regarded as food insecure [ $Y_i < R$ ]

Speaking other way, a food secure household is that whose daily per capita calorie intake is above or on the recommended per capita daily calorie intake line. On the other hand, a food insecure household is that whose daily per capita calorie intake

falls below the recommended per capita daily calorie intake line.

Based on the calculated  $F_i$  values, another related measure is also calculated such as head counts of food secure households following the formulae given in FAO(2005). The head count ratio measures the fraction of foodsecure households to total study households. A household may consume more or less than recommended calories which is necessary to lead a healthy life.

## **4. Result and Discussion**

### **4.1 Food Security in Bangladesh at National Level**

National food security is used to describe whether a country has access to enough food to meet dietary energy requirements of her citizens. To some it connotes self-sufficiency, which means a country produces enough food to meet its population's demand. National food security measures the extent to which a country has the means to make available to its people the food needed or demanded, irrespective of whether the food is domestically produced or imported (Kuwornuet al., 2013).

#### **4.1.1 Food Availability: Major Food Items**

Availability of food is determined by domestic production, external trade and the efficiency of distribution through market and other channels (Devet al., 2014). At the national level food security means the availability of sufficient stocks of food in the country to meet domestic demand and at the individual level. It means that all members of the society have access to the food they need, either from their own production, from market and/or from the government's transfer mechanism. However, when the national level food security is achieved, in terms of food availability, individuals and groups in the country can face the food shortages because they do not have the means to access to food. The availability of food at national level in Bangladesh is shown in Table 1. It is found that Bangladesh has made steady progress in the expansion of domestic food production. The net production of food grain has increased from 24 million metric ton in 2004 to more than 30 million metric tons in 2013 from Table 1. We know when population increases, food demand also increases. As a result, consumption requirement for food grain is 25.81 percent higher in 2013 compared to 2004.



**Table 1: Food Grain (Rice and Wheat) Availability and Requirement in Bangladesh ('000'metric ton)**

Year	Net Production	Food Requirement	Food Gap	Private Import	Public Distribution	Internal Procurement	National Availability	Per Capita Availability(g ram/day)
1	2	3	4=2-3	5	6	7	8=2+5+6-7	9
2004	24698	22682	2016	2480	987	843	27322	544
2005	23520	24949	-1429	2982	1367	899	26970	529
2006	24539	25309	-770	2265	1245	945	27104	524
2007	25250	25686	-436	2209	1480	1140	27799	529
2008	26202	26046	156	2916	1329	1217	29230	549
2009	28306	26391	1915	2217	2129	1483	31169	578
2010	29179	26717	2462	2899	1964	805	33237	608
2011	30371	27058	3313	3109	2293	463	35310	638
2012	30617	27355	3262	1138	1667	1114	32308	578
2013	30885	28537	2348	1418.7	2090	1404.8	32988.9	588

Source: BBS and unpublished data from FPMU, Ministry of Food, GoB.  
Food requirement (per capita intake) has been calculated 489gm thereafter

However, it is found that in recent years total private import has decreased drastically. As is seen from Table 1, the volume of private import in different years did not follow any specific trend. The total public distribution of food grain has increased from 0.98 million metric ton in 2004 to more than 2.09 million metric tons in 2013. However, it is found that internal procurement has been increased significantly in recent years. Net national food availability increased from about 27 million tons in 2004 to more than 32.0 million tons in 2013. And per capita per day availability (gram) also rose from 544gm to 588 gm whereas per capita food grain requirement is 489 gm (MoFDM, 2012). Thus, per capita food availability has also increased in this period despite increase in population. This growth in production has been achieved through expansion of irrigation facilities, spread of modern varieties and increase of cropping intensity.

#### 4.1.2 Self Sufficiency Level of Major Food Items in Bangladesh

The core food items in Bangladesh are rice, wheat, pulses, edible oil, potato, fish, milk, meat, vegetables etc (Muzaffar, 2009). Self sufficiency level of food items is an important indicator in ensuring food security at national level. For Bangladesh food security is synonymous with achieving self-sufficiency in rice production and stabilization in rice prices. However, domestic food grain production remains susceptible to floods and droughts thereby perpetuating the threat of major production shortfalls, inadequate food availability, and vulnerability from fluctuation in prices. The availability of other foods has not increased, and the progress in nutritional outcome has remained slow. The level of self sufficiency of major food items (food grain, potato, pulses, oil seeds, vegetables, fish, meat, milk, fruits and sugar) of Bangladesh are presented in Table 2.

**Table 2: Self Sufficiency Level of Major Food Items in Bangladesh ('000'metric ton)**

Food Items	2012			2010			2008		
	Net Production	Food Requirement	SS Level	Net Production	Food Requirement	SS Level	Net Production	Food Requirement	SS Level
1	2	3	4=2/3	5	6	7=5/6	10	11	10/11
Food Grain	30617	27355	111.9	29179	26717	109.2	26202	26046	100.6
Potato	74.03	41.38	178.9	72.21	39.92	180.9	59.78	39.40	151.7
Pulses	2.16	6.13	35.24	1.99	5.91	33.67	1.85	5.83	31.73
Oil Seeds	4.04	30.65	13.18	3.4	29.57	11.50	5.78	29.18	19.81
Vegetables	21.33	25.28	84.38	20.08	24.39	82.33	18.37	24.07	76.32
Fish	29.60	73.56	40.24	26.19	70.97	36.90	23.13	70.04	33.02
Meat	21.29	18.39	115.8	11.44	17.74	64.49	9.4	17.51	53.68
Milk	31.59	88.89	35.54	21.35	85.75	24.90	23.9	84.63	28.24
Fruits	29.66	30.65	96.77	32.14	29.57	108.7	29.34	29.18	100.6
Sugar	6.24	30.65	20.36	5.6	29.57	18.94	14.78	29.18	50.65

Source: Own Calculations using data from BBS

From Table 2 it is observed that in food grain, potato and meat production Bangladesh have achieved self sufficiency level whereas in fruit and vegetables production near sufficiency level is achieved in 2012. However, In case of pulses, oilseed, fish, and milk and sugar production our self sufficiency level are on critical level in these years. Food grain, pulses, vegetables and fish production gradually increased while meat production has sharply increased at the sufficiency level but sugar production has decreased continuously from 2008 to 2012.

#### 4.1.3 Food Access: Food Expenditure Scenario of Bangladesh

Food access depends upon income available to the households, on the distribution of income within the households and on the price of food. The sources of income and their reliability for a steady flow and reliable amounts are important to individuals and households for ensuring food. During the last fifteen years the monthly household expenditure has risen at national level and this has increased both in rural and urban areas. The household expenditure has scaled up mainly due to the higher food expenditure. The food expenditure scenario in Bangladesh at the national level and rural- urban level is shown in Table 3.

The food expenditure has climbed up from Tk2477 to Tk 6030 at national level, Tk 2299 to Tk 5542 in rural areas and from Tk 3174 to Tk 7361 in urban areas during the period of 2000 to 2010 in Bangladesh. However, food expenditure has increased at a faster rate than that of income. During the period of 2000 to 2010, the monthly household income has increased with a growth rate of 18.20%. At the same time, the monthly household food expenditure has risen with a growth rate of 19.72%. From Table 3 it is also found that at the national level, actual food expenditure did not exceed the required food expenditure in different years. This means there is a problem of access to food in the country although the access gap is gradually declining. This pattern is almost same at both rural and urban level but access gap of the urban level has quickly been declining than rural level.

**Table 3: Food Expenditure Scenario in Bangladesh (Tk)**

National							
Year	Average Household Income	Average Household Expenditure on Food (%of average household income)	Required Per Capita Food Expenditure Per Day	Household Size	Required Food Expenditure of the Household Per Month	Gap/Surplus of Food Expenditure	Access Gap in %
1	2	3	4	5	6=(4*5)*30	7=3-6	7/6*100
2000	5842	2477(35.90)	27.50	5.18	4273.5	-1796.5	-42.04
2005	7203	3209(44.55)	33.00	4.85	4728.75	-1519.75	-32.14
2010	11479	6030(52.53)	52.37	4.50	7069.95	-1039.95	-14.71
Rural							
2000	4816	2299.85(47.75)	27.50	5.19	4281.75	-1981.9	-46.29
2005	6095	3023.59(49.61)	33.00	4.89	4841.1	-1817.51	-37.54
2010	9648	5542.71(57.45)	52.37	4.53	7117.08	-1574.37	-22.12
Urban							
2000	9878	3174.19(32.13)	27.50	5.13	4232.25	-1058.06	-25.00
2005	10463	3755.89(35.90)	33.00	4.72	4672.8	-916.91	19.62
2010	16475	7361.50(44.68)	52.37	4.41	6928.55	-432.95	-6.25

Source: Author's own calculation using BBS data

#### 4.1.4 Division Wise Food Expenditure Scenario of Bangladesh

Food expenditure by the households differs across regions in Bangladesh. Division wise actual food expenditure scenario in Bangladesh is shown in Table 4. It is found that food expenditure scenario is not similar in all divisions because the income and other socioeconomic characteristics of households in all divisions are not similar.

From Table 4 it is observed that at the national level required food expenditure of households per month was Tk 7069. Food expenditure gap was Tk 1039 and access gap was 14.71% in 2010 in Bangladesh. Table 4 shows that the average household size in Sylhet division was 5.50 persons in 2010 whereas this was 4.26 and 4.15 in Khulna and Rajshahi divisions, respectively, in the same year.

**Table 4: Division Wise Food Expenditure Scenario of Bangladesh (Tk)**

Food Consumption Indicators	Year		
	2000	2005	2010
<b>Barisal</b>			
Household Size	5.44	4.97	4.56
Required Food Expenditure of the Household Per Month	4488	4920.3	7164.22
Gap/Surplus of Food Expenditure	-2011	-1711.9	-1134.22
Access Gap in %	-44.81	-34.79	-15.83
<b>Chittagong</b>			
Household size	5.86	5.42	4.97
Required Food Expenditure of the Household Per Month	4834.5	5365.8	7808.37
Gap/Surplus of Food Expenditure	-2357.5	-2156.8	-1778.37
Access Gap in %	-48.76	-40.20	-22.78

<b>Dhaka</b>			
Household Size	5.00	4.69	4.39
Required Food Expenditure of the Household Per Month	4125	4643.1	6897.13
Gap/Surplus of Food Expenditure	-1678	-1434.1	-867.13
Access Gap in %	-40.68	-30.89	-12.57
<b>Khulna</b>			
Household Size	5.07	4.71	4.26
Required Food Expenditure of the Household Per Month	4182.75	4662.9	6692.89
Gap/Surplus of Food Expenditure	-1705.75	-1453.9	-662.89
Access Gap in %	-40.78	-31.18	-9.90
<b>Rajshahi</b>			
Household Size	4.77	4.53	4.15
Required Food Expenditure of the Household Per Month	3935.25	4484.7	6520.07
Gap/Surplus of Food Expenditure	-1458.25	-1275.7	-490.07
Access Gap in %	-37.06	-28.45	-7.52
<b>Rangpur</b>			
Household Size	-	-	4.28
Required Food Expenditure of the Household Per Month	-	-	6724.31
Gap/Surplus of Food Expenditure	-	-	-694.31
Access Gap in %	-	-	-10.33
<b>Sylhet</b>			
Household size	-	5.57	5.50
Required Food Expenditure of the Household Per Month	-	5514.3	8641.05
Gap/Surplus of Food Expenditure	-	-2305.3	-2611.85
Access Gap in %	-	-41.81	-30.23

Source: Own calculation using data from BBS and GoB (2005)

The required food expenditure of households in Sylhet division per month was Tk 8641 in 2010 which was Tk 6520 in Rajshahi division and Tk 6693 in Khulna division. The food expenditure and access gap in Sylhet division were 2612 and 30.23% respectively. This rate was 490.07 and 7.52% in Rajshahi divisions, 662.89 and 9.90% in Khulna division. These figures were higher in Sylhet followed by Chittagong, Barisal, Dhaka, Rangpur, Khulna, and Rajshahi Divisions.

#### **4.1.5 Food Utilization: Per Capita Food Intake Per Day in Bangladesh by Items of Food**

The final pillar of food security is food utilization, refers to ingestion and digestion of adequate and quality food for maintenance of good health. In order to achieve food security, the food ingested must be safe and must be enough to meet the physiological requirements of each individual. Per capita food intake per day is essential to ensure nutritional requirement of body. Intakes of food according to food items by the households per capita per day for the year 2010 have been presented in Table 5.

**Table 5: Per Capita Food Intake Per day in Bangladesh in 2010 (gram)**

Food Items	Average Consumption			Required Food Intake
	National	Rural	Urban	
Rice	416.01	441.6	344.20	421
Wheat	26.09	23.3	33.6	40
Pulses	14.30	13.2	17.2	40
Potato	70.30	71.5	66.7	27
Vegetables	166.10	170	155.0	150
Edible Oil	20.50	18.3	26.6	20
Fish	49.5	45.8	59.9	48
Meat	19.07	14.07	33.3	12
Egg	7.20	5.80	10.9	50
Milk & Milk Product	33.72	31.8	39.2	58
Fruits	44.7	42.6	50.4	20
Sugar/Gur	8.40	7.4	11.3	20
Total	875.89	885.37	848.3	906

Source: Own calculations using data from BBS, 2012

Table 5 reveals the detailed explanation of food consumption by households considering major food items. Rice is the main food item and average per capita per day intake of rice was 416.01 gm in 2010 in Bangladesh, which was 441.6 gm in rural areas and 344.20 gm in urban areas. The second important food item was observed to be vegetables and the consumption rate was about 166.10 gm per capita per day at the aggregate level. The next important food item was potato followed by fish, fruits, edible oil, wheat, meat, pulses, sugar, and egg.

#### 4.1.6 Per Capita Calorie Intake of Households in Bangladesh at National Level

Food energy intake is measured by the unit of kilo calorie. Every food item has its own calorie value and these are different from each other. Total calorie intake is derived from total consumption of food for all food items and is presented in terms of per capita per day basis. Average daily per capita intake of calorie for all food items is shown in Table 6. Improving availability of and access to food are necessary but not sufficient conditions to ensure that people will be secured with food for leading an active and healthy life.

**Table 6: Per Capita Calorie Intake of Households in Bangladesh**

Year	National		Rural		Urban	
	Calorie Intake(kcal/cap /day)	Food Security Index	Calorie Intake(kcal/cap /day)	Food Security Index	Calorie Intake(kcal/cap /day)	Food Security Index
2000	2240.3	0.982	2263.2	0.992	2150	0.942
2005	2238.5	0.981	2253.2	0.988	2193.8	0.962
2010	2318.3	1.02	2344.6	1.03	2244.5	0.984

Source: Own calculations using data from BBS

The overall average daily per capita calorie intake by households was observed to be 2240.3 kcal in 2000 which increased to 2318.3 kcal in 2010. It is also found that

the statistics of the food security status at the different levels is shown in Table 6. The value of food security index is 1.02 (above the threshold of 1) at the national level that is found to be food secure in 2010. The value of food security index of the rural level is also found to be 1.03 (above the threshold of 1) and the value of food security index of the urban level is found to be 0.98 (below the threshold of 1) in 2000. Using the food security index measures at national level we are just food secured on the average since 2010 compared to earlier years. The studies showed that calorie intake was relatively higher for the rural people compared to urban people.

Survey year	Calorie intake(kcal/cap/day)			Protein intake(gram/cap/day)		
	National	Rural	Urban	National	Rural	Urban
2010	2318.3	2344.6	2244.5	66.26	65.24	69.11
2005	2238.5	2253.2	2193.8	62.52	61.74	64.88
2000	2240.3	2263.2	2150.0	62.50	61.88	64.96

Source: BBS, 2012

Along with calorie people also receive protein from consuming different items of food. Per capita calorie vis-a-vis protein intake by Bangladeshi people is given in Table 7. It is important to note that per capita calorie consumption increased from 2240.3 kcal in 2000 to 2318.3 kcal in 2010 at national level as well as rural and urban areas. However, per capita protein consumption has slightly increased over the years.

## **4.2 Food Security in Bangladesh at Household level**

Household food security depends substantially on household income and asset status (Jacobs, 2009). A household food security should be defined as one which has enough food available to ensure a minimum necessary intake by all members. The minimum is related to, among other things, body size, weight, sex, and nature of work and for women, pregnancy or lactation status (Alamgir, 1991). Ensuring food security for all is one of the major challenges in Bangladesh today. Despite the impressive achievements in food grains production during the last few decades, food security at households and individual levels remains a major concern for the Government. Different aspects and condition of food security at household level are described in this section.

### **4.2.1 Food Availability: Per Capita Food Intake Per day in the Sample Households**

To analyze food security status at household level individual data on food consumption have been collected from the study area and efforts have been given on identifying whether an individual household is food secured. A food secured household is that whose daily per capita calorie intake is on or is above the recommended 2280 kcal per capita daily calorie intake (FAO, 2005). On the other hand, a food insecure household is that whose daily per capita calorie intake falls below the recommended 2280 kcal per capita daily calorie intake (FAO, 2005).

Consumption of food according to food items by the study households per capita per day are presented in Table 8.

**Table 8: Per Capita Food Intake Per Day in the Study Area (gram)**

Food Items	Rajshahi			Natore			Naogaon			Total		
	All Households	Food Secured Households	Food Insecured Households	All Households	Food Secured Households	Food Insecured Households	All Households	Food Secured Households	Food Insecured Households	All Households	Food Secured Households	Food Insecured Households
Rice	451.9	470.7	438.46	430.9	436.5	428.77	449.15	464.95	435.33	441.23	451.85	434.47
Wheat	43.77	49.14	39.94	43.38	47.7	41.67	44.56	49.51	40.23	44.87	51.72	40.51
Pulses	34.53	44.13	27.68	32.53	41.51	28.98	35.48	44.39	27.68	36.28	48.56	28.46
Potato	30.47	32.29	29.17	33.91	40.63	31.25	33.27	34.38	32.29	38.72	52.08	30.21
Vegetables	180.6	200	166.67	171.76	195.83	162.25	186.11	208.33	166.67	174.54	200	158.33
Fish	41.67	53.77	33.02	34.18	49.06	28.3	42.01	56.6	29.25	36.43	46.23	30.19
Meat	6.05	8.55	4.27	4.39	6.84	3.42	5.93	6.84	5.13	6.46	8.54	5.13
Egg	32.72	47.3	22.3	20.53	29.73	16.89	31.08	47.3	16.89	27.96	43.24	18.24
Milk and Milk Product	30.35	47.76	17.91	25.50	52.24	14.93	30.05	50.75	11.94	28.64	52.53	13.43
Fruits	14.72	16.67	13.33	11.89	16.67	10	9.78	13.33	6.67	9.26	13.33	6.67
Sugar	16.61	20.73	13.66	16.30	18.05	15.61	17.40	20	15.12	15.77	17.56	14.63
Oil	14.96	21.11	10.56	14.22	19.56	12.11	15.82	20.44	11.78	15.04	20.33	11.67
Total	898.29	1012.1	816.97	839.54	954.28	794.18	900.64	1016.82	798.98	875.2	1005.97	791.94

Source: Author's own calculation

From Table 8 it is revealed that the rice is the main item of foods of both food secured and insecured households in the study area. It is found that average per capita per day intake of rice was 441.23 gm in the study area, which was 451.86 gm in food secured households and 434.47gm in food insecured households. Thus, food secured households consume more rice than food insecured households. The second important food item of households in the study area was observed to be vegetables and the consumption rate was about 174.54 gm per capita per day in total study households. The next important food item was wheat followed by potato, fish, pulse, milk and milk product, egg, sugar, oil, fruits, and. meat. The per capita food intake per day is not same in all three study districts. From Table 8 it is found that the per capita food intake per day is highest in Naogaon district followed by Rajshahi and Natore district.

Again, per capita food intake is not same for food secure and food insecured households. Table 8 reveals that per capita food intake per day of food secured households is high in Naogaon district followed by Rajshahi and Natore districts. On the other hand, per capita food intake of food insecured households is higher in Rajshahi district followed by Naogaon and Natore districts. Again, from the disaggregated analysis it is found that households of all districts receive most of the calories from the consumption of rice and vegetables.

#### 4.2.2 Food Access: Food Expenditure Pattern in the Sample Districts

The present study has analyzed the actual food expenditure pattern of selected

districts which is shown in Table 9. Table 9 shows that the average household size in Rajshahi district was 4.10 persons in 2010 whereas this was 3.95 and 4.05 in Naogaon and Natore districts respectively in the same year. The required food expenditure of households in Rajshahi district per month was Tk 6441 in 2010 which was Tk6205 in Naogaon district and Tk 6362 in Natore district. The food expenditure and access gap in Rajshahi district were 411 and 6.39% respectively. This rate was 189 and 2.99% in Naogaon district, and 332 and 5% in Natore district.

**Table 9: Actual Food Expenditure Pattern in the Sample Districts (Tk)**

Food Consumption Indicators	Year	
	2000	2010
<b>Rajshahi</b>		
Household Size	4.91	4.10
Required Food Expenditure of the Household Per Month	4050.75	6441.51
Gap/Surplus of Food Expenditure	-1573.75	-411.51
Access Gap in %	-38.85	-6.39
<b>Naogaon</b>		
Household Size	4.71	3.95
Required Food Expenditure of the Household Per Month	3885.75	6205.85
Gap/Surplus of Food Expenditure	-1408.75	-185.85
Access Gap in %	-36.25	-2.99
<b>Natore</b>		
Household Size	4.64	4.05
Required Food Expenditure of the Household Per Month	3828	6362.96
Gap/Surplus of Food Expenditure	-1351	-332.96
Access Gap in %	-35.29	-5.23

Source: Own calculations using data from BBS, 2001& 2011

However, from the district wise analysis it is found that there are substantial food expenditure and access gaps in all the three study districts and the food expenditure gap is highest in Rajshahi district followed by Natore and Naogaon districts. On the other hand, the food access gap is higher in Rajshahi district followed by Natore and Naogaon district.

#### **4.2.3 Food Utilization: Results of Food Security Index**

On the basis of recommended daily calorie intake of 2280 kcal suggested by FAO (2005), total households are classified into food secured and insecure which is represented in Table 10. From the table it is observed that 70 of total households in the study area are food secured whereas 110 are food insecure. This figures vary for three study districts also. On the basis of field survey data collected from three districts of northern Bangladesh a food consumption index is calculated which enabled us to understand whether an individual is secured in the availability of food. Table 10 presents the mean of food consumption of an individual of sample households in the study area measured in kcal. From Table 10 it is found that the mean value of food security index is 0.979 in the study area whereas the value of



food security index is 0.942, 0.996 and 0.999 of the Natore, Rajshahi and Naogaon districts for the sample households.

Table 10: Results of Food Security Indices			
	All Households	Food Secured Households	Food Insecured Households
<b>Natore</b>			
Number of Households	60	17(0.28)	43(.72)
Mean Calorie Intake(kcal)	2150	2337	2075
FSI Value	0.942	1.03	0.91
<b>Naogaon</b>			
Number of Households	60	28(0.47)	32(0.53)
Mean Calorie Intake(kcal)	2279	2500	2085
FSI Value	0.999	1.010	0.914
<b>Rajshahi</b>			
Number of Households	60	25(0.42)	35(0.58)
Mean Calorie Intake(kcal)	2270	2500	2092
FSI Value	0.996	1.11	0.92
<b>Total</b>			
Number of Households	180	70(0.39)	110(0.61)
Mean Calorie Intake(kcal)	2233	2467	2083
FSI Value	0.979	1.08	0.913

Source: Author's own calculation

Note: The figure in the parenthesis indicates the percentage

From Table 10 it is found that the average per capita calorie intake in the area is 2233 kcal which is less than 2280 kcal whereas the mean calorie intake of food secured and insecured household in the study area is 2467 and 2083 kcal. The mean calorie intake of food insecured household is lowest for Natore (2075) compared to 2085 kcal for Naogaon and 2092 kcal for Rajshahi.

### Comparison Analysis of National and Household Level

It is observed that per capita per day availability (gram) also rose from 544gm to 588gm whereas per capita food grain requirement is 489gm (GoB, 2012) from Table 1. And it is found in 2012 that food grain, potato and meat production Bangladesh have achieved self sufficiency level whereas in fruit and vegetables production near sufficiency level is achieved from Table 2. However, in case of pulses, oilseed, fish, and milk and sugar production our self sufficiency level are on critical level in these years. At the household level, average per capita per day intake of food grain was 486.07gm in the study area, which was 503.52gm in food secured households and 475.08gm in food insecured households and the second food item is which vegetables that consumption rate is about 174.54gm per capita per day in the study area. Although our food grain, potato and meat production is exceeded the demand of its at the aggregate level, but sample districts received most of the calories from the consumption of rice and vegetables at the household level.

As regards food access, food expenditure has increased at a faster rate than that of income. During the period of 2000 to 2010, the monthly household income has increased with a growth rate of 18.20% and the monthly household food expenditure has risen with a growth rate of 19.72%. However, actual food expenditure did not exceed the required food expenditure in different years in the national level (rural and urban), this pattern is almost same at both divisions and selected districts in the household level. Again, at the household level, from the district wise analysis it is found that the food access gap is higher in Rajshahi district followed by Natore and Naogaon districts.

Regarding food utilization, the value of food security index is 1.02 (above the threshold of 1) at the national level that is found to be food secure in 2010 compared to earlier years and the calorie intake was relatively higher for the rural people compared to urban people (Table 7). Although, it is found that the mean value of food security index is 0.979 in the study area whereas the value of food security index is 0.942, 0.996 and 0.999 of the Natore, Rajshahi and Naogaon districts, but this pattern is different from the food secured and food insecure households for the sample households from Table 10.

## 5. Conclusion

Despite remarkable achievements in increasing food availability side, problems of access to food still continue in Bangladesh. The country has yet to achieve comprehensive food security that could resolve the problems of inadequate food intake at the household level. Bangladesh as a whole has a very low level of nutrition in the context of households and individuals level who cannot afford balanced and nutritious diet. Using the food security index, the value of FSI is food 1.02 at the national level and the mean of FSI is 0.979 which is nearly food secured in the household level whereas the mean of FSI of food secured and insecure household in the study area is 1.08 and 0.913 (Table 10). However, approximately 33 million of the total 160 million population in Bangladesh cannot consume more than 1800 kcal food per day. Bangladesh needs to accelerate growth and productivity of food grain production and improve the level of socioeconomic factors such as education in order to improve the quality of food utilization. Therefore, government and non-government agencies should come forward with financial supports to ensure food security for the household level and they should also provide relevant knowledge about balanced diet and nutritional food for these people.

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## **Economics of Sustainable Intensification and Adaptation Practices for Low Carbon Farming in Bangladesh**

**Fakir Azmal Huda\***  
**Gazi Hasan Kamal\***

**Abstract:** *This paper sets out the economic implications of sustainable intensification and farmers' motivation toward adaptation. Economic rationality implies the cost-effectiveness of coping mechanisms, and the cost of GHG emission in farm activities. All of these effects are important for the successful adaptation of farms from an economic viewpoint. Only a few studies have been conducted to analyze farm-level performance focusing on the global climate change perspective. This study tries to identify merits of coping mechanisms among the available options using traditional farm management analytical tools and descriptive statistics. It is based on the survey of three hundred farms prone to the effects of climate change in Bangladesh. An effective way of reviving the farm income to the threshold level is to reduce the cost and increase productivity, widening the scope of agricultural adaptation. It is shown that a combination of several farming practices; like crop management, fertilizer application, and rainwater harvesting provide three benefits. These are low-resource use to ensure productivity, earn high farm net income at the same time reduce GHG in production, and farm operation under adaptation to changing climatic conditions. The results suggest that farmers' pathway to low-carbon farming under different adaptation practices may reverse the negative climate change impacts for future generations.*

**Keywords:** Sustainable intensification, climate change, net farm income, adaptation and mitigation

### **1. Introduction**

Alternative agro-climate and eco-system services are new challenges for the farm economy. The community faces climate change and may change production practices and existing management. A coping mechanism that uses ecological, social,

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\* Professor, Dept. of Agricultural Economics, Bangladesh Agricultural University, Mymensingh  
Professor Dept. of Economics Govt. Ananda Mohan College, Mymensingh

and economic systems in response to climate stimuli and their effects is defined as adaptation. More specifically, farm-level adaptation may refer to process, action, or outcome in a farming system for better adjustment to climatic stress, hazard, risk or opportunity (McCathy et al. 2011, Smit and Wandel 2006). An adaptation strategy may involve cost appreciation, cost reduction, input or output substitution and reduction in net earnings from threshold earnings. Farmers maximize their objectives in such a complexity of choices under uncertainty, risk, and volatility of investment benefit. These are the main economic implications of adaptation on farming for sustainable intensification.

The economic implications of climate change and adaptation at the farm level are not yet well understood. Farming is a risky business and impacts of climate variability cannot be easily separated from it. The slow and gradual effects of climate variability threaten the economic outcome of farming activities. It is essential that an assessment of climate change should comprise all its associated costs and benefits. When the cost of climate change and the net benefits of adaptation options are well understood, strategies and priorities can be defined for an effective combination of mitigation and adaptation measures for farming.

Nordhaus (1994) states adaptations could be realized up to a point where their marginal benefits equal to the marginal cost of adaptation. The straight-forward approach in economic valuation is to estimate costs of climate change impacts and to assess the costs and benefits of alternative adaptation options. Valuation techniques can be based on: (i) directly observed market behavior, or (ii) hypothetical market behavior (AGHGO 2004). The first approach addresses direct market pricing of costs and benefits and indirect market or surrogate market, pricing of cost and benefit of climate impact. The second category is applicable where value is not directly observable in the market. The common framework for costing the impact of climate change is given by welfare economic theory. It addresses the externalities, uncertainties, and equity with a monetary value of the impacts of climate change and provides methods and tools. Welfare economics typically applies partial equilibrium analysis and general equilibrium analysis. Partial equilibrium analysis assesses the impacts of climate change on a single sector, while general equilibrium analysis deals with economic effects through the whole economy.

Therefore, for an economic analysis of climate change impacts and adaptation options, impacts have to be identified first. These bottom-up studies may assess impacts under the assumption that climate change impacts will not be large or indirect (AGHGO 2004).

## **2 Analytical framework and tools**

Climate change impacts indicate the difference between conditions of a system with and without climate change (Ahmad and Warrick 2001, Adams et al. 1998).

This analysis includes all the potential impacts of climate change from the direct bio-physical impacts to the indirect ecological and social ones. Climate change adaptation is the adjustment that helps to reduce the susceptibility of a community to the effects of climate change and can be both behavioral changes as well as technological adjustments. The aim is to cope with climate change with tactical as well as strategic adjustment (Frankhauser, Tol and Pearce 1997). The assessment of adaptation impacts includes the gross benefit of adaptation. This can be quantified by referring to the extra cost and extra benefits of the coping mechanism. By assessing the efficiency of resource use within different adaptation options and the mitigation potential, farm management decision-makers can decide which adaptation option offers the greatest benefits relative to threshold or non-adapted productivity.

## **2.1 Adaptation appraisal**

### **(a) Farm performance analysis**

Both commercial and subsistence farmers are suffering economic losses due to climate shocks. These losses can be measured as the increased resource inputs and the loss in the value of the output when referring to productivity (AGHGO 2004). Choosing the approach depends on the anticipated response of producers' impact. There are a number of tools and indicators available with which production cost, productivity or farm net income can be measured. These are:

**Gross margin analysis:** This method refers to the units of output and the estimated change in output due to climate change or adaptation impact.

**Agricultural land assessment:** These method estimates changes in land value with and without climate change and the impacts may indicate variability of productive capacity. Comparing, the unit costs of resource inputs; such as water requirements before and after changes and adaptation.

**The total budgeting approach:** It may help to estimate the difference between net incomes (the value of gross output minus gross resource inputs) with and without climate change or adapted or non-adapted conditions.

**The partial budgeting approach:** It can be used to estimate the marginal change of output or farm net income due to alternative production practices for adaptation to climate change. It is a tool to analyze change in farm business by input substitution, output substitution or technology adoption.

All methods are popular appraisal techniques for estimating the net benefit of adaptation to specific climate change impacts for the purpose of choosing between different adaptation alternatives. These estimates focus on the economic implications of climate change and adaptation options for optimizing farm goals at alternative bio-physical changes and ecosystem services.



The study uses most of the analytical tools described for appraising adaptation techniques and the impacts of climate change. On the basis of the estimated indicators, the impacts of climate change and adaptation options were compared with a base line (or reference) scenario to visualize the net effects.

Descriptive statistics of adaptation practice are presented for the two main rice growing seasons, *Boro* and *Aman*. To get an overall idea of impact and adaptation, this study used all the indicators. The analysis of impact of farm management strategies on per hectare productivity (yield, gross margin, net margin, and returns to land) uses the mean variance method (Just and Pope 1979). The variance of the productivity in a specific season indicates production risk. The comparison of mean productivity for threshold to non-adapted periods and non-adapted periods to adapted periods reveals the impact of climate change and adaptation efficacy.

### **(b) Cost-Benefit Analysis**

The appraisal of adaptation options is also done using one of the CBA techniques BCR. This is an economic decision support instrument that compares benefits of adaptation with the cost of the implementation of an adaptation option. Some adaptations have investment costs at the initial stage and resource maintenance costs each year in addition to production costs. For these investments, the undiscounted full costs are used in the BCR analysis to assess the financial performance of rice farming after adaptation.

### **(c) Cost-Effectiveness Analysis**

This is an economic decision-support instrument widely used to determine least-cost pathways to advise on economic or environmental goals (AGHGO 2004). In the study, CEA provides the estimated benefits in kind (for example, quantity of rice) for adaptation options that are likely to be achieved for 100 BDT spent on adaptation as a given cost. For simplification, the assumption is to revive production up to the threshold level. In the first step, the method identifies the cost of each option. Then, the benefits as incremental outputs that are achieved by each alternative option are quantified. Finally, the cost-effectiveness of an adaptation option is calculated by determining the amount of BDT necessary to cover the rice production towards thresholds under climate shocks. This also indicates how much incremental rice could be produced for 100 BDT spent on an adaptation option.

## **2.2 Data sources**

The study uses the data from the field survey and, thus, a total of 300 farm households prone to the effects of climate change. Part of the 13th agro-ecological zone that the study covers, where production is considered to have medium potential, is of tidal flood plains. The three sample coastal districts, Khulna, Sathkhira and Bagherhat, were purposely selected in consideration of the farm income vulnerabilities in the regions. Selection was also based on the existence of GO and

NGO-supported projects for climate change adaptation and GHG mitigation. Three Upazila were purposely selected for the same attributes of representation.

Detailed cost and production information was collected for 2006 (provided by the farmers' records in association and memory). This period of production is considered the threshold level. There was no severe effect of climate variability on production in the area up to 2006. The next three years, 2007, 2008 and 2009, are considered the climate shocks period. After two devastation sea storm *Sidre* (2007) and *Aila* (2009) the production system, the farmers claim, underwent severe changes. This period is assumed as production without coping strategies under adverse climate variability or the non-adapted period for the sample farmers. From 2010 to 2013 the sample farmers adopted alternative production systems in their fields; this period is the adapted period aiming of sustainable intensification. Farmers' bench mark data on different thresholds was recorded by the farmers when they joined the farmers club. Hence, data of inputs and outputs were cross-checked with bench mark records kept by the farmers' club.

Detailed information on adaptation practice, production stages, labour endowment, land preparation, fertilizer use, irrigation efficiency and variety status was collected. Data was available for the years 2006 to 2013- 8 years of the respondent farmers' production status.

### **3 Results and discussion**

#### **3.1 Economic implications of the farmers' perception and climate change impacts**

Most of the sample farmers perceive that changes in present climate compared to 20 years ago comprise less rainy days in the dry season, a delay of the rainy season, increased temperatures and more hot days associated with a higher-than-average maximum temperature. They consider 2006 as the last year with a stable climate. Following 2006, the basic climate parameters have not returned to the farmers' normal threshold ranges. After a devastating tropical sea storm named *Sidre* in 2007, there was significant rising of the sea level around the coast of Bay of Bengal. This created shocks such as salinity intrusion in rice fields and water stagnation. Traditionally, the areas of agricultural land have been marginally salinity-prone, but farmers could wash away the land and remove the problem of salinity with available rain-water. After sea levels, however, problems have increased: water stagnation has worsened average, maximum temperatures risen, and there have been changes in the magnitude of the rainy season. The farmers' production systems have faced a new bio-physical and ecological environment that was created by climate variability and the secondary effects of salinity. Interestingly, farmers' perceptions about climate variability are truly reflected in the levels of productivity and farm income. From 2007 rice production per hectare in the Boro and Aman seasons compared to threshold production drastically declined

(Table 1). Farmers are using extra input, water and labor to reach the threshold levels of output or the combinations of inputs that cost the least to ensure productivity resilience. They are faced with continuing climate variability shocks and increasing food insecurities.

**Table 1 Comparison of the farm performance in the threshold (2006) and non-adapted (2007-2009) periods relative to climate variability impacts**

	<i>Boro season</i>				<i>Aman season</i>			
	Yield (Kg/ha)		Gross margin (BDT/ha)		Yield (Kg/ha)		Gross margin (BDT/ha)	
	Threshold period	Non adapted period	Threshold period	Non-adapted period	Threshold period	Non-adapted period	Threshold period	Non-adapted period
<b>Mean</b>	4,113	2,448	53,472	34,985	2,536	1,786	39,066	24,995
<b>Mean difference</b>	1,614.2970 t = 11.5300 (000)		1,8486.9100 t = 10.1773 (000)		750.4596 t = 31.1063 (000)		7,970.5850 t = 27.2055 (000)	
<b>Standard deviation</b>	2,514. 86	363.13	32,693. 21	5,083.84	901.07	569.50 2	11,722. 12	7,973.03
<b>Co-efficient of variation</b>	28	119	28	119	48	54	48	54

Note: t = pair t test value; figures in parentheses indicates provability levels that ensured a high level of significance.

Source: Author's own calculations from survey

Another sea storm Aila hit the study area in May 2009 devastating the rice farming system. In the period of 2007 to 2009, the sample farm households faced severe vulnerability of farm income to climate variability. The variability of yields and of gross margins indicates the impact of climate variability after the threshold climate. Figure 1 represents the relative performance of farm management at the threshold and in the non-adapted period.

The gross returns of Boro rice per hectare were estimated at 53,472 BDT (approximately 535 Euro) under the threshold climate, while this was 39,066 BDT (approximately 400 Euro) for the Aman season. Compared to the threshold, the average gross margin per hectare for both seasons drastically fell in the non-adapted period. This has important implications for farm income and welfare under climate variability, and the significant mean difference in yield and gross margins indicates this impact

### 3.2 Adaptive response to perceived climate variability and its economic implications

The surveyed farmers have adopted a variety of coping mechanisms in response to climate change shocks. In the aftermath of sea storm Aila an intensive rehabilita-

tion program was initiated by GOs and NGOs in the study area. The perceived knowledge of climate change in non-adapted periods and the agricultural rehabilitation programs of different organizations have directed farmers towards adaptation. Their alternative production practices can be categorized in three distinct management approaches for both growing seasons: soil and crop management practices, best fertilizer management practice, and water management practice. Each of the adaptation categories consists of sub-practice options for environment friendly agricultural activities. There are five specific adaptations for rice cultivation in the *Aman* season and nine distinct categories of adaptation for rice cultivation in the *Boro* season practiced by the sample farmers details described in table 2. Most of the individual practices also indicate that low carbon farming practice was introduced with the climate change adaptation extension program in the study area. The adaptation options are chosen depending on the available resources, growing season, and regional salinity level. The sample farmers rank the adaptation performance according to the net output gain, problems in their application, availability of resources, cost-effectiveness, and sometimes on adaptation and mitigation potential. Interestingly, most of the farmers have great awareness about climate variability and change, because of media reports, GO and NGO campaigns, and extension programs in the study area.

In order to assess the impact of a new adaptation management practices on farm production, this study has described the available fourteen adaptation options in detail. The overall economic performance is discussed in the following sections.

### **3.3 Relative farm performance under different adaptation options**

#### **Farm earning performance**

A budget approach estimates different performance indicators in farm management analysis. A farmer typically wishes to maximize his farm income subject to the exogenous conditions of the farm. The exogenous conditions are the farm's environment, including climate and ecology. Farmers choose a crop mix and inputs for each unit of land that maximizes the farm net profit.

A number of performance indicators is obtained from a complete budgeting approach according to figure 1. A key indicator is 'returns to land'. In this study, returns to land were estimated for threshold, non-adapted, and adapted periods. This is also the basis for Ricardian theory of land rent, and the basis for further analysis of the impacts of climate change on farms.

The 'returns to land' indicator effectively represents farm earnings and the impact on land under conditions of endogenous factor endowment for profit maximization subject to exogenous climate stimuli and adaptation dynamics. It is evident from table 1.2 that in return to land all categories drastically decreased by weather variability in the non-adapted period. Adaption impact varies according to the nature of the practice and the seasons.

For the *Aman* season, almost all the adaptation options reap the benefits of reviving production; except in being option number 5 which tried to adapt only by saline-tolerant varieties with fertilizer deep placement. Adaptation option number 2, soil and crop management through relay cropping with khesari (*Lathyrus sativus L.*) and balanced fertilizer application, give the greatest benefits Among the *Aman* season options: farmers get double the crops in the same plot at the same time. Option 2 is followed by adaptation option number 3, soil and crop management through relay cropping with khesari (*Lathyrus sativus L.*) including balanced fertilizer application and irrigation management by diversion ditches considering the value of returns to land. Adaptation option 3 also provides double crop benefits as it helps to grow the legume crop in the same plot. Considering the threshold level of the returns to land value, it almost revives the full benefit of the threshold income. In the *Aman* season options number 1 and 4 moderately increase the value of returns to land but these are significantly lower than the threshold level.

In the *Boro* season, seven out of nine categories of alternative adaptation options had positive impacts on the value of returns to land. Zero tillage with saline-tolerant varieties and best fertilizer management practice were found to not have a positive impact on returns to land. Although both options have merits in mitigation, the farmers claimed there is no positive economic impact. Water management in the *Boro* season is crucial for reviving the threshold level of productivity. Ensuring the water harvesting and diversion ditches, adaptation option 5 in the *Boro* season provides the highest returns to land Among the available options. The second best option in the *Boro* season is adaptation option number 5 which only ensures irrigation water management with a water reservoir and diversion ditches. Considering the returns to land, the option 5 in the *Boro* rice growing season is followed by adaptation option 1 which uses soil and crop management practice with climate stress-tolerant seed varieties, including best fertilizer management practice, and irrigation water harvesting.

**Table 1 : Returns to land at different climate thresholds under adaptation options**

Adaptations	Returns to land (BDT/ha)		
	Threshold period	Non-adapted period	Adapted period
<i>Aman</i> season			
1. Soil and crop management with saline-tolerant seed varieties ( <i>Aman-1</i> )	16,240	10,491	12,153
2. Soil and crop management through relay cropping with legume, and balanced fertilizer application ( <i>Aman-2</i> )	38,485	27,903	32,685
3. Soil and crop management through relay cropping with khesari ( <i>Lathyrus sativus L.</i> ) including balanced fertilizer application and irrigation management by diversion ditches ( <i>Aman-3</i> )	30,426	20,953	29,264
4. Integrated pest management with saline-tolerant seed varieties ( <i>Aman-4</i> )	31,462	21,791	22,685
5. Minimum or zero tillage-based integrated crop management with saline-tolerant varieties and best fertilizer management practice by nitrogen deep placement ( <i>Aman-5</i> )	14,290	9,519	7,518

<b>Boro Season</b>			
1. Soil and crop management practice with climate stress-tolerant varieties including best fertilizer management as well as irrigation water harvesting ( <i>Boro-1</i> )	37,93]	13,612	21,493
2. Soil and crop management through saline-tolerant varieties and balanced fertilizer application by nitrogen deep placement with water harvest ( <i>Boro-2</i> )	31,534	14,588	16,738
3. Crop management by saline-tolerant varieties, balanced fertilizer application with nitrogen deep placement as well as irrigation management by water reservoir and diversion ditches ( <i>Boro-3</i> )	26,975	11,697	13,934
4. Minimum tillage-based integrated crop management with salt-tolerant varieties ( <i>Boro-4</i> )	35,164	14,281	16,105
5. Best fertilizer management practice by balanced fertilizer, nitrogen deep placement including water reservoir and diversion ditches ( <i>Boro-5</i> )	40,912	17,787	29,350
6. Irrigation water management with water reservoir and diversion ditches ( <i>Boro-6</i> )	33,850	16,919	26,427
7. Soil and crop management practice with saline tolerant varieties associated with irrigation water management with water reservoir and diversion ditches ( <i>Boro-7</i> )	21,492	12,868	12,893
8. Zero tillage-based integrated crop management with saline tolerant varieties with water reservoir and diversion ditches ( <i>Boro-8</i> )	31,490	16,162	16,005
9. Best fertilizer management practice applied by balanced fertilizer ( <i>Boro-9</i> )	17,261	10,418	9,396

Source: Author's own farm survey

Interestingly, options 3 and 7 in the Boro season is used most of the available components, but the restoration performance was low. The reason behind this is the higher costs of inputs involved in implementing an integrated approach which reduces farm returns to land. At the same time, some regions salinity levels exceed the tolerance level in crop growing and, as a beginner; it will take time to fully adjust to the new practices.

Adaptation options 2 and 4 moderately increase the land value from the non-adapted period, but compared to the threshold level, the performance is low. Nevertheless, all adaptation options for the sample farmers have monetary as well mitigation merits. Compared to threshold levels, the returns to land indicator of the non-adapted periods significantly decreased. The hope is that the diminishing trends of such indicators for the sample farmer stops with successful coping mechanisms of the adaptation options.

### **3.4 : Marginal impact of adaptation by partial budgeting approach**

Partial budgeting evaluates the consequences of changes in farm methods which affect only part rather than the whole system of the farm (Dillon and Hardaker 1980). In the case of adaptation, farmers use a new technology package that affects performance.

**Table 2 Marginal impacts of adaptation options using a partial budgeting approach in the Aman season**

Options	Aman-1	Aman-2	Aman-3	Aman-4	Aman-5
<b>A. Benefit forgone</b>					
Gross margin forgone	33,408	39,144	41,129	41,784	39,144
New extra cost	18,945	23,011	18,846	20,531	18,668
<b>Subtotal</b>	<b>52,353</b>	<b>62,155</b>	<b>59,975</b>	<b>62,315</b>	<b>57,812</b>
<b>B. Benefit gained</b>					
Gross margin due to change	36,753	45,695	66,443	48,807	45,695
Cost no longer incurred	19,658	19,920	20,451	23,433	18,898
<b>Subtotal</b>	<b>56,411</b>	<b>65,615</b>	<b>86,894</b>	<b>72,240</b>	<b>64,593</b>
<b>C. Net change = (B-A)</b>	<b>4,057</b>	<b>3,460</b>	<b>26,919</b>	<b>9,924</b>	<b>6,781</b>

Source: Author's calculations based on the farm survey.

By comparing situations with and without the new alternative practices, the net effect on the whole farm performance can be estimated. This is also described as the marginal impact of change by production method substitutions. In the first step, the performance change as a result of adaptation is calculated based on the benefit forgone and the benefit gained. The benefit forgone has two sub-components: the gross margin forgone by introducing the new method (the gross margin without adaptation), and the extra cost for the new production practice. In other words, the benefit received under the present farm system would no longer be received for alternates systems (tables 3 and 4).

The benefit gained has two sub-elements: the gross margin due to change (that is, the gross margin after adaptation) and the cost no longer incurred for alternatives. Finally, the net change in farm profits associated with alternative adaptations can be calculated as benefits gained minus benefit forgone. If, after the calculation, the benefit gained is greater than the benefit forgone, the adaptation option is considered a feasible alternative. If the converse is true, the adaptation is not sustainable from an economic point of view.

Tables 3 represent the figures for adaptation options in the Aman season. The highest possible net change occurs with adaptation option 3 in the Aman season. Interestingly, if water management is absent in this adaptation option of the Aman season, the net gain drastically falls to the lowest level as indicated in case of option 2. Therefore, irrigation is an influential factor, which greatly affects the results, for this option. The soil and crop management practice only by saline-tolerant rice varieties marginally changes in gross margin. Farmers have potential for greater gain if they include integrated pest management to the varieties change. The marginal effect of adaptation option number 5 in the Aman season accounts for 6,781 BDT per hectare.

**Table 3 Marginal impacts of adaptation options using a partial budgeting approach in Boro season**

Options	Boro-1	Boro-2	Boro-3	Boro-4	Boro-5	Boro-6	Boro-7	Boro-8	Boro-9
<b>A. Benefit forgone</b>									
Gross margin forgone	45,893	38,865	40,096	41,258	39,310	34,820	41,357	39,534	35,781
New extra cost	27,063	26,942	28,252	26,867	32,974	32,167	25,267	25,417	36,943
<b>Subtotal</b>	<b>72,956</b>	<b>65,807</b>	<b>68,348</b>	<b>68,125</b>	<b>72,284</b>	<b>66,987</b>	<b>66,624</b>	<b>64,951</b>	<b>72,724</b>
<b>B. Benefit gained</b>									
Gross margin due to change	76,676	63,978	57,878	77,374	65,022	54,711	71,220	64,037	62,123
Cost no longer incurred	26,764	23,573	27,936	26,157	20,678	21,471	25,288	22,018	23,791
<b>Subtotal</b>	<b>103,440</b>	<b>87,551</b>	<b>85,814</b>	<b>103,531</b>	<b>85,700</b>	<b>76,182</b>	<b>96,508</b>	<b>86,055</b>	<b>85,914</b>
<b>C. Net change = (B-A)</b>	<b>30,484</b>	<b>21,744</b>	<b>17,464</b>	<b>35,405</b>	<b>13,416</b>	<b>9,195</b>	<b>29,884</b>	<b>21,104</b>	<b>13,180</b>

Source: Author's own calculations based on the farm survey.

The five options assessed all have positive effects on the net change but the range is very high. Some options are reducing costs and some are increasing the gross margin. The farmers apply the practice according to their affordability and availability of resources. They claim their new adaptation knowledge is a first step to climate-resilient farming.

In the case of the *Boro* season, the highest possible net change occurs with adaptation option 4 because it is an option which notably reduces tillage cost and contributes to reducing production cost. If irrigation water is applied with the best fertilizer management as adaptation option 1 in the *Boro* season, cost increase, and the net gain decreases compared to option 4 under minimum tillage. Option 1 is the second best option in *Boro* season. Therefore, irrigation and fertilizer are influential factors in gross margin increase; however, the net change is less and cost is high compared to option number 4. Options 2, 3, and 8 provided moderate changes in net income after adaptation. Farmers have some potential for greater gain if they include soil and crop management with the saline-tolerant seed varieties. The marginal effect of adaptation option number 7 in the *Boro* season accounts for 29,884 BDT per hectare, which is the third best option in the *Boro* season. Adaptation options number 5 and 9 provided low changes in net income compared to the other available options. The marginal impacts of options 5 and 9 on net income change accounts for 13,416BDT and 13,180BDT per hectare of land respectively. Adaptation option 6 in the *Boro* season use only irrigation water and diversion ditches which effects marginal changes in the gross margin.

The nine options assessed all have positive effects on the net change but the range is very wide. Some options reduce costs and some increase the gross margin to the same degree as that of the *Aman* season. The farmers apply the practice according to their affordability and availability of irrigation water resources. For long-term



adaptation options they have to invest for an extended period of time and keep land resources for rain water reservoir which has opportunity costs. The financial analysis and economic appraisal can better present the implications of adaptation options as it accounts for such resources and the opportunity cost.

### 3.5 Appraisal of the adaptation options of the Boro and Aman rice growing seasons on the basis of the farm survey data

The farmers that are prone to the effects of the climate change have specific goals, including the resilience of farm productivity and returning revenue up to the threshold level. The goals relate to family food security and better livelihoods as a result of a stable farm income (Ramasamy 2012). According to the views expressed in the study survey, traditional and subsistence farmers are very rigid in their professional mobility even when vulnerability of income and opportunity costs is higher. They want to survive by changes within the farming system, and this makes adaptation options worthwhile. However, any adaptation or investment decision has to be economically assessed in view of available options. In the following CBA (using benefit cost ratio BCR indicator) and CEA are used for assessing the most valuable adaptation options in rice farming. BCR is one of the CBA tool indicates the financial performance of adaptations, while CEA indicates the total benefit for a given amount of money. Table 5 represents both the BCR and CEA of farm-level selected adaptation options. These analyses were considered only for the adaptation options that need initial investment cost, pay-back periods and, benefits comes over an extended period of time.

**Table 4 : Cost-benefit and cost-effective analysis of adaptation options in Aman and Boro seasons**

Adaptations	BCR	Cost-Effectiveness
1. Soil and crop management through relay cropping with khesari ( <i>Lathyrus sativus</i> L.) including balanced fertilizer application and irrigation management by diversion ditches ( <i>Aman-3</i> )	2.40	100 BDT spent on the adaptation ensures 10kg of rice
2. Soil and crop management practice with climate stress-tolerant varieties including best fertilizer management as well as irrigation water harvesting ( <i>Boro-1</i> )	2.83	100 BDT spent on the adaptation ensures 8.04kg of rice
3. Soil and crop management through saline-tolerant varieties and balanced fertilizer application by nitrogen deep placement with water harvest ( <i>Boro-2</i> )	2.37	100 BDT spent on the adaptation ensures 5.7kg of rice
4 Crop management by saline-tolerant varieties, balanced fertilizer application with nitrogen deep placement as well as irrigation management by water reservoir and diversion ditches ( <i>Boro-3</i> )	2.05	100 BDT spent on the adaptation ensures 4.4kg of rice
5. Best fertilizer management practice by balanced fertilizer, nitrogen deep placement including water reservoir and diversion ditches ( <i>Boro-5</i> )	1.9	100 BDT spent on the adaptation ensures 2.9kg of rice.
6. Irrigation water management with water reservoir and diversion ditches ( <i>Boro-6</i> )	1.7	100 BDT spent on the adaptation ensures 2kg of rice
7. Soil and crop management practice with saline tolerant varieties associated with irrigation water management with water reservoir and diversion ditches ( <i>Boro-7</i> )	2.82	100 BDT spent on the adaptation ensures 8.4kg of rice

8. Zero tillage-based integrated crop management with saline tolerant varieties with water reservoir and diversion ditches ( <i>Boro-8</i> )	2.5	100 BDT spent on the adaptation ensures 5.9kg of rice
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Source: Author's own calculations based on farm survey.

In the Aman season, adaptation option 3 is only long-term investment option and has a BCR of greater than 2 which is quite impressive in financial point of view. The value of BCR higher than one implies that the investment is feasible at given rate of interest as the benefits exceed the cost. The CEA for the same adaptation is also supportive because 100 BDT ensures 10 kilograms of rice, or the cost of 10 BDT/kg of rice. This adaptation option is feasible for its total benefit because the market price of rice is 15 BDT/kg.

In case of the Boro season adaptation option 1, is also a feasible option as the BCR and CEA support application. Boro adaptation 2 is a financially sound adaptation practice and the CEA indicator also supports adopting the technology.

Boro season adaptation option number 3 is a feasible option in view of BCR and CEA indicators, whereas option number 5 is not financially viable provides only 2.9 kilograms of rice for each 100 BDT spent. Similarly, Boro season adaptation option 6 is not-feasible because this adaptation provides only 2 kilograms of rice for each 100 BDT spent; while the market value of two kilograms of rice is only 30 BDT.

Adaptation option 7 for the Boro season usually covers its cost. Finally, adaptation option 8 is also a feasible according to both Indicators.

The alternative production system appraisal helps to set priorities for climate adaptation on farms. The overall assessment suggests that a single sub-component of an adaptation practice alone will not functionally sufficient for facing climate change. An integrated approach consisting of all system components, soil and crop management, fertilizer management, and irrigation option management, will be a feasible adaptation strategy.

#### 4 : Conclusions

This paper presented the economic implications of adaptation options in different ways. The assessment indicators of climate change adaptation were analyzed to find the performance of farms at different thresholds. There is not a single criterion to assess economic implications of climate change adaptation for carbon farming as the bio-physical environment and markets determine profitability and viability of farming. The profitability and success of farming depends on many exogenous and endogenous variables. Consequently, the analysis of the economic impacts of climate change adaptation options is challenging because the contributions of influencing factors are difficult to single out. Keeping in mind all the limitations, this study estimated the relevant indicators of farm performance using common

economic tools. The basic findings of the study postulate that climate variability has a significant impact on rice production in both growing seasons. The effects are estimated in monetary terms. Results show clear farm income vulnerability from the threshold level due to climate change. As a consequence, farmers operated their farms despite climate shocks for some period and then adopted some alternative practices to build resilience in farm productivity by intensification and improve returns to the threshold level. These adaptations ensured benefits compared to the non-adapted period, minimized the costs of production and economized resource use that ensures sustainability of the farming. In addition to this mitigation potentiality of new practice for low carbon climate smart production merits for sound cultivation. There were 14 common practices of intensification found in the farm survey whose economic implications were assessed for sustainability. Three basic components of adaptation were found to be important for full economic recovery: soil and crop management, nutrition application management and water management. The combined application of the three components can successfully revive the threshold productivity in the study area.

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## Causal Relationship between Sectoral Agricultural Output and Economic Growth in Bangladesh: An Econometric Analysis

Somrita Alam\*  
Md Abdul Wadud\*

**Abstract:** *The study attempted to investigate the cointegration and causal relationships between sectoral agricultural output and economic growth by applying recent advances in econometric methods like cointegration and error correction model with careful attention to time series data for avoiding spurious regression of traditional econometric analysis. To estimate the relationships, this study used time series data from 1973-74 to 2012-13. Results of unit root tests confirm that the variables are integrated of order one in levels and integrated of order zero in first differences. Results of Johansen cointegration tests indicate that there are long-run equilibrium relationships among the variables. Results of Granger Causality tests imply that there is bidirectional Granger-causality between total agricultural output and economic growth. It can be concluded that agriculture makes a significant contribution to economic growth in both short-run and long-run and that agriculture serves as an engine of economic growth in Bangladesh.*

**Keywords:** Agricultural Output, Economic Growth, Cointegration, Granger Causality, Bangladesh

### 1. Introduction

The potential contribution of agriculture to economic growth has been an on-going subject of much controversy among development economists, while some economists contend that agricultural development is a precondition to industrialization which lead to economic growth, others strongly disagree and argue for a different path. Taking advantage of recent developments in time series econometric methods, this study re-examined the question of whether agriculture could serve as an engine of growth.

Two polar views regarding the centrality of agriculture's role in the process of economic growth are prominent in the literature of economic development. At one

\* The authors are respectively Lecturer and Professor Department of Economics, Rajshahi University.

pole, a substantial literature argues that agricultural development is necessary for overall economic transformation of a country. The contribution of agriculture in food, raw materials, and financial surplus (including foreign exchange) is essential for the process of industrialization in the early stages of an economy, during which by definition, the industrial sector is small (Johnston, 1970). At the other pole of views, economists can often bypass the process of agricultural development and instead of investing to build an industrial base.

Bangladesh has a basically agrarian economy where rice, jute, tea, wheat, sugarcane, potatoes, meat, milk, poultry etc., are the major agricultural products. Agriculture comprises about 18 percent of the country's gross domestic product (GDP) and employed around 50 percent of the labour force (Bangladesh Economic Review, 2014). The agricultural sector in Bangladesh is divided into four sub-sectors which are crop, fisheries, livestock and forestry. The crop sub-sector dominates the agricultural sector contributing about 57 percent of total output (Bangladesh Economic Review, 2014). This is the single largest producing sector of the economy. Fisheries, livestock and forestry sub-sectors contribute 22 percent, 8 percent and 13 percent, respectively (Bangladesh Economic Review, 2014).

Bangladesh is one of the most impoverished countries in the world. It is the seventh most populous country and is among the densely populated countries in the world with high poverty rate. About 35.6 percent population live below the poverty line. The total GDP of Bangladesh is US\$572 billion in 2014, GDP growth rate is 7.2 percent (in 2015-16 estimated) (Bangladesh Economic Review, 2015) and GDP per capita is US\$1314 in 2015 (Bangladesh Economic Review, 2016). In 2014, the sector wise contribution to GDP of Bangladesh accounts 19 percent in agriculture, 30 percent in industry and 51 percent in services; and about 40 percent labour force is employed in agriculture, 30 percent in industry and 30 percent in services (Bangladesh Economic Review, 2015).

Much of the early work on this issue coincided with the debate on the role of agriculture in promoting economic development in low-income nations in the aftermath of extended periods of colonial rule ((Lewis, 1954, Fei and Ranis, 1961; Jorgenson, 1961; Johnston and Mellor, 1961; Schultz, 1964). Johnston and Mellor (1961), Timmer (2002), Memon et al., (2008) and Meijerink and Roza (2006) observe that agriculture contributes to economic growth and development through five inter-sectoral linkages. The sectors are linked via (i) supply of surplus labour to firms in the industrial sector, (ii) supply of food for domestic consumption, (iii) provision of market for industrial output, (iv) supply of domestic savings for industrial investment and (v) supply of foreign exchange from agricultural export earnings to finance import for intermediate and capital goods. The "Johnston-Mellor Linkages" allow market-mediated input, input-output interactions between agriculture and non-agriculture sectors, so that agriculture can contribute to

economic development. Hwa (1988) argues that agriculture is an engine of growth and adds agriculture to the standard Solow-Swan growth equation as a measure of linkages between rural and industrial sector of the economy. Edwards (1993), Caporale and Pittis (1997), Frankel and Romer (1999), Gardner (2005), Shombe (2005), Tiffin and Irz (2006), Tsakok and Gardner (2007), Awokuse (2008) and Awokuse (2009) examine the dynamic causal linkages between agriculture and economic growth and report mixed results regarding causal relationship between agriculture and economic growth.

As total output of all sectors in Bangladesh is increasing and no econometric work, to the best of our knowledge, has been done on the causal relationship between agricultural sub-sectors and economic growth, this study was designed to evaluate the cointegrating and causal relationship between sectoral contributions of agriculture and economic growth in Bangladesh using econometric techniques like cointegration and Granger representation theorem.

The rest of the paper is structured as follows. Section 2 describes methodology; Section 3 explains data and variables; Section 4 reports empirical results and Section 5 gives conclusions and policy implications.

## 2. Methodology

In recent years, several econometric methodologies have been developed for econometric analysis of time series data. It is observed that time series data used in many econometrics studies create some critical problem to econometrician. It is assumed that the underlying time series data are stationary. If this assumption is not present in the estimation process, the traditional hypothesis testing, which is based on small sample or asymptotic distribution of the estimates, are no longer valid. Following this problem some approaches have already been developed, that are effective for estimation and specification of time series analysis. These tools allow relevant economic theory to enter into the information of long-run equilibrium levels with the short-run dynamics of the equation. The development of cointegration and error correction mechanism (ECM) in time series analysis has guided the tools to apply dynamic models that account explicitly for the dynamic of the short-run adjustment towards long-run equilibrium. The methods are expressed as follows.

### 2.1. Augmented Dickey – Fuller (ADF) test

It is started with the Dickey –Fuller (Dickey and Fuller, 1979) test which is applied to regression in the following forms to check whether the variables suffer from nonstationarity or not:

$$\Delta Y_t = \xi Y_{t-1} + u_t \quad (1)$$

$$\Delta Y_t = \delta_1 + \xi Y_{t-1} + u_t \quad (2)$$



$$\Delta Y_t = \delta_1 + \delta_2 t + \xi Y_{t-1} + u_t \quad (3)$$

The difference between (3) and other two regressions lie in the inclusion of the constant and the trend term. Where  $t$  is the time and trend variable. The next step here is to divide the estimated  $\delta$  coefficient by its standard error to computed the Dickey-Fuller  $\tau$  statistic and to refer to DF tables to see the null hypothesis  $\delta = 0$  is rejected (there is a unit root). If the computed absolute value of the  $\tau$  statistics is less than the absolute critical values, the time series is considered to be non-stationary (Gujarati, 1998).

The Augmented Dickey-Fuller (ADF) test is applied for test of stationary allowing the chance of autocorrelation of error term  $u_t$ . ADF test requires modifying equation (3) as follows:

$$\Delta Y_t = \delta_1 + \delta_2 t + \varphi Y_{t-1} + \theta \sum \Delta y_{t-i} + u_t \quad (4)$$

Where  $u_t$  are assumed to be identically, independently distributed random variable. This ADF test involves adding an unknown number of lagged first differences of the dependent variable to capture auto-correlated omitted variables that would otherwise enter the error term  $u_t$ . The numbers of lagged difference terms to be included are often determined empirically, the idea being to include enough terms, so that the error term in equation (4) is serially independent. This ADF test statistics checks the null hypotheses that the time series has a unit root, i.e.,  $\xi = 0$  under the alternative hypothesis of stationary time series. That ADF test statistic has the same asymptotic distribution as the DF test statistic, so the same critical values are used.

## 2.2. Phillips-Perron (PP) unit root test

The alternative test for existence of a unit root in the residuals of the cointegrating regression is that suggested by Phillips (1987) and extended by Perron (1988) and Phillips and Perron (1986). An important assumption of the DF test is that the error terms  $u_t$  are independently and identically distributed. The ADF test adjusts the DF test to take care of possible serial correlation in the error terms by adding the lagged difference terms of the regressand. Phillips and Perron use nonparametric statistical methods to take care of the serial correlation in the error terms without adding lagged difference terms. The asymptotic distribution of the PP test is same as the ADF test statistic.

## 2.3. Cointegration

The concept of cointegration was introduced by Granger in 1981 and the statistical analysis of cointegrated process was organized by Engle and Granger (1987). Cointegration means that despite being individually non-stationary a linear combination of two or more time series can be stationary (Gujarati, 1998). When a linear combination of non-stationary variables is stationary, the variables are said to be

cointegrated, and the vector that defines the stationary linear combination is called a cointegrating vector. Thus it is quite possible for a linear combination of cointegrated variables to be stationary. In this case, the variables are said to be cointegrated. If the variables become stationary by differencing once, i.e.,  $I(1)$ , then the error term originated from the cointegration regression is stationary, i.e.,  $I(0)$  (Johansen, and Juselius, 1990 and Johansen, 1998). Now consider the following cointegrating regression:

$$Y_t = \alpha + \beta X_t + u_t \quad (5)$$

If the series  $Y_t$  and  $X_t$  are  $I(1)$ , and the error term  $u_t$  is  $I(1, 0)$ . The coefficient  $\beta$  measures the equilibrium relationship between the series  $Y$  and  $X$ . The term  $u_t$  indicates the variation from the long-run equilibrium path of  $Y_t$  and  $X_t$ . When a time series  $Y_t$  is said to be integrated of order one, it is denoted by  $I(1)$ . Taking first difference of the time series leads to a non-stationary process. At the same way if the original nonstationary series has to be differenced  $d$  times before it becomes stationary, the original series is integrated of order  $d$ , it is denoted by  $I(d)$ .  $Y_t$  is integrated of order  $I(0)$ , when it is stationary in level form. Following this way, in the case where original series, let  $X_t$  and  $Y_t$  are integrated of order one  $I(1)$ , as is frequently the case with economic variables (Nelson and Plosser, 1982), constancy in error correction mechanism requires all of terms to be integrated of order zero,  $I(0)$ . This is only the case if  $X_t$  and  $Y_t$  are cointegrated, i.e., there is a linear combination of  $X$  and  $Y$ , such as  $X_t = Y_t + u_t$ , which is stationary.

#### 2.4. Granger causality test

When variables are cointegrated, there is a general and systematic tendency for the series to return to their equilibrium value: short-run discrepancies may be constantly occurring but they cannot grow indefinitely. This means that the dynamics of adjustment is intrinsically embodied in the theory of cointegration. The Granger representation theorem (Granger, 1986 and Gujarati, 1998) states that if a set of variables is cointegrated  $(I, I)$ , implying that the residual of the cointegrating regression is of order  $I(0)$ , then there exists an error correction mechanism (ECM) describing that relationship. This theorem is a vital result as it implies that cointegration and ECMs can be used as a unified empirical and theoretical framework for the analysis of both short-run and long-run behavior. The ECM specification is based on the idea that adjustments are so as to get closer to the long-run equilibrium relationship. Hence, the link between cointegrated series and ECMs is intuitive: error correction behavior induces cointegrated stationary relationships and vice-versa (McKay *et al.*, 2002).

Let  $Y_t$  and  $X_t$  variables are cointegrated, and then the relationship between the two can be expressed as ECM. The ECM can be written as:

$$\Delta \ln Y_t = \alpha_0 + \alpha_1 \Delta \ln X_t + \alpha_2 ECT_{t-1} + \varepsilon_t \quad (6)$$

Where  $\Delta$  as usual denotes the first difference operator and  $\varepsilon_t$  is a random error term. The term  $ECT_{t-1}$  is the one period error correction term from the cointegrating regression. The ECM regression states that,  $\Delta Y$  depends on  $\Delta X$ , and also on the error correction term ( $ECT$ ). If the later is non zero then the model is out of the equilibrium. Suppose  $\Delta X$  is zero and  $ECT_{t-1}$  is positive. That means  $Y_t$  is above its equilibrium value. Since  $\alpha$  is expected to be negative, the term  $\alpha_2 ECT_{t-1}$  is negative and therefore  $\Delta Y_t$  becomes negative to restore the equilibrium. That is, if  $Y_t$  is above its equilibrium value, it starts falling in the next period to correct the equilibrium error, hence the name ECM (Gujarati, 1998).

The Granger causality test augmented with a lagged error-correction term (ECM) is also conducted in the final stage. If long-run relationship exists among the variables specified, there must be Granger causality in at least one direction (Engle and Granger, 1987). The Granger Causality test involves the estimation of an error correction model (ECM).

According to Granger representation theorem, a cointegrated system can be estimated as an ECM. While cointegration tests provide information about long-run relationships among variables, Granger causality tests provide information on both short-run and long-run dynamics relationships among variables.

### 3. Data and Variables Description

The success of any econometric analysis ultimately depends on the availability of the appropriate data. The empirical analysis of the study has been conducted using national data of agricultural output and GDP in Bangladesh from 1973-74 to 2012-2013. The data utilized are obtained from various publications of Bangladesh Bureau of Statistics (BBS). A summary statistics of variables of agricultural output and GDP is given in Table 1 and detailed data are shown in Appendix 1.

**Table 1: Summary Statistics of Variables**

Variables	Variable notation	Mean	Standard deviation	Maximum	Minimum
Crop output	Cp	6068.846	1825.324	10162.58	2604.18
Forestry Output	Fp	979.2065	569.7405	2061.61	136.91
Livestock Output	Lp	833.4703	324.5704	1671.84	287.76
Fisheries Output	Fip	1533.497	1055.733	3147.9	341.7
Total Agricultural Output	Tp	9417.106	3593.022	17043.32	3479.26
Gross Domestic Product	GDP	40394.88	34345.12	140425	6830.09

Table 1 provides information on mean, standard deviation, maximum value and minimum value of agricultural variables and GDP in Bangladesh for a period of 40 years.

## 4. Results and Discussion

### 4.1. Results of unit roots tests

This study used unit root test to check whether variables of agricultural output and GDP are non-stationary. All variables are used in logarithmic form. Two types of unit root tests used are augmented Dickey-Fuller (ADF) test and Phillips-Perron test.

Results of Augmented Dickey-Fuller (ADF) tests are presented in Table 2. Akaike Information Criterion is used to determine the optional lag length for the augmented terms. Results show that for all variables, the null hypothesis (non-stationary) of unit root cannot be rejected at 5 percent level for both cases with intercept and without trend and intercept. This means that the variables are integrated of order one. When the first difference is tested, the null hypotheses (non-stationary) are rejected at 5 percent level for both cases. That means the variables are integrated of order zero in first difference. But for the variable GDP, the null hypothesis cannot be rejected at 5 percent level. When the first difference is tested, the null hypothesis (non-stationary) is rejected at 10 percent level. But for without intercept, when we take second difference, the null hypothesis is rejected. Therefore, result confirms that, GDP variable is integrated of order one in levels but integrated of order zero in first differences. For without intercept, this variable is integrated of order zero in second difference.

**Table 2: Results of Augmented Dickey-Fuller (ADF) tests**

Variables	Levels		1 <sup>st</sup> Difference	
	With intercept	Without intercept	With intercept	Without intercept
lnCp	-0.016	0.229	-7.256	-6.779
lnFp	0.342	2.109	-3.854	-2.553
lnLp	-1.479	0.553	-5.341	-4.878
lnFip	0.236	1.455	-2.889	-2.229
lnTp	0.290	1.190	-6.526	-5.450
lnGDP	2.700	3.727	-2.870*	-5.721*

Note: The 1% critical value for Level is -3.64, 5% CV -2.95 and 10% CV -2.61. The 1% critical value for first difference is -3.65, 5% CV -2.96 and 10% CV -2.62. For without trend the 1% CV for level is -2.64, 5% CV -1.95 and 10% CV -1.62. The 1% critical value for Difference is -2.64, 5% CV -1.95 and 10% CV -1.62.

Phillips-Perron unit root test results for the logarithms of levels and first differences of all variables are presented in Table 3.

**Table 3: Results of PP unit root tests**

Variables	Levels		1 <sup>st</sup> Difference	
	With intercept	Without intercept	With intercept	Without intercept
lnCp	-2.296	1.851	-9.051	-9.017
lnFp	0.546	2.779	-4.204	-3.711
lnLp	-0.523	4.099	-4.488	-7.090
lnFip	-0.059	1.347	-3.986	-3.573
lnTp	0.276	3.958	-8.541	-7.896
lnGDP	4.133	7.092	-4.118	-3.376

Note: The PP unit root tests reported here are estimation with intercept and without trend and intercept. If the computed absolute value of the PP test statistics is less than the absolute critical values, the time series is considered non-stationary. The 1% critical value for Level is -3.64, 5% CV -2.95 and 10% CV -2.61. The 1% critical value for first difference is -3.64, 5% CV -2.95 and 10% CV -2.61. For without trend the 1% critical value for level is -2.64, 5% CV -1.95 and 10% CV -1.62. The 1% critical value for first Difference is -2.63, 5% CV -1.95 and 10% CV -1.62.

Table 3 shows that for all variables, the null hypothesis (non-stationary) of unit root cannot be rejected at 5 percent level for both cases with intercept and without trend and intercept. This means that the variables are integrated of order one. When the first difference is tested, the null hypotheses (non-stationary) are rejected at 5 percent level for both cases. This means that the variables are integrated of order zero in first difference.

Results from both tests, therefore, confirm that all variables are integrated of order one in levels but integrated of order zero in first differences. Thus we can now proceed for cointegration and Granger causality.

#### 4.2 Results of Cointegration

Cointegration of two (or more) time series suggests that there is a long-run, or equilibrium, relationship between them. Following the steps of Johansen procedure, hypothesis testing procedures are carried out to select the order of vector autoregression (VAR), starting with a maximum lag length four. A lag length of more than four is not considered because of the limited sample size. If the residuals do not suffer from serial correlation, it is appropriate to select a lower lag length although incorporating additional coefficients reduces the degree of freedom. Results from the lag length test suggest that possible lag lengths lie between one and four. The rank of the cointegration, i.e., the number of cointegrating vectors, is selected by using the maximum eigenvalue test. The second step in the Johansen procedure is to test for the presence of the number of cointegrating vectors among the series in the model. Results of cointegration are presented in Table 4.

**Table 4: Result of Johansen's Cointegration test between agricultural variables and GDP**

Variables	Cointegration rank	Eigen Value	Likelihood ratio	5% critical value	Decision
Crop output and GDP	$r \leq 0$	0.61	36.67	25.32	None
	$r \leq 1$	0.17	6.26	12.25	At most 1
Forestry output and GDP	$r \leq 0$	0.53	35.81	25.32	None
	$r \leq 1$	0.28	10.83	12.25	At most 1
Livestock output and GDP	$r \leq 0$	0.40	18.99	15.41	None
	$r \leq 1$	0.10	3.41	3.76	At most 1
Fisheries output and GDP	$r \leq 0$	0.41	16.51	15.41	None
	$r \leq 1$	0.02	0.66	3.76	At most 1
Total agricultural output and GDP	$r \leq 0$	0.44	27.71	25.32	None
	$r \leq 1$	0.27	9.62	12.25	At most 1

Note: Likelihood Ratio test indicates cointegrating equation at 5 percent significance level.

Results show that since the likelihood ratio (LR) value is greater than the critical value at 5 percent level, the null hypotheses of no cointegration is rejected. The hypotheses of one cointegrating vector are accepted. The Johansen cointegration results in Table 4 indicate that agricultural variables and GDP have one cointegrating vector. It means unique long-run equilibrium relationships exist between the variables.

### 4.3 Results of Granger Causality Test

If the cointegration exists, the next step is to investigate the short-run dynamics via the analysis of Granger causality tests. While cointegration tests provide information about long-run relationships among the variables, Granger causality tests provide information on short-run dynamics. We estimate two ECMs in order to test for Granger causality where the first equation has GDP as the dependent variable and the second has sectoral agricultural output as the dependent variable. Two null hypotheses are examined: a) agricultural output does not Granger-cause GDP; b) GDP does not Granger-cause agricultural output. The direction of Granger causality is captured through the joint significance tests of the coefficients of the lagged-differences of the explanatory variables. Results of Granger causality test are presented in Table 5.

**Table 5: Results of Granger causality test**

Null Hypotheses	Observations	F-Statistic	Probability
GDP does not Granger Cause Crop Output	40	12.2308	0.00015
Crop output does not Granger Cause GDP		3.82012	0.03412
GDP does not Granger Cause Forestry Output	40	0.47750	0.62529
Forestry output does not Granger Cause GDP		1.87893	0.17151
GDP does not Granger Cause Livestock Output	40	3.30272	0.05155
Livestock output does not Granger Cause GDP		2.28809	0.12012

GDP does not Granger Cause Fisheries Output	40	3.02584	0.06461
Fisheries output does not Granger Cause GDP		1.65364	0.02950
GDP does not Granger Cause Total Agricultural Output	40	9.10858	0.00090
Total Agricultural output does not Granger Cause GDP		3.86991	0.03282

Results of the Granger Causality tests suggest that agriculture makes a significant contribution to economic growth in both short-run and long-run as the null hypotheses are rejected at 5 percent significant level. Specifically, the null hypothesis that “agricultural Output does not ‘Granger-cause GDP’ is rejected at the 5 percent level. So it can be concluded that results from the empirical analysis provide strong evidence indicating that agriculture is an engine of economic growth.

### 5. Conclusion and Policy Recommendations

This research applies an econometric framework to estimate relationship between agricultural output and economic growth in Bangladesh. Secondary time series annual data have been used for the period of 1973-74 to 2012-13. Six variables have been selected for model specification of agricultural output and economic growth. This study uses cointegration and ECM to investigate the causality between agricultural output and economic growth at national level. Results suggest that outputs of agricultural sectors are cointegrated with economic growth both in the short and long-run. This implies that short-run disequilibria are corrected in the long-run within this framework. Results of Granger causality suggest that sectoral outputs of agriculture help boost economic growth implying that agriculture can still be considered as an engine of economic growth in Bangladesh. The policy implication of this research is that the government of Bangladesh should continue taking appropriate policies for fostering production of crops, livestock, forestry and fisheries sectors of agriculture.

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**Appendix 1: Annual Agricultural Output and GDP of Bangladesh**

Year	Agricultural output (In Million US\$)					GDP (in Million US\$)
	Crop	Forestry	Livestock	Fisheries	Total output	
1973-74	4169.38	216.91	393.77	429.43	5209.51	8923.23
1974-75	7594.30	260.39	466.13	537.90	8858.73	14167.64
1975-76	2996.80	139.09	287.76	385.21	3808.86	7138.12
1976-77	2604.18	136.91	291.33	446.84	3479.26	8923.23
1977-78	3538.71	268.84	514.26	457.50	4779.31	8618.89
1978-79	3718.30	312.28	689.81	452.34	5172.73	9510.15
1979-80	4418.53	313.75	839.12	451.78	6023.18	11132.99
1980-81	5143.86	369.68	765.81	431.89	6701.25	14347.05
1981-82	4730.68	326.44	633.58	381.46	6072.15	13214.12
1982-83	4390.36	357.26	620.67	341.70	5709.99	12121.01
1983-84	5205.36	476.11	669.87	431.06	6427.60	14028.47
1984-85	5957.27	528.28	644.06	563.91	8079.07	16128.32
1985-86	4667.35	635.11	515.32	485.54	6303.33	15600.13
1986-87	5386.17	670.73	529.62	588.32	7174.84	17604.03
1987-88	5366.08	812.17	572.14	663.46	7413.79	19113.12
1988-89	5490.59	752.55	661.66	730.31	7635.12	20522.71
1989-90	5899.23	805.83	768.49	782.17	8255.72	22404.00
1990-91	6105.73	802.77	744.61	772.81	8425.91	23388.57
1991-92	5831.15	812.81	737.05	809.20	8190.73	23764.45
1992-93	4718.00	828.88	807.70	1025.23	7389.81	24218.40
1993-94	4691.22	843.46	902.25	1210.10	7647.03	25758.55
1994-95	5600.40	968.72	1004.29	1415.71	8989.12	29110.61
1995-96	5875.26	1313.06	775.11	2093.72	10037.15	40729.25
1996-97	6088.29	1334.14	784.95	2257.92	10465.31	42318.01
1997-98	6253.04	1330.86	805.67	2392.23	10781.81	44037.15
1998-99	6740.02	1340.51	863.74	2597.64	11541.91	45708.51
1999-00	6642.22	1363.04	877.92	2717.84	11601.02	47123.82
2000-01	6312.88	1277.43	866.28	2484.49	10941.08	46988.54
2001-02	5901.73	1239.36	868.60	2419.62	10429.30	47567.24
2002-03	6221.73	1290.77	915.45	2462.66	10890.66	51913.66
2003-04	6597.66	1343.08	953.62	2508.40	11402.76	56498.08
2004-05	6756.68	1413.64	978.22	2517.58	11661.64	60381.73
2005-06	6875.14	1443.37	957.53	2432.45	11708.48	61975.22
2006-07	7579.83	1557.40	993.39	2569.01	12699.64	68257.28
2007-08	8830.37	1766.42	1094.00	2884.76	14575.54	79565.89
2008-09	8954.46	1797.56	1305.27	2890.78	15025.29	81067.50
2009-10	9417.07	1875.02	1340.79	2967.07	15599.96	101067.50
2010-11	9531.00	1871.84	1571.63	3086.90	16061.37	113404.40
2011-12	9790.24	1910.18	1655.50	3115.021	16470.94	129121.37
2012-13	10162.58	2061.61	1671.84	3147.90	17043.32	140425.24

Source: Statistical Yearbook of Bangladesh, BBS.



## **An Economic Study on Small-Scale Medicinal and Aromatic Plant Enterprises in Bangladesh**

**M. Yousuf Ali\***  
**S.A. Sabur\***

**Abstract:** *The specific objectives of the study are: (i) to identify different entrepreneurs/actors and their activities in supply chain of the small-scale medicinal and aromatic plants (MAPs) enterprises; (ii) to determine marketing channel of the medicinal and aromatic plants and products; and (iii) to find out the constraints and improvement strategies for the enterprises sectors in Bangladesh. Both primary and secondary data were used for the study. Ten villages under Laxmipur- kholabaria Union of Natore sadar upazila in Natore district and ten unions of Barlekha Upazila in Moulabazar district were selected as study areas for medicinal plant and aromatic plant, respectively. Primary data were collected through two periodic 'Focus Group Discussion' (FGD) organized with the participation of the medicinal and agar plant entrepreneurs/actors and representatives of local Upazila Agriculture Offices in the study areas by using a checklist and a schedule as well as based on information recording and field observation. For getting secondary information several research papers, literatures and documents were collected from different agriculture and agribusiness line agencies and from website. For the medicinal plant enterprises, the major problems are: high price and low quality of inputs, high irrigation cost, lacking of scientific and appropriate knowledge, experience of the MAPs entrepreneurs and actors, absence of local assembling and processing centre and non-availability of government support. For the agar-atar enterprises, the problems are: absent of official recognition and priority of this sector; scarcity of standard/quality testing tools and machineries of government; high duty imposed by the imported countries; complexity of 'Transit Permit' (TP) and CITES Certificate.*

### **1. Introduction**

In Bangladesh majority of the people who are engaged in agriculture have little knowledge on agribusiness activities. Due to development of infrastructure and

\* PhD Fellow, Department of Agribusiness & Marketing, BAU, Mymensingh and Professor, Department of Agribusiness & Marketing, BAU, Mymensingh

construction of houses for additional population, cultivable land is decreasing day by day in a alarming rate. For increasing population, landholdings become fragmented and landlessness is increasing gradually. In these circumstances, development of agribusiness and agribusiness enterprises could generate more income and employment by adding more value to agricultural products using less land as well as intensive use of existing land. But in fact, promotion of agribusiness and agribusiness enterprises in Bangladesh is becoming in very slow motion. In these considerations, an attempt of developing small-scale medicinal and aromatic plants (MAPs) enterprises may be identified a great step for economic growth of the country.

At one time, Bangladesh, as a tropical country was very rich in diverse natural medicinal and aromatic plants scattered throughout the forests, plain lands, crop fields, roadsides, gardens and wetlands. Unfortunately, in Bangladesh, due to over population pressure, over exploitation, deforestation and change in land use patterns, many species of MAPs have reached the edge of extinction or severe genetic loss. In addition, the country has to face serious consequences of biodiversity loss from the over use of high toxic chemical inputs in agriculture and the global climate change that are causes for destroying the MAPs species.

In early 1980's Ayurvedic and Unani companies could procure 80% of MAPs from natural forests and then rest 20% from import. Now the scenario has changed: 80% imported and 20% from domestic production (Merry and Shahjahan, 2014). In spite of these inverse situations, Bangladesh is still now blessed with innumerable genetic diversity of medicinal plants. In Bangladesh there are about 250 – 300 thousand plant species; in fact, almost all of these plant species are either directly or indirectly used as source of herbal medicines (Nasrin, 2012). Bangladesh Agricultural Research Institute (BARI) recorded 722 plant species, growing or available in Bangladesh have medicinal values. More than 8000 plant species used as medicinal plant in world. In India 4000 plant species are used as medicinal plants, while 700 plant species are used as medicinal plants in Bangladesh. Almost 255 medicinal plants (Mohiuddin, 2014) used in ayurvedic and unani system of herbal medicine preparation.

World Health Organization (WHO) has given statistics that 80% of the world population including Asia and the rural population in Bangladesh depends on traditional medicine (TM) produced from MAPs due to an accessible, affordable and culturally appropriate source of primary health care needs (Banik and Chowdury, 2014).

In Bangladesh, majority of the farmers are still now totally unaware about the profitability of MAPs cultivation. So, it is clear that MAPs cultivation is still a rudimentary stage. There are very few farmers, who are cultivating MAPs by their own initiatives. The commercial cultivation of medicinal plants started in early

1990s mainly in sadar upazila of Natore district (Shahidullah and Haque, 2010). Recently, in other areas such as Bogra, Ghaibandha and Chittagong Hill tracks the commercial cultivation of medicinal plants has been introduced. Company cultivation is sporadic or in patchy form. No prescribed cultivation methods are practiced for MAPs. Farmers cultivate MAPs in their own way using indiscriminate harvesting, processing, storage and packaging. Both farmers and different NGOs are cultivating and promoting medicinal plants in limited area.

In order to resist the decline of MAPs resources and uphold the user's friendly traditional healing heritage, urgent actions are needed at local, regional and national levels. These sectors have huge potentials in economic development as well as export earnings for the country. So, scientific approaches for MAPs exploration, cultivation, conservation and value addition through harvesting, handling, processing, packaging, storage, transportation and marketing both in domestic and export markets are in high demand nowadays for entrepreneurship development in these sectors. Considering the present situation and future need, necessary and appropriate research studies should be conducted regarding these sectors to find out the scientific approaches on the aforesaid activities.

Therefore, this study is expected to provide valuable information that would be helpful formulating appropriate measures and policy for widespread production of MAPs plants and products in the country as well as marketing both in the country and the abroad. The MAPs entrepreneurs and actors, concerned organizations and policy makers are expected to benefit from the study. The present study seeks for achieving the following specific objectives.

The Specific Objectives are:

- i. to identify different entrepreneurs/actors and their activities in supply chain of the small-scale medicinal and aromatic plants (MAPs) enterprises;
- ii. to determine marketing channel of the medicinal and aromatic plants and products; and
- iii. to find out the constraints and improvement strategies for the enterprises sectors in Bangladesh.

## **2. Materials and Methods**

Both primary and secondary data were used in the study. Primary data were collected from different entrepreneurs and actors of selected small-scale medicinal and aromatic (agar) plants (MAPs) enterprise. Different entrepreneurs and actors identified are commercial producers, input suppliers and service providers, processors, stockiest, transporters, wholesale traders, retailers, exporters, medicine companies and selected agents of foreign imported company. Secondary data were collected from various published and unpublished reports, documents and papers of national and international agencies working in agriculture and agribusiness

sectors and from website.

For collection of primary data, ten commercially medicinal plant cultivated villages such as Laxmipur, Kholabaria, Kahalbaria, Borabaria, Ibrahimpur, Dakhinpur, Chauri, Gazipur, Hoybatpur, Darabpur under Laxmipur-kholabaria Union of Natore Sadar Upazila in Natore district and ten commercially aromatic plant-agar cultivated unions such as Barlekha Sadar, South Sahbagpur, North Sahbagpur, Niz Bahadur, Barni, Talimpur, North Dakhinbag (Katalthali), South Dakhinbag, Sujanagar, Dasher Bazar of Barlekha Upazila in Moulabazar district were selected as study areas. As the villages and the unions in the upazilas are closely situated, they are separately identified as single cluster for the medicinal and aromatic (agar) plant, respectively.

Separate 'Focus Group Discussion' (FGD) with participation of the different entrepreneurs and actors of MAPs enterprises and representatives of local upazila agriculture office were arranged in the each cluster. Number of participants of the two FGDs organized in Laxmipur-kholabaria Union of Natore Sadar Upazila in Natore district and Sujanagar Union of Barlekha Upazila in Moulavi Bazar district were 15 and 10, respectively. Details of the implemented FGDs are mentioned in Table 1.

**Table 1: Information of Focus Group Discussion Organized in the Study Areas**

Sl. No.	Type of agribusiness enterprises	Category of entrepreneurs and actors participated	Number of participants attended	Location of FGD organized	Date of FGD organized
01.	Medicinal plant enterprise	Seedling Supplier, Producer, Processor, Stockiest, Wholesale Traders and Sub-Assistant Agriculture Officer	15	Vill: Klolabaria, Union: Luxmipur-Klolabaria, Upazila: Natore Sadar, District: Natore	May 20, 2015
02.	Aromatic plant-agar enterprise	Seedling Supplier, Producer, Processor and Trader (Exporter)	10	Vill: Sujanagar, Union: Sujanagar Upazila: Barlekha District: Natore	December 27, 2014

Both primary and secondary data were collected from different sources through direct and indirect investigation and communication. Primary data on medicinal and aromatic plant enterprises from the study areas were collected through the aforesaid focus group discussion (FGDs), face to face interview method with

several lead, pioneer and potential entrepreneurs and actors and discussion with the aforesaid Upazilas Agriculture Officers by using developed checklists and schedules. It is worth to mention that during interviewing and discussion to the participants, respondents and the informants, observation and recording methods were applied by data collector (researcher) to capture the relevant information missing in the checklists and the schedules. During interviewing for the data collection, the background, goal and objectives of the study were clearly informed to the participants, respondents and informants.

The collected information and data were properly processed and maintained just after the collection in well manner form. Different errors in the collected data such as inconsistency, inaccuracy and unreliability were timely and properly edited through communication with the interviewed participants, respondents, informants; using the gained recording documents, observation, experiences, research reports, documents and guide books, etc. Then the justified data were tabulated through necessary cleaning. Finally, the data were made ready for the analysis as per the objectives of the study. The processed data were analyzed, interpreted and presented in descriptive methods including tables, diagrams, etc.

### **3. Results and Discussion**

In the study areas, medicinal plant and aromatic plants (MAPs) were major cultivated crops and livelihood sources. These two crops are mainly commercially cultivated in both homestead farming and field cultivation. On basis of the produced crops, several types of agribusinesses were developed in the areas which contributed a vital role in the household livelihoods of the areas. Different types of commercial activities generated on basis of medicinal plant enterprise and aromatic plant (agar) enterprise are described below.

#### **3.1 Production of medicinal plant**

Most medicinal plants are commercially produced at Laxmipur-Klolabaria Union in the Natore sadar Upazila. According to the field information, about 109 types of medicinal plants are produced both in the homestead and in the field. Of the total number of medicinal plants, 10 types such as Amrul, Basak, Ghratokumary, Hostipolas Kalomegh, Misridana, Owshaganda, Shatamul, Shimulmul and Tulsi are commercially produced in large-scale in field level which were considered as samples for the study. Some basic information of the said medicinal plants and their medicinal uses are shown in Tables 2 and 3.



**Table 2: Basic Information of the Selected Medicinal Plants**

Sl. No.	Species of medicinal plant	Duration of life	Planting period	Harvesting period
01.	Amrul	1 year	Middle April .– Middle June	The whole year
02.	Basak	4-5 years	The whole year	The whole year
03.	Gritokumary	1 year	Middle Oct. – Middle Nov.	1st - Middle Jan. – Middle Feb. 2nd - Middle Nov. – Middle Dec.
04.	Kalomegh	6-8 months	Middle March.– Middle June	Middle Sept.– Middle Nov.
05.	Hostipolas	1-2 years	The whole year	The whole year
06.	Misridana	1 year	Middle March.– Middle June	Middle March.– Middle May
07.	Owshaganda	1 year	The whole year	The whole year
08.	Shatamul	1-2 years	The whole year	The whole year
09.	Shimulmul	1 year	Middle March.– Middle June	Middle Nov. – Middle March
10.	Tulsi	6-8 months	Middle March.– Middle June	Middle March.– Middle May

Source: FGD (2015).

**Table 3: Medicinal Uses of selected Medicinal Plants**

Sl. No.	Species of medicinal plant	Plant parts used as medicine	Name of diseases for which medicinal plant is used
01.	Amrul	Underground root of plant	(1). Reduce couf-cold, (2). Reduce allergy
02.	Basak	Only leaf	Remove Kasi-couf and Fever.
03.	Hostipolas	Only root	Reduce rheumatic pain.
04.	Gritokumary	Full/partial part of leaf	(1) Couf-kas, (2) Physical cool & refresh, (3) Physical weakness, (4) Reduce head pain, (5) Remove pain and injury incurred by firing.
05.	Kalomegh	All parts of plant without root and seed	(1) Increase eating taste and food digestion, (2) Control dysentery and fever.
06.	Misridana	Underground part of plant	(1) Useful for gas.
07.	Owshaganda	Full part but root is more useful	(1) Remove sexual diseases.
08.	Shatamul	Only root	(1) Reduce urine pain (2) Clear Urine Extraction (3) Purify blood.
09.	Shimulmul	Only root	(1) Gas control, (2) Increase digestion (3) Reduce complexity of toilet.
10.	Tulsi	The whole part of plant without root	Remove Kasi-couf and Fever.

Source: FGD (2015)

### 3.2 Diversity of medicinal plant enterprise

Based on the produced medicinal plants, multi-types of agribusiness and entrepreneurs/actors are developed in the study area. In Laxmipur-kholabaria union, about 800 farmers were commercially involved in the medicinal plant production. Some of them were directly involved in upstream and downstream (backward and forward linkages) activities of the medicinal plants and products such as primary processing business, seasonal stock business, partially seed and seedlings produce business and wholesale trading. They operate these business either in their residence or in their shops situated in the local markets. Besides these, about 50 traders, 100 processors, 30 stockiest, 1 transporter, 4 seedlings producers and suppliers and 15 seasonal seed (including other crop seeds) suppliers have smoothly been conducting their business on the medicinal plants and its products. All business activities directly contribute to generate local employments and income.

### 3.3 Marketing of medicinal plant

Generally farmers' produced medicinal plant are sold locally in either their cultivated land or in their residences to various kinds of customers such as local hakim/kabiraj, faria/bepari, local agent, wholesale trader, processor, stockiest, some national medicinal companies e.g. Navana Pharmaceuticals, Square Pharmaceuticals, Akmy Pharmaceuticals, Hamdard Laboratory Limited and commission agents of foreign imported companies of China and Thailand. The imported countries – China and Thailand do not direct purchase ghritocumary from the producers, they purchase through their contractual companies (commission agents) of this country. On the other hand, the medicine companies direct purchase the medicinal plants and its products from the producers through their recruited staff in the field.

All the producers, traders, processors, stockiest, faria/bapari and agents generally follow the marketing systems derived from their own knowledge and experience. Jute bag, polythene bag, jute rope and string, polythene rope and bamboo basket are used as package materials. After packaging in traditional method, dry medicinal plants are stored at their own residences. Any special standard is not followed for product grading. Locally low quality and high quality standards are always followed by the all parties. In all stages of the product selling, price is fixed by open bargaining method. As the products are mostly sold locally, in most stages artificial pressure is not faced by the producers for price fixing. No specialized transport is used for the products transportation. Traditional means such as van, truck, bus and train are used in this case. For most cases, payment is made at the time of purchase, but in some rare cases, payment is made in advance. Prices per unit of the products are given in Table 4 .

**Table 4 : Form and Price of Sold Medicinal Plant and Products**

Sl. No.	Species of medicinal plant	Price per kg (in Tk.)		Package size	
		Green form	Dry form	Green form (kg)	Dry form (kg)
01.	Amrul	20.0	70 – 80.0	1 – 60	
02.	Basak	5.0	30.0	60	40
03.	Gritokumary	2.0	No sale in dry form	50	-
04.	Hostipolas	100.0	300.0	40	40
05.	Kalomegh	No sale in green form	50.0	-	2 - 10
06.	Misridana	80.0	160.0	50	40
07.	Owshaganda	No sale in green form	Dry root = 200.0 Dry leaf = 150.0 Dry stem = 330-350.0	-	Dry root = 40 Dry leaf = 20 - 40 Dry stem = 20 – 50
08.	Shatamul	60.0	400.0	40	40
09.	Shimulmul	40.0	100.0	50	40
10.	Tulsi	10.0	100.0	1 – 60	

Source : FGD (2014).



Figure 1 : Marketing Channels of Medicinal Plant

### 3.5 Major constraints for the medicinal plants enterprises

1. Prices of different inputs e.g. fertilizers and pesticides are high but quality is low and government fixed prices are not followed by the dealers.
2. Due to non-available electric supply, diesel pump is operated for irrigation which incurred high irrigation costs.
3. As in March and April ground water level goes down to high depth, water supply through pump is seriously hampered.

4. Over all, due to unscientific and non-appropriate knowledge and experience, the entrepreneurs and the actors perform all the activities based on their own developed knowledge and experience.
5. Due to lacking of scientific and appropriate knowledge and experience on medicinal uses of the medicinal plants and products, the entrepreneurs/actors conduct their sale promotion activities on their traditional knowledge and experience.
6. There exist no association of the medicinal plant entrepreneurs/actors.
7. Absence of local assembling and processing centre for proper processing and sale of the medicinal plants and products.
8. Non-availability of government and non-government support to the promotion of medicinal plant sector and the entrepreneurs/actors.

### **3.6 Recommendations to overcome the constraints**

1. Proper monitoring and supervision are needed by concerned government authority for fixing input price and maintaining its quality.
2. Electricity supply could be made available in the medicinal plant cluster zone so that pumps can be operated electrically.
3. Necessary steps to be taken through government and non-government organizations for providing proper support and training to the medicinal plant entrepreneurs/actors on scientific and appropriate knowledge and experience regarding the aforesaid activities.
4. Locally a assembling, processing and ICT centre may be established in the medicinal plants and products cluster zone through government and non-government support.
5. As early as possible, multi-dimension appropriate and effective development program and project should be developed and started through government and non-government organizations to upgrade the existing condition of the medicinal plant sector and the entrepreneurs/actors.

### **3.7 Production of aromatic plant**

There are various species of aromatic plant. Agar plant is one of them. Almost all unions of Barlekha Upazila in Moubazar district constitute the largest commercial produced agar plant cluster in Bangladesh. The heritage of agar industry in Bangladesh is about one thousand year old which was established based on the agar plants produced in the Barlekha upazila of Maulabibazar district (Boxs et al., 2009). Some basic information regarding agar plant enterprise in Barlekha area are mentioned in Table 5.

**Table 5 : Basic Information of Agar Plant Enterprise in Barlekha**

Particulars	Information
Cultivated land under agar plant	150 hectare
Number of employee engaged in agar plant and product nursery, production, Processing, and trading/exporting enterprises sector	50 thousand
Season of seed sowing	March – April
Season of seedling planting	June – September
Maturity period of agar plant harvested in natural method	25-30 years
Maturity period of agar plant harvested in nail method	15 -16 years
Average quantity of atar produced from a maturity agar plant	18 – 24 gm

Source: FGD (2014).

### 3.8 Diversity of aromatic plant enterprise

On depending of the produced aromatic plants-agar, several types of agribusiness and agribusiness entrepreneurs and actors are developed in the study areas. In the Barlekha upazila, about 500 farmers are commercially involved in the agar plant production. Some of them are directly involved in upstream and downstream (backward and forward linkages) activities of the agar seedlings production and products such as seedlings supply business, agar products processing business and agar products exporting business. They operate these businesses either in their residence or in their shops or processing factories situated in their residence areas. Besides these, about 25 exporters, 350 processors, and 15 seedlings producers and suppliers are conducting their business on the aromatic plants and its products. All business activities directly contribute to generate local employments and income.

### 3.9 Different uses of the agar products

Aromatic plants are treated as industrial crops or vegetables depending on their way of use. Actually in case of MAPs, all aromatic plants are medicinal but all medicinal plants are not aromatic. Different uses of agar plant products are described in Table 6.

**Table 6: Different Uses of Agar products**

Sl. No.	Name of products	Different uses
01.	Agar oil/atar	(i) Sweet smelling and liquid perfume Ingredient for making herbal medicine (iii) Ingredient for making perfume and perfume category product (iv) Natural colour in food item (v) Meditation
02.	Agar wood	(i) Medication (ii) Make smoky for medication
03.	Agar cheeps	(iii) Ingredient for making perfume and perfume category product (iii) Ingredient for making herbal medicine
04.	Agar residual/ dust/ powder	(i) Making agar candle (ii) Ingredient in making of cosmetic and perfume product

Source : FGD (2014).

### 3.10 Major products manufactured from agar plant and their marketing

After harvesting of agar plant, 4 types of products e.g., agar oil/atar, agar wood, agar cheeps and agar residual/dust/powder are produced through proper processing of agar plant. Almost all of the products are fully (approximate 99%) exported to different Middle East Countries, China and Japan (Boxes et al., 2009). It is locally said that any part of agar plant is not rejected, all the parts are fully exported to different countries in the world. Agar oil/atar is totally exported to Saudi Arabia, Qatar, Kuwait, Dubai and other Middle East Countries as well as to China and Japan. Agar wood and agar cheeps are fully exported in Saudi Arabia, Qatar, Kuwait, Dubai and other Middle East Countries. Agar residual/dust/powder are exported in Saudi Arabia, Qatar, Kuwait, Dubai and other middle east countries and are sold also to agar candle manufacturing companies in the country. Different types of agar products and their prices are mentioned in Table 7.

**Table 7: Different types of Customers of Agar Products**

Sl. No.	Name	Types of customer
01.	Agar oil/atar	Saudi Arabic, Qatar, Kuwait, Dubai and other middle east country, china and Japan
02.	Agar wood	Saudi Arabic, Qatar, Kuwait, Dubai and other middle east country
03.	Agar cheeps	Saudi Arabic, Qatar, Kuwait, Dubai and other middle east country
04.	Agar residual/ dust/ powder	1) Agar candle Company 2) Saudi Arabic, Qatar, Kuwait, Dubai and other middle east country

Source : FGD (2014).

**Table 8 : Different Types of Agar Products and their Prices**

Sl. No.	Major Product	Type of product	Price (Tk./Unit)	Remark
1.	Agar plant (harvested)	-	5,000– 50,000/-/plant	1 tola=11.85 gm
2.	Agar oil/atar	Boiyer /white atar	2,500 – 3,000/-/ tola	
		Lohar chos/black atar	6,000 – 7,000/-/ tola	
		Surun/original atar (lohar mal atar)	8,000 – 10,000/-/ tola	
		Surun/original atar (Allahr/natural mal atar)	20,000– 30,000/-/tola	
3.	Agar wood/Ud	Lohar mal/wood	15,000 – 30,000/-/kg	
		Allahr/natural mal/wood	40,000–2,00,000/-/kg	
4.	Agar cheep	Small piece cheep	50 – 60/-/kg	
		Cheep dust/powder	20 -30/-/kg	

Source : FGD (2014).

**3.10 Major constraints for the agar plant enterprises**

- Lack of official recognition of this sector as priority industry by government.
- Not included this sector in the government's priority list of the industry.
- Scarcity of standard testing tools and machineries for testing quality of agar products.



- High import duties imposed by imported countries on the agar products.
- Non-availability of bank loan for the agar enterprises at lower interest rate.
- In case of selling agar plant by government forest department, priority is given to intermediaries instead of actual entrepreneurs of the agar plant.
- There exists some chapters against the entrepreneurs in the ‘Agar Plant Selling Policy - 2010’ formulated by the Department of Forest.
- Due to complexity for delivery of TP for harvesting and transportation of the purchased agar plant, export of the agar products are seriously hampered.
- Provide CITES (Convention on International Trade in Endangered in Flora & Fauna) Certificate by the head office of Forest Department in Dhaka.

### **3.11 Recommendations to overcome the constraints**

1. Agar-Atar Industry would be declared as a prior industry in publishable ‘National Industry Policy – 2015’.
2. Necessary steps to be taken to delivery easy loan at lower interest rate to the agar-atar entrepreneurs.
3. To reduce system loss, special and specific training should be provided to the agar-atar entrepreneurs and their workers.
4. Necessary steps need to be taken for modernization of the Sujanagar Agar-Atar Production Cluster and Processing Plant.
5. Make easy and relax of CITES and TP delivery. CITES should be delivery through the local forest office of Moulabibazar District.
6. Necessary actions to be taken for developing of fast growing hybrid gene of agar plant.
7. MOU (Memorandum of Understanding) may be signed with importing countries for reducing their import duties and making easy access of the agar-atar products to their counties.
8. To establish a standard testing lab in the Barlekha aga-atar cluster for testing the qualities of the agar-atar products.
9. Over all, to develop the Barlekha aga-atar cluster as a perfect exported model of agar-atar cluster, integrated development program should be taken and implemented by government.

### **4. Concluding Remarks**

Medicinal and Aromatic Plants (MAPs) are major cultivated crops and livelihood sources in the study areas. These two crops are mainly commercially cultivated in homestead area and in the field. Based on the produced crops, several types of

agribusiness are developed that generate a huge employment opportunity and income generation.

About 109 types of medicinal plant are produced in the study area. Of them, 10 types – Amrul, Basak, Gritokumary, Hostipolas, Kalomegh, Misridana, Owshaganda, Shatamul, Shimulmul and Tulsi are commercially produced in large-scale at field level. The produced medicinal plant are sold locally both at producers' cultivated land and residences to various kinds of customers such as local hakim/kabiraj, faria/bapari, local agent, wholesale trader, processor, stockiest, some national medicinal companies and commission agents of the imported countries - China and Thailand. Traditional marketing system, like other crops, is generally followed locally by all the entrepreneurs/actors. Some major problems for the medicinal plant enterprises are: high price and low quality of inputs, high irrigation cost, lack of scientific and appropriate knowledge and experience.

There exists various species of aromatic plant. Agar plant is one of them. Barlekha upazila in Moulavibazar district is the largest commercial produced agar plant cluster in Bangladesh. Cultivated land under agar plant production was about 150 hectare; number of agar plant producer was about 500; Atar processing plant/centers were 350; Agar plant products exporters were about 25 and number of employes engaged in agar and atar production and processing enterprises were about 50 thousand. After harvesting of agar plant, 4 types of products such as agar oil/atar, agar wood, agar cheeps and agar residual/dust/powder are produced from agar through proper processing of agar plant. Most of the products are exported to different middle east countries. Some major problems identified for agar-atar enterprises are : no official recognition and priority of this sector as industry by government, scarcity of standard/quality testing tools and machineries, high duty imposed by the imported countries, non-availability of bank loan, complexity of obtaining TP and CITES Certificates. The participants also suggested some recommendations for the solution of the problems.

In fact, government and non-government support services for the medicinal plant and agar-atar enterprises in the study areas are very limited. So necessary services according to the recommendation by the entrepreneurs should be taken by the government. and non-govt. organizations.

For the medicinal plant enterprises some major steps are: quality inputs supply at lower price; availability of electricity supply; provide necessary training to the entrepreneurs/actors on scientific activities regarding MAPs enterprises and establishing assembling, processing and ICT centres.

For the aromatic plant enterprises some recommendations are: give priority Agar-Atar Industry in publishable 'National Industry Policy – 2015'; take actions for modernization of the Barlekha Agar-Atar Production Cluster and Processing Plant; make easy and relax of CITES and TP delivery; develop fast growing hybrid

gene of agar plant; reduce import duties and make easy access of the agar-atar products to different export countries and establish a standard testing lab in the Barlekha aga-atar cluster.

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## পরিবহণ অবকাঠামো পরিকল্পনা : প্রেক্ষিত বাংলাদেশ

ড. মো: মোয়াজ্জেম হোসেন খান \*

সারকথা: আলোচ্য প্রবন্ধে লেখক বাংলাদেশের পরিবহণ অবকাঠামোর একটি বস্তুনিষ্ঠ বিশ্লেষণ উপস্থাপনের প্রচেষ্টা গ্রহণ করেছেন। আর তা করতে গিয়ে তিনি প্রবন্ধের প্রথমাংশে পরিবহণ অবকাঠামোর ক্ষেত্রে বিশ্বে আমাদের দেশের অবস্থান ব্যাখ্যা করেছেন। এখানে তিনি দেখিয়েছেন যে, আমাদের দেশ পরিবহণ অবকাঠামোগত উন্নয়নের দিক দিয়ে বিশ্বের উন্নত দেশসমূহের তুলনায় তো বটেই, এমন কি দক্ষিণ এশিয়ার অনেক দেশের তুলনায় অনেক নিচে অবস্থান করছে। প্রবন্ধের দ্বিতীয়াংশে লেখক তথ্য-উপাত্ত বিশ্লেষণ করে দেখিয়েছেন যে, চলমান সপ্তম পঞ্চ বার্ষিক পরিকল্পনা-য়ও অতীতের মত পরিবহণ অবকাঠামো বিশেষ করে রেল, বিমান ও নৌ পরিবহণের মত উপখাতগুলোকে গুরুত্ব দেয়া হয় নি। প্রবন্ধের শেষাংশে তিনি একবিংশ শতাব্দীর উপযোগী সুসমন্বিত এবং অবশ্যই সুপরিকল্পিত অত্যাধুনিক এক পরিবহণ ব্যবস্থা গড়ে তোলার পক্ষে তার বক্তব্য উপস্থাপনের প্রয়াস পেয়েছেন।

### ১. ভূমিকা

পরিবহন অবকাঠামো হচ্ছে আমাদের দেশের অর্থনীতির হৃৎপিণ্ড। হৃৎপিণ্ড অসুস্থ হলে যেমন মানুষ অনেকটাই অকেজো হয়ে পড়ে ঠিক তেমনি পরিবহণ ব্যবস্থা অসুস্থ তথা জরাজীর্ণ হলে গোটা অর্থনীতিটাই রোগাক্রান্ত হয়ে পড়ে, অসুস্থ হয়ে যায়। বাংলাদেশের পরিবহণ ব্যবস্থায় মহানৈরাজ্যজনক অবস্থা বিরাজ করছে বললেও কম বলা হবে বলে আমি মনে করি। আর এ জন্যে দায়ী পঁচাত্তর পরবর্তী সরকারগুলো। কারণ বিশ্ব ব্যাংক ও আইএমএফ এর মত সাম্রাজ্যবাদী সংস্থাগুলোর কুপরামর্শে তারা রেল ও নৌ পরিবহণকে গুরুত্ব না দিয়ে সড়ক পরিবহণকে বিকশিত করার এক মরণঘাতী পদক্ষেপ গ্রহণ করেছিল। রেলকে তারা ধ্বংস করে দিয়েছে, নদীকে মেরে ফেলেছে। নিজেদের ব্যক্তিগত স্বার্থ উদ্ধারে তারা শুধুই সড়ক পরিবহণ ব্যবস্থা বিকশিত করেছে। আমাদের দেশের পরিবহণ ব্যবস্থা আজ শুধু বিশ্বে নয়, দক্ষিণ এশিয়াতেও সবচেয়ে অদক্ষ এক পরিবহণ ব্যবস্থার দুর্গম কুড়িয়েছে। এমন দিন খুবই বিরল যেদিন সড়ক দুর্ঘটনায় অন্তত: ডজন খানেক মানুষ মারা না যাচ্ছে। আর উৎসব-পার্বনে তো তা শতকের ঘরে পৌঁছায়। সম্পদের ক্ষতির কথা না-ই-বা বললাম। এমন অবস্থা কারও কাম্য হতে পারে না। আলোচ্য প্রবন্ধে তাই আমরা এ অবস্থা থেকে উত্তরণের পথ খোঁজার প্রয়াস নিয়েছি: পরিকল্পিত পরিবহণ অবকাঠামো গড়ে তোলার প্রয়োজনীয়তার কথা বলতে চেয়েছি।

\* অধ্যাপক, অর্থনীতি বিভাগ, রাজশাহী বিশ্ববিদ্যালয়, রাজশাহী-৬২০৫

## ২. পরিবহণ অবকাঠামোর বর্তমান অবস্থা

পূর্বেই উল্লেখ করেছি যে, পরিবহণ অবকাঠামোগত উন্নয়নে আমরা খুবই পিছিয়ে আছি। সারণী-১ এ উপস্থাপিত তথ্য থেকে আমরা দেখতে পাচ্ছি যে, দক্ষিণ ও পূর্ব এশিয়ার ৮টি দেশের মধ্যে এ ক্ষেত্রে আমাদের অবস্থান সপ্তম। একমাত্র মিয়ানমারের উপরে অবস্থান করছি আমরা। বিশ্ব অর্থনৈতিক ফোরামের ২০১৪-২০১৫ সালের রিপোর্ট অনুযায়ী ১৪৪টি দেশের মধ্যে এ ক্ষেত্রে আমাদের দেশের অবস্থান ১৩০-তম (০৩)। অথচ চীন ও থাইল্যান্ডের অবস্থান যথাক্রমে ৪৬ ও ৪৮। আর দক্ষিণ এশিয়ায় শ্রীলংকার অবস্থান সবচেয়ে ভাল অর্থাৎ ৭৫-তম। অত্যন্ত পরিতাপের বিষয় এই যে, পাঁচ বছরের ব্যবধানে অবস্থার তেমন কোনও উন্নতি হয় নি (সারণী-২)। সারণী-২ এর তথ্য থেকে দেখা যাচ্ছে যে, ২০০৯-১০ সনে একই সংস্থার রিপোর্ট অনুযায়ী ১৩৩টি দেশের মধ্যে বাংলাদেশের অবস্থান যেখানে ছিল ১২৬-তম, ২০১৪-১৫ সনে ১৪৪টি দেশের মধ্যে তা গিয়ে ঠেকে ১৩০-তম স্থানে। আর সম্ভবত: এ কারণেই বিদেশী বিনিয়োগকারীরা চীনের চেয়ে অনেক বেশী সুযোগ-সুবিধা দেয়া সত্ত্বেও বাংলাদেশমুখী হচ্ছে না। অন্যদিকে চীন বিনিয়োগ নিয়ে কুলোতে পারছে না। সরকারগুলোর ভুল নীতি ও অবহেলা এর জন্যে দায়ী। কে না জানে যে, স্থল পরিবহণের ক্ষেত্রে সারা বিশ্বে রেল পরিবহণই হচ্ছে সবচেয়ে সাশ্রয়ী, নিরাপদ ও দক্ষ। আর সেকারণেই চীন, ভারতসহ বিশ্বের উন্নত ও উন্নয়নশীল দেশসমূহ বিশাল রেল নেটওয়ার্ক গড়ে তুলেছে। অথচ আমাদের দেশে রেল পরিবহণ ব্যবস্থা খুবই সংকটজনক অবস্থায় আছে (০৬, ০৭)। ২০১২ সালের পর রেলের দৈর্ঘ্য একটুও বাড়ে নি (সারণী-৩)। ভাৰা যায় ১৬০ মিলিয়ন মানুষের দেশে মাত্র ২,৮৭৭ কি: মি: রেল পথ! রেলে যাত্রী পরিবহণের সূচক ষষ্ঠ পঞ্চ বার্ষিক পরিকল্পনার মেয়াদে প্রায় অপরিবর্তিত রয়েছে (১০২.৬)। আর পণ্য পরিবহণের সূচকের মারাত্মক অবনতি হয়েছে (৭৭.৮)। একই অবস্থা নৌ পরিবহণের ক্ষেত্রে (সারণী-৪)। লক্ষ্য মাত্রার চেয়ে অর্জন বেশ পিছিয়ে আছে। বিমান পরিবহণের অবস্থা তো আরও খারাপ। দেশে বর্তমানে চলমান, বন্ধ ও নির্মাণাধীন মিলে মোট ২১টি বিমান বন্দর আছে। এগুলোর মধ্যে ৩টি আন্তর্জাতিক ও বাকী ১৮টি আভ্যন্তরীণ। ৩টি আন্তর্জাতিক বিমানবন্দরই চলমান আছে। এগুলো হলো যথাক্রমে হযরত শাহজালাল আন্তর্জাতিক বিমানবন্দর (ঢাকা), হযরত শাহ আমানত আন্তর্জাতিক বিমানবন্দর (চট্টগ্রাম) ও জেনারেল এম.এ.জি. ওসমানী আন্তর্জাতিক বিমানবন্দর (সিলেট)। আভ্যন্তরীণগুলো হচ্ছে : কক্সবাজার, রাজশাহী, যশোর, সৈয়দপুর, বরিশাল, ঈশ্বরদী, কুমিল্লা, ঠাকুরগাঁও, রংপুর, নোয়াখালী, ফেনী, কিশোরগঞ্জ, পটুয়াখালী, ঢাঙ্গাইল, সিরাজগঞ্জ, রসুলপুর, সন্দীপ, তেজগাঁও, বগুড়া, শমশেরনগর ও হযরত খানজাহান আলী। এগুলোর

সারণী-১ : পরিবহণ অবকাঠামোর উন্নয়নের ক্ষেত্রে দক্ষিণ এশিয়ার কয়েকটি দেশের তুলনামূলক চিত্র, ২০১৪-১৫ সালে

দেশসমূহ	র্যাংক/অবস্থান*	স্কোর			
		সার্বিক	সড়ক	রেলপথ	বন্দর
১	২	৩	৪	৫	৬
১। বাংলাদেশ	১৩০	২.৮	২.৯	২.৪	৩.৭
২। ভারত	৮৭	৩.৬	৩.৮	৪.২	৪.০
৩। চীন	৪৬	৪.৭	৪.৬	৪.৮	৪.৬
৪। কম্বোডিয়া	১০৭	৩.১	৩.৪	১.৬	৩.৬
৫। মিয়ানমার	১৩৭	২.১	২.৪	১.৮	২.৬
৬। পাকিস্তান	১১৯	২.৭	৩.৮	২.৫	৪.৪

৭। শ্রীলংকা	৭৫	৪.০	৫.১	৩.৭	৪.২
৮। থাইল্যান্ড	৪৮	৪.৬	৪.৫	২.৪	৪.৫

\* ১৪৪টি দেশের মধ্যে।

উৎস : ০১, পৃ: ৩৪৫।

মধ্যে বর্তমানে চালু আছে মাত্র ৫টি : কজ্বাজার, রাজশাহী, যশোর, সৈয়দপুর ও বরিশাল। নির্মাণাধীন আছে ১টি : হযরত খানজাহান আলী (বাগেরহাট)। বাকী ১৪টি দীর্ঘ দিন যাবৎ বন্ধ রয়েছে (০২,২৭০৬১৬)। অবশ্য

**সারণী-২ : পরিবহণ অবকাঠামোর র্যাংকিং এর ক্ষেত্রে আমাদের দেশের অবস্থার পরিবর্তনের চিত্র, ২০০৯-১৫ সময়ে**

বছরসমূহ	র্যাংক/অবস্থান	স্কোর			
		সার্বিক	সড়ক	রেলপথ	বন্দর
১	২	৩	৪	৫	৬
২০১৪-১৫	১৩০*	২.৮	২.৯	২.৪	৩.৭
২০০৯-১০	১২৬**	২.৪	২.৯	২.৩	৩.০

\* ১৪৪টি দেশের মধ্যে।

\*\* ১৩৩টি দেশের মধ্যে।

উৎস : ০১, পৃ : ৩৪৫।

**সারণী-৩ : বাংলাদেশের ষষ্ঠ পঞ্চ বার্ষিক পরিকল্পনায় রেল পরিবহণের উন্নয়ন চিত্র, ২০১০-২০১৫ সময়ে**

বছরসমূহ	রেলপথের দৈর্ঘ্য		যাত্রী পরিবহণ		পণ্য পরিবহণ	
	মোট, কি:মি:	সূচক	মোট, মি:	সূচক	মোট মি:টন	সূচক
১	২	৩	৪	৫	৬	৭
২০১০	২,৮৩৫	১০০.০	৬৫.৬	১০০.০	২.৭	১০০.০
২০১১	২,৭৯১	০৯৮.৪	৬৩.৫	০৯৬.৮	২.৬	০৯৬.৩
২০১২	২,৮৭৭	১০১.৫	৬৬.১	১০০.৮	২.২	০৮১.৫
২০১৩	২,৮৭৭	১০১.৫	৬৫.০	০৯৯.১	২.৩	০৮৫.২
২০১৪	২,৮৭৭	১০১.৫	৬৫.০	০৯৯.১	২.২	০৮১.৫
২০১৫	২,৮৭৭	১০১.৫	৬৭.৩	১০২.৬	২.১	০৭৭.৮

উৎস: ০১, পৃ:৩৪৮, এর তথ্যের ভিত্তিতে লেখক কর্তৃক হিসেবকৃত।

বিমান ও পর্যটন মন্ত্রী বলেছেন যে, শীঘ্রই এগুলোর মধ্যে কয়েকটি প্রয়োজনীয় সংস্কারের পর চালু করা হবে। কিন্তু আমাদের দেশে আশান্বিত হওয়া খুবই কঠিন ব্যাপার। কারণ সরকার ও মন্ত্রী মহোদয়দের কথায় ও কাজে বিস্তর ফারাক। এটা আরও একবার প্রমাণিত হলো পরিবহণ খাতে পঞ্চ বার্ষিক পরিকল্পনার লক্ষ্যমাত্রাগুলো অর্জিত না হওয়ার মাধ্যমে (সারণী-৫)। সারণীর তথ্য থেকে দেখা যাচ্ছে যে, সার্বিকভাবে ২০১৩ সাল ছাড়া বাকী চার বছরের লক্ষ্যমাত্রা তো অর্জিত হয়ই নি, অধিকন্তু শুরু ও শেষ বর্ষে তা যথাক্রমে মাত্র ৭২.৭% ও ৭৫.৯% এ গিয়ে ঠেকে। লক্ষ্যণীয় যে, সেতু ও রেল মন্ত্রণালয়ের অবস্থা সবচেয়ে খারাপ : পরিকল্পনার শেষ বর্ষ অর্থাৎ ২০১৫ সালে এদের অর্জন হচ্ছে যথাক্রমে মাত্র ৫৫.১% ও ৭৬.৪%।

সারণী-৪: বাংলাদেশের ষষ্ঠ পঞ্চ বার্ষিক পরিকল্পনায় নৌ পরিবহনের  
উন্নয়ন চিত্র, ২০১০-২০১৫ সময়ে

দফাসমূহ	ভিত্তি বছর, ২০১০ সাল		লক্ষ্যমাত্রা, ২০১৫ সাল		অর্জন, ২০১৫ সালে	
	মোট	সূচক	মোট	সূচক	মোট	সূচক
১	২	৩	৪	৫	৬	৭
১। খনের মাধ্যমে নৌ পথের উন্নয়ন, কি: মি:	২,৫০০	১০০.০	৩,১২০	১২৫.০	৩,০০ ০	১২০.০
২। যাতায়াত সহায়ক পণ্য সংগ্রহ ও স্থাপন, কি: মি:	৫,২৫০	১০০.০	৬,০০০	১১৪.৩	৫,৮২ ৪	১১০.৯
৩। নদী বন্দর স্থাপন, সংখ্যা	০.০০	০০.০	৩	০০.০	১	৩৩.৩ (লক্ষ্য মাত্রার তুলনায়)
৪। বন্দর স্থাপন ও আধুনিক যন্ত্রপাতি স্থাপন, সংখ্যা	১২	১০০.০	২২	১৮৩.৩	১৬	১৩৩.৩
৫। পনটুন স্থাপন, সংখ্যা	৪৭৫	১০০.০	৫৭৫	১২১.১	৪৮০	১০১.১

উৎস: ০১, পৃ:৩৫০ এর ভিত্তিতে লেখক কর্তৃক হিসেবকৃত।

৩. সপ্তম পঞ্চ বার্ষিক পরিকল্পনায় (২০১৬-২০২০) পরিবহণ অবকাঠামো

দীর্ঘকাল যাবৎ আমরা বলে আসছি যে, আমাদের দেশের ভবিষ্যত নিহিত রয়েছে রেল- নৌ-বিমান পরিবহনের আধুনিক ও সুসমন্বিত এক ব্যবস্থার মধ্যে (০৬, ০৭, ০৮)। সরকারগুলো কথা শোনে নি। শেখ হাসিনার নেতৃত্বে মহাজোট সরকার ২০০৯ সালে ক্ষমতায় এসে ষষ্ঠ পঞ্চ বার্ষিক পরিকল্পনার (২০১০-২০১৫) আওতায় বিচ্ছিন্ন কিছু পদক্ষেপ গ্রহণ করে (০১)। এ সময়ের উল্লেখযোগ্য ঘটনা ছিল বঙ্গবন্ধুর সময়ের রেল মন্ত্রণালয় পুনরায় চালু করা। এখানে উল্লেখ্য যে, জেনারেল জিয়া পাঁচাত্তর পরবর্তী সময়ে ক্ষমতায় এসে রেলকে যোগাযোগ মন্ত্রণালয়ের অধীনে ক্ষুদ্র একটি বিভাগে পরিণত করে। আর তখন থেকেই রেল ধ্বংস তথা আমাদের অর্থনীতির ধ্বংস প্রক্রিয়া আসলেই শুরু হয় যা এখনও আমরা হাড়ে হাড়ে টের পাচ্ছি। অত্যন্ত অদক্ষ এক পরিবহণ ব্যবস্থা আমাদের অর্থনীতির প্রাণশক্তি হ্রাস করে দিচ্ছে, বিপুল সম্ভাবনাকে আমরা কাজে লাগাতে পারছি না। বর্তমান সরকার যোগাযোগ মন্ত্রণালয় থেকে সড়ক ও সেতু বিভাগকে পৃথক করে মন্ত্রণালয়ের মর্যাদা দিয়েছে। এটা আর একটা ভাল পদক্ষেপ। তবে বিচ্ছিন্ন পদক্ষেপ নিয়ে আশানুরূপ ফল পাওয়া যাবে না বলে আমরা মনে করি। অবশ্যই পদক্ষেপ হতে হবে সুসমন্বিত। সরকারের ভাবসাব দেখে মনে হচ্ছে যে, সরকার পরিবহণ খাতকে গুরুত্ব দিচ্ছে। কিন্তু বাস্তবতা তা বলছে না। সরকার সপ্তম পঞ্চ বার্ষিক পরিকল্পনায় পরিবহণ ও যোগাযোগ খাতকে সর্বোচ্চ বরাদ্দ দিলেও, রেল, নৌ ও বিমান উপখাতগুলোকে চরমভাবে অবহেলা করা হয়েছে (সারণী-৬)। আমরা মনে করি যে, বরাদ্দের দিক দিয়ে এক

সারণী-৫ : বাংলাদেশের ষষ্ঠ পঞ্চ বার্ষিক পরিকল্পনায় পরিবহণ খাতের বরাদ্দ কাঠামো এবং অর্জন, ২০১১-২০১৫ সময়ে

বি: টাকা, %

খাত/উপখাতসমূহ	লক্ষ্যমাত্রা					প্রকৃত ব্যয়										
	২০১১	২০১২	২০১৩	২০১৪	২০১৫	২০১১		২০১২		২০১৩		২০১৪		২০১৫		
	মোট	%	মোট	%	মোট	%	মোট	%	মোট	%	মোট	%	মোট	%	মোট	%
১। সড়ক পথ বিভাগ:	২	৩	২৮.৫	৩৬.৩	৪৬.১	৭	৭	৯	১০	১১	১২	১৩	১৪	১৫	১৬	১৬
২। রেল মন্ত্রণালয়:	-	২২.৭	৩০.২	৩৬.৭	৪৪.৯	-	-	২৬.২	৩১.৯	৩৬.০	৩৯.২	৩৬.৩	৩৯.৫	৪৩.৮	৩৫.০	৩৫.০
৩। সড়ক ও রেল বিভাগ*:	৩৫.০	৫১.২	৬৬.৫	৭৩.২	৯০.৯	২৯.৭	৮৪.৯	৪৫.৪	৫৪.৮	৬৪.৭	৯৭.৩	৭৮.৩	৯৭.১	৭৮.১	৮৫.৯	৮৫.৯
৪। সেতু বিভাগ:	১১.১	০৬.৯	০৮.২	২০.৯	৮.৭.৪	৩৩.৮	৩৪.২	০৪.২	৬০.৯	১৭.৫	২৩.৪	২০.৫	২০.৫	৪৮.২	৫৫.১	৫৫.১
মোট	৪৬.১	১০৯.৩	১৪১.২	১৬৭.৩	২৬৯.৩	৩৩.৫	৭২.৭	৪৯.৫	৪৫.৩	১৪৬.৯	১০৪.০	১৬৩.৭	১৭৭.৮	২০৪.৪	১৭৫.৯	১৭৫.৯

\* ২০১১ সাল পর্যন্ত রেল ও সড়ক একত্রে দেখানো হয়েছে।  
উৎস: ০১, পৃ: ৩৫২, এর ভিত্তিতে লেখক কর্তৃক হিসেবকৃত।



সারণী : ৬ বাংলাদেশের সপ্তম পঞ্চ বার্ষিক পরিকল্পনায় খাতিভিত্তিক সরকারী বিনিয়োগ বরাদ্দের চিত্র, ২০১৬-২০২০ সময়ে

বি: টাকা, %

খাতসমূহ	২০১৫-১৬		২০১৬-১৭		২০১৭-১৮		২০১৮-১৯		২০১৯-২০		সর্বমোট পাঁচ বছরে ২০১৬-২০২০		স্থান
	মোট	অংশ	মোট	অংশ	মোট	অংশ	মোট	অংশ	মোট	অংশ	সর্বমোট	অংশ	
১	২	৩	৪	৫	৬	৭	৮	৯	১০	১১	১২	১৩	১৪
১। সাধারণ গণ সেবাসমূহ	৪১.৮	০৪.২	৩০.৯	০২.৭	৩৪.৯	০২.৭	৩৮.৭	০২.৭	৪৩.৪	০২.৭	১৮৯.৮	১০০.০ (০২.৯)	VIII
২। প্রতিরক্ষা	০৪.২	০০.৪	০৩.০	০০.৩	০৩.৪	০০.৩	০৩.৭	০০.৩	০৪.২	০০.৩	১৮.৬	১০০.০ (০০.৩)	XIV
৩। জন সংখ্যা ও নিরাপত্তা	১৫.৩	০১.৬	১৮.০	০১.৫	২০.৩	০১.৬	২২.৫	০১.৬	২৫.২	০১.৬	১০১.৩	১০০.০ (০১.৬)	X
৪। শিল্প ও অর্থনৈতিক সেবাসমূহ	২১.০	০২.১	২৯.৯	০২.৬	৩৫.২	০২.৭	৪১.০	০২.৯	৪৭.৭	০৩.০	১৭৪.৮	১০০.০ (০২.৭)	IX
৫। কৃষি	৫৯.০	০৬.০	৭৫.২	০৬.৫	৮৪.৮	০৬.৬	৯৪.২	০৬.৬	১০৫.৬	০৬.৬	৪১৭.৮	১০০.০ (০৬.৫)	V
৬। বিদ্যুৎ ও জ্বালানী	১৮.৮	১৮.৭	১৯.৫	১৬.৫	১৮.৯	১৪.৭	২১.১	১৪.৭	২৩.১	১৪.৭	১,০১৩.৪	১০০.০ (১৫.৬)	III
৭। পরিবহন ও যোগাযোগ	২৩৪.৩	২৩.৮	২৭৮.২	২৪.০	৩১০.৫	২৪.১	৩৪৩.৩	২৩.৯	৩৮৫.৫	২৩.৯	১,৫৫১.৭	১০০.০ (২৪.০)	I
৮। স্থানীয় সরকার ও পল্লী উন্নয়ন	১৮১.৮	১৮.৫	২১২.৬	১৮.৪	২৩৯.৬	১৮.৬	২৬৬.২	১৮.৬	২৯৭.৮	১৮.৫	১,১৯৮.০	১০০.০ (১৮.৪)	II
৯। পরিবেশ ও জলবায়ু পরিবর্তন	০৪.৮	০০.৫	০৬.৮	০০.৬	০৭.৭	০০.৬	০৮.৬	০০.৫	০৯.৬	০০.৫	৩৭.৫	১০০.০ (০০.৬)	XIII
১০। আবাসন ও কমিউনিটি সুযোগ-সুবিধা	১৮.৯	০১.৯	১৬.৬	০১.৪	১৮.৭	০১.৫	২০.৮	০১.৫	২৩.২	০১.৪	৯৮.২	১০০.০ (০১.৫)	XI
১১। স্বাস্থ্য	৫৩.৩	০৫.৪	৬৪.০	০৫.৫	৭২.২	০৫.৬	৮১.৬	০৫.৭	৯২.৮	০৫.৮	৩৬৩.৯	১০০.০ (০৫.৬)	VI
১২। বিদ্যমান, সংস্কৃতি ও ধর্ম	০৮.৩	০০.৮	১০.১	০০.৯	১১.১	০০.৯	১২.৩	০০.৯	১৩.৮	০০.৯	৫৫.৬	১০০.০ (০.৯)	XII
১৩। শিক্ষা ও প্রযুক্তি	১২১.১	১২.৩	১৭৩.৭	১৫.০	২০৭.০	১৬.০	২৩০.৬	১৬.০	২৫৮.৩	১৬.০	৯৯০.৭	১০০.০ (১৫.৩)	IV
১৪। সামাজিক সুরক্ষা	৩৭.৫	০৩.৮	৪৭.১	০৪.১	৫৩.৩	০৪.১	৫৯.৪	০৪.১	৬৬.৬	০৪.১	২৬৩.৯	১০০.০ (০৪.১)	VII
সর্বমোট	৯৮৬.১	১০০.০	১,২৫৭.৬	১০০.০	১,২৮৮.৬	১০০.০	১,৪৩৪.২	১০০.০	১,৬০৯.৮	১০০.০	৬,৪৭৬.৩	১০০.০ (১০০.০)	

উৎস: ০১, পৃ: ১১৭-১২৩ এর তিথিতে লেখক কর্তৃক হিসেবকৃত।

সারণী-৭ : বাংলাদেশের ষষ্ঠ পঞ্চ বার্ষিক পরিকল্পনায় পরিবহণ ও যোগাযোগ খাতের বরাদ্দ কাঠামো, ২০১১-২০১৫ সময়ে

বি: টাকা, %

উপখাতসমূহ	২০১৬		২০১৭		২০১৮		২০১৯		২০২০		সর্বমোট পাঁচ বছরে ২০১৬- ২০২০
	মোট	অংশ	মোট	অংশ	মোট	অংশ	মোট	অংশ	মোট	অংশ	
১	২	৩	৪	৫	৬	৭	৮	৯	১০	১১	১২
১। সড়ক	৫৬.৮	২৪.২	৬৫.৩	২৩.৫	৭৩.৫	২৩.৭	৮১.৭	২৩.৮	৯১.৪	২৩.৭	৩৬৮.৬ (১০০.০) (২০.৮)
২। সেতু	৮৯.২	৩৮.১	১২০.৪	৪৩.৩	১৩৫.৩	৪৩.৫	১৫০.৩	৪৩.৮	১৬৮.১	৪৩.৬	৬৬৩.৩ (১০০.০) (৪২.৭)
মোট	১৪৬.০	৬২.৩	১৮৫.৭	৬৬.৮	২০৮.৮	৬৭.২	১৩২.০	৬৭.৬	২৫৯.৫	৬৭.৩	১০৩২.০ (১০০.০) (৬৬.৫)
৩। রেল	৫৬.৫	২৪.১	৬০.২	২১.৬	৬৭.৯	২১.৯	৭৫.৪	২১.৯	৮৪.৪	২১.৯	৩৪৪.৪ (১০০.০) (২২.২)
৪। নৌ	১০.৮	০৪.৬	১০.৭	০৩.৮	১২.০	০৩.৯	১৩.৪	০৩.৯	১৫.০	০৩.৯	৬১.৯ (১০০.০) (০৪.০)
৫। বিমান ও পর্যটন	০৩.৩	০১.৪	০৪.০	০১.৫	০৪.৮	০১.৫	০৫.৪	০১.৬	০৬.২	০১.৬	২৩.৭ (১০০.০) (০১.৫)
৬। ডাক ও টেলিযোগাযোগ	১৭.৭	০৭.৬	১৭.৬	০৬.৩	১৭.১	০৫.৫	১৭.১	০৫.০	২০.৪	০৫.৩	৮৯.৯ (১০০.০) (০৫.৮)
সর্বমোট	২৩৪.৩	১০০.০	২৭৮.২	১০০.০	৩১০.৫	১০০.০	৩৪৩.৩	১০০.০	৩৮৫.৫	১০০.০	১,৫৫১.৮ (১০০.০)

উৎস : ০১, পৃ : ৩৭২ এর ভিত্তিতে লেখক কর্তৃক হিসেবকৃত।

নম্বরে থাকলেও এখানে রয়েছে শুভঙ্করের ফাঁকি। আর তা হচ্ছে এই যে, এর মধ্যে সড়ক ও সেতু এবং ডাক ও টেলিযোগাযোগের মত উপখাতগুলোকে চুকিয়ে দেয়া হয়েছে। সারণী-৬ এর তথ্যে দেখা যাচ্ছে যে, মোট বরাদ্দের প্রায় এক চতুর্থাংশ (২৪.০%) ৭ নম্বর খাতকে দিলেও, এখান থেকে যদি উপরে বর্ণিত উপখাতদ্বয়কে বাদ দেয়া হয় তাহলে পরিবহণের বরাদ্দ আর কোনক্রমেই এক নম্বরে থাকছে না। আর

এখানেই আমাদের ঘোর আপত্তি। কারণ পরিবহণকে অবশ্যই পৃথক খাত হিসেবে স্বীকৃতি দিতে হবে। বাকী উপখাতদ্বয়কেও পৃথকভাবে দেখানো আবশ্যিক। আমাদের অর্থনীতি এখন প্রায় ১০০ বিলিয়ন ডলারের অর্থনীতি। সেতুলনায় কিন্তু খাত-উপখাতের সংখ্যা বাড়ে নি। বর্তমানের ১৪টি খাতের স্থলে তা ২০-২৫টি হলে বা করলে ক্ষতি কি?

পূর্বেই উল্লেখ করা হয়েছে যে, আমাদের শাসক গোষ্ঠীর কথা ও কাজে যথেষ্ট ফারাক বিদ্যমান। ২০১২ সালে রেল মন্ত্রণালয় করা হলেও সপ্তম পঞ্চ বার্ষিক পরিকল্পনায় বরাদ্দের ক্ষেত্রে রেল এখনও অবহেলিতই রয়ে গেছে (সারণী-৭)। সপ্তম পরিকল্পনায় পরিবহণ ও যোগাযোগ খাতের বরাদ্দ চিত্র দেখে মনে হচ্ছে যে, আমাদের দেশের নীতি নির্ধারণী মহল এখনও সামরিক আমলের ঘোরমুক্ত হতে পারেন নি। বঙ্গবন্ধুর উত্তরসূরীদের জ্ঞাতার্থে বলছি যে, তাঁর আমলে রেল মন্ত্রণালয় ছিল, ছিল রেলের পৃথক বাজেট। তাঁর সময়ে রেলের পেছনে প্রায় ৮০% অর্থ ব্যয় হতো, বাকী ২০% এর মত যোগাযোগ (সড়ক-সেতু ও ডাক-টেলিফোন) উপখাতে ব্যয় হতো। সামরিক আমলে এ অনুপাতটা উল্টে দেয়া হলো অর্থাৎ প্রায় ৮০% ব্যয় হতো সড়ক-সেতু উপখাতে এবং ২০% এর মত রেল উপখাতে। দুঃখ হয় যে, সামরিক আমলের সেই ভূত এখনও আমাদের তথাকথিত গণতান্ত্রিক সরকারের মাথায় চেপে বসে আছে। তা না হলে এখনও কেন সড়ক-সেতু উপখাত রেলের তুলনায় বেশী, অনেক বেশী বরাদ্দ পাবে? সারণী-৭ এ উপস্থাপিত তথ্য বলছে যে, সড়ক ও সেতু উপখাত মিলে পরিবহণ ও যোগাযোগ খাতে বরাদ্দের ৬৬.৫% পেয়েছে। অথচ রেল পেয়েছে মাত্র ২২.২%। আর নৌ ও বিমানকে তো বলা যায় হিসেবের মধ্যেই ধরা হয় নি (০৪.০% ও ০১.৫% যথাক্রমে)।

এ অবস্থা কাঙ্খিত নয়, হতেও পারে না। পরিবর্তন অত্যন্ত জরুরী। ব্যর্থ হওয়ার সুযোগ একেবারেই নেই। কি করতে হবে সেব্যাপারে প্রবন্ধের পরবর্তী অংশে সুপারিশমালার আকারে আমার বক্তব্য উপস্থাপন করছি।

## ৪. সুপারিশমালা

শেখ হাসিনার মহাজোট সরকার ২০০৮ সালের নির্বাচনে জয়লাভের মাধ্যমে ক্ষমতায় আসার পর পুনরায় আমাদের দেশের উন্নয়নে পরিকল্পনা প্রণয়নের সিদ্ধান্ত গ্রহণ করে। এরই ধারাবাহিকতায় ২০০৯ এর এপ্রিলে বাংলাদেশের ইতিহাসে প্রথম বারের মত প্রেক্ষিত (দীর্ঘ মেয়াদী) পরিকল্পনা রচনার কাজ শুরু করা হয়। এর নামকরণ করা হয় রূপকল্প ২০২১। ২০১২ সালের ১০ মে জাতীয় অর্থনৈতিক পরিষদের সভায় তা পাশ হয়। এ রূপকল্প দু'টি মধ্যমেয়াদী পঞ্চ বার্ষিক পরিকল্পনার মাধ্যমে বাস্তবায়িত হবে মর্মে সিদ্ধান্ত গৃহীত হয়: ১। ষষ্ঠ পঞ্চ বার্ষিকের মেয়াদ ছিল ২০১০-২০১৫ যা ইতোমধ্যেই বাস্তবায়িত হয়েছে। ২। সপ্তম পঞ্চ বার্ষিক পরিকল্পনা ২০১৬-২০১২০ যার বাস্তবায়ন প্রক্রিয়া চলছে। এখানে উল্লেখ করা প্রয়োজন যে, ষষ্ঠ পঞ্চ বার্ষিক পরিকল্পনার লক্ষ্যমাত্রা অর্জিত না হওয়া সত্ত্বেও সপ্তম পরিকল্পনায়ও প্রবৃদ্ধি ২০২০ সালে অর্থাৎ পরিকল্পনার শেষ বর্ষে গিয়ে ৮% এ দাঁড়াতে বলে আশাবাদ ব্যক্ত করা হয়েছে। বছর অনুযায়ী প্রবৃদ্ধির লক্ষ্যমাত্রা ষষ্ঠ ও সপ্তম পরিকল্পনায় যথাক্রমে ৬.৭% (২০১১), ৬.৯% (২০১২), ৭.২% (২০১৩), ৭.৬% (২০১৪), ৮.০% (২০১৫) এবং ৭.০% (২০১৬), ৭.২% (২০১৭), ৭.৪% (২০১৮), ৭.৬% (২০১৯) ও ৮.০% (২০২০) ধরা হয়েছে। প্রবৃদ্ধির এ লক্ষ্যমাত্রাগুলোকে আমি উচ্চাকাঙ্খী বলবো না। বরং আমি মনে করি যে, এটাকে অতিক্রম করে প্রবৃদ্ধি দু'অংকে নিয়ে যাওয়া সম্ভব যদি নিম্নোক্ত বিষয়গুলোর প্রতি যথাযথ গুরুত্ব আরোপ করা হয় :

১। রেল-নৌ-বিমান পরিবহণকে সমন্বিত করে অত্যাধুনিক এক পরিবহণ অবকাঠামো করে তুলতে হবে। মনে রাখতে হবে যে, একটাকে বাদ দিয়ে অন্যগুলো গড়ে তুললে সুফল পাওয়া যাবে না।

২। অবস্থা দৃষ্টে মনে হচ্ছে যে, প্রশাসনের সর্বোচ্চ মহল বিষয়টির গুরুত্ব অনুধাবন করতে পেরেছেন। কিন্তু পরিকল্পনা ও বাজেটে তথাকথিত কিছু মেগা প্রকল্প ছাড়া রেল, নৌ ও বিমান পরিবহণ সম্পর্কে সুদূরপ্রসারী কোনও লক্ষ্যমাত্রা আমরা দেখতে পাচ্ছি না। আমরা মনে করি যে, ঢাকা-চট্টগ্রাম, ঢাকা-রাজশাহী, ঢাকা-খুলনা, ঢাকা-সিলেট রুটে যত শীঘ্র সম্ভব ডাবল লাইন এমনকি ট্রিপল-লাইন রেলপথ গড়ে তুলতে হবে। ট্রেনের গতি অবশ্যই বৃদ্ধি করতে হবে। ২৪ হাজার কিলোমিটার নৌপথকে যথাযথ খননের মাধ্যমে নৌযান চলাচল উপযোগী করে গড়ে তুলতে হবে। এ বিশাল নৌপথের নাব্যতা ধরে রাখতে হলে সারা বছর ধরে খনন কার্য পরিচালনা আবশ্যিক। আর তার জন্যে আবারও আমার প্রস্তাব নতুন একটি মন্ত্রণালয় গঠন করা হোক যার নাম হবে “নদী খনন ও ব্যবস্থাপনা” মন্ত্রণালয়। এ কথা সত্য যে, আমাদের দেশে বর্তমানে আন্তর্জাতিক মানের বিমান বন্দর একটিও নেই। বিষয়টির প্রতি নজর দেয়া অত্যন্ত জরুরী। আমাদের রাজধানী নগরীর চারদিকে অন্তত: চারটি সুপারিসর অত্যাধুনিক আন্তর্জাতিক মানসম্পন্ন বিমান বন্দর গড়ে তোলা এখন সময়ের দাবী। ব্যবসা-বাণিজ্য ও অর্থনীতির আয়তন যতটা বৃদ্ধি পেয়েছে সেতুলনায় বিমান পরিবহণ ব্যবস্থা একেবারেই পিছিয়ে রয়েছে। শরীয়তপুরের পদ্মা অববাহিকায় বঙ্গবন্ধু আন্তর্জাতিক বিমান বন্দর স্থাপনের সিদ্ধান্ত নিয়েছে সরকার। এটা নিঃসন্দেহে ভাল সিদ্ধান্ত। বাকী তিনটি আমি মনে করি পূর্ব, পশ্চিম ও উত্তর দিকের কোন নদী অববাহিকায় গড়ে তোলার সুদূরপ্রসারী পরিকল্পনা এখনই গ্রহণ করতে হবে। দেশের অন্যত্র বঙ্গ বিমান বন্দরগুলোকে সংস্কার করে যথাসম্ভব আন্তর্জাতিক মানে উন্নীত করতে হবে।

৩। নগর পরিবহণের ক্ষেত্রে ঢাকায় অবশ্যই পাতাল রেল গড়ে তুলতে হবে যা ইতোমধ্যে শুরু হয়েছে বলে মনে হচ্ছে। এটা ভাল লক্ষণ। তবে জাপানী পরামর্শে ভূ-উপরিস্থ রেল (এলিভেটেড) নির্মাণ কতখানি টেকসই হবে ঢাকার মত অত্যন্ত ঘনবসতির নগরীতে সে ব্যাপারে আমার যথেষ্ট সন্দেহ আছে। আমার মতে খরচ একটু বেশী হলেও ভূ-গর্ভস্থ পাতাল রেল বা মেট্রো নির্মাণ করতে হবে। প্রক্রিয়াটি অবশ্যই ত্বরান্বিত করতে হবে। এ ক্ষেত্রে ভারত ও চীনের অভিজ্ঞতা প্রণিধানযোগ্য। ভারতে বর্তমানে সর্বমোট ৩০০ কিলোমিটারের মত মেট্রো লাইন রয়েছে। অন্যদিকে চীনের রয়েছে সাড়ে তিন হাজার কিলোমিটারের মত (০৯, ১০)। নগরসমূহের যানজট নিরসনে চীন মেট্রো নির্মাণকে অগ্রাধিকার দিয়ে দ্রুত এগোচ্ছে। ভারতও চীনের অভিজ্ঞতার আলোকে রেল ও মেট্রো নির্মাণে অগ্রাধিকার দিয়ে বিশাল আকারের বিনিয়োগ করার এক মহাপরিকল্পনা গ্রহণ করেছে। এ ক্ষেত্রে তারা চীনের সহযোগিতা চেয়েছে। আমি মনে করি আমাদের দেশের ক্ষেত্রেও এই মূল্যে ঢাকা ব্যতীত আরও অন্তত: তিনটি মহানগরীতে মেট্রো নির্মাণের কাজ হাতে নেয়া ফরজ হয়ে গেছে। নগরী তিনটি হচ্ছে : চট্টগ্রাম (লোকসংখ্যা ৫ মিলিয়নের মত), খুলনা ( লোকসংখ্যা প্রায় ২ মিলিয়নের মত) ও রাজশাহী (লোকসংখ্যা মিলিয়ন ছুই ছুই)। এ ছাড়াও অন্যান্য বিভাগীয় শহরগুলোতেও অদূর ভবিষ্যতে মেট্রো নির্মাণের মহাপরিকল্পনা এখনই গ্রহণ করতে হবে। মনে রাখতে হবে আমাদের মত দেশে অন্তত: একশো বছরের পরিবহণ চাহিদা হিসেবে রেখে এগুতে হবে। তা না হলে দক্ষ অর্থনীতি গড়ার আকাংখা স্বপ্নই থেকে যাবে। এ ক্ষেত্রে যে পরিবহণ ব্যবস্থা অধিকতর নিরাপদ, সময় ও অর্থ সাশ্রয়ী, আরামদায়ক ও দ্রুত গতির তাকেই অগ্রাধিকার দিতে হবে।

৪। রেল-নৌ-বিমান পরিবহণের সমন্বয়ে দেশব্যাপী এক সুসমন্বিত পরিবহণ ব্যবস্থা বা নেটওয়ার্ক গড়ে তোলার মহাপরিকল্পনা প্রণয়নের এখনই সময়। কারণ সরকার সারা দেশব্যাপী চীনের আদলে ১০০টির মত বিশেষ অর্থনৈতিক অঞ্চল গড়ে তোলার এক উচ্চাকাঙ্খী পরিকল্পনা গ্রহণ করেছে। একে সাফল্যমণ্ডিত করতে হলে যে ধরনের পরিবহণ নেটওয়ার্ক প্রয়োজন তার কিছুই নেই এখন দেশে। এর উপরে রয়েছে ক্রমবর্ধমান জনসংখ্যা ও শিল্পায়নের চাপ। আমরা মনে করি একমাত্র পরিকল্পিত পরিবহণ

অবকাঠামো নির্মাণই দিতে পারে এ সমস্যাগুলোর সার্বিক সমাধান।

৫। অর্থায়ন কীভাবে হবে এবং কে করবে এ প্রশ্ন উঠতেই পারে। আমি মনে করি যে, সর্বাত্মে সিদ্ধান্ত নিতে হবে আমরা আদৌ চাই কি না দক্ষ ও অত্যাধুনিক এক পরিবহণ নেটওয়ার্ক গড়ে তুলতে। যদি চাই-ই, তাহলে অর্থায়ন কখনও সমস্যা হবে না। নিজস্ব খরচে পদ্মাসেতু নির্মাণ তার প্রকৃষ্টতম উদাহরণ। প্রায় ৩০ হাজার কোটি টাকার মহাপ্রকল্প সাম্রাজ্যবাদী বিশ্ব ব্যাংক ও আন্তর্জাতিক মুদ্রাতহবিলের তাল-বাহানা ও ছল-চাতুরীকে বৃদ্ধাঙ্গুলী দেখিয়ে আমরাই নির্মাণ করছি। ইতোমধ্যেই এর নির্মাণ কাজের প্রায় অর্ধেক সম্পন্ন হয়েছে (০৯)। এ প্রসঙ্গে এখানে একটি গুরুত্বপূর্ণ বিষয় উল্লেখের দাবী রাখে যে, বাংলাদেশ অর্থনীতি সমিতিই সর্বপ্রথম ১৯ জুলাই ২০১২ সালে জাতীয় সেমিনার করে দেশবাসী ও সারা বিশ্বকে বস্তুনিষ্ঠ তথ্য-উপাত্ত দিয়ে প্রমাণ করে দিয়েছিল সাম্রাজ্যবাদীদের সাহায্য ছাড়াই নিজস্ব অর্থায়নে পদ্মা সেতুর মত একাধিক সেতু নির্মাণ সম্ভব (১১, ১২)। আমরা বিদেশী সহায়তার বিরুদ্ধে নই। তবে সে সাহায্য হতে হবে শর্তমুক্ত।

## ৫. উপসংহার

রূপকল্প ২০২১ বাস্তবায়নে ষষ্ঠ (২০১১-২০১৫) ও সপ্তম (২০১৬-২০২০) পঞ্চম বার্ষিক পরিকল্পনা আমাদের দেশের জন্যে যেমন মাইল ফলক হয়ে থাকবে, তেমনি এ কথাও সত্য যে, এ পরিকল্পনাগুলো রচনার সময় আমাদের মহান সংবিধানের চার মৌলস্তম্ভ বা নীতিকে যথাযথ অনুসরণ করা হয় নি, মুক্তিযুদ্ধের চেতনার বাংলাদেশ বিনির্মাণে যা অতীব প্রয়োজন ছিল। দেশের চূরান্ত লক্ষ্য শোষণ-বঞ্চনামুক্ত সমতাধর্মী এক অসাম্প্রদায়িক উদার সমাজ প্রতিষ্ঠা করা, অর্থাৎ সমাজতন্ত্র প্রতিষ্ঠার ব্যাপারে টুশম্পটি উচ্চারিত হয়নি গোটা পরিকল্পনার সুবিশাল দলিলটির কোথাও। এটা কি সুপরিকল্পিত ও উদ্দেশ্যপূর্ণভাবে করা হয়েছে? না কি দেশের নীতি নির্ধারণী পর্যায়ে যারা আছেন তারা সমাজতন্ত্রে বিশ্বাস করেন না। পরিকল্পনায় ও বাজেটে কিছু বিক্ষিপ্ত সামাজিক কর্মসূচী নিলেই টেকসইভাবে বৈষম্য দূর হবে এ কথা ভাবা বোকার স্বর্গে বাস করার সামিল হবে। দেশে নতুন প্রযুক্তি আসতে সহায়ক শর্তমুক্ত সাহায্য অবশ্যই আমরা গ্রহণ করবো। সাগর-মহাসাগরের দিকে উন্মুক্ত দক্ষিণ সীমান্তের মত ভৌগোলিক অবস্থানকে আমাদেরকে আরও দক্ষতার সাথে কাজে লাগাতে হবে। স্মরণ রাখতে হবে চীন-ভারতসহ এশিয়া ও ইউরোপের অনেক দেশই দক্ষিণ এশীয় করিডোর নির্মাণে অত্যন্ত আগ্রহী। চীন তো বেশ পূর্বে এ ব্যাপারে প্রস্তাব দিয়ে অপেক্ষায় আছে। আমাদেরকে এক্ষেত্রে কঠিন দর-কষাকষিতে যেতে হবে দেশের স্বার্থ সমুন্নত রাখার জন্যে। তবে দ্রুত আগাতে হবে। এছাড়া এ ধরনের মহাপরিকল্পনা বাস্তবায়নে সিডিকেটেড অর্থায়নে (একাধিক ব্যাংক ও আর্থিক প্রতিষ্ঠানের সমন্বয়ে) যেতেই হবে। জনসাধারণের কাছ থেকেও বন্ড, লেডি ইত্যাদি আকারে সহায়তা নেয়া যেতে পারে। পরিকল্পনায় ও বাজেটে ব্যক্তিখাতকে এবং বিত্তবানদের যে সুযোগ-সুবিধা দেয়া হয়েছে তাতে ধন বৈষম্য আরও বাড়বে বৈ কি! ভাষা আন্দোলন থেকে ৬ দফা হয়ে মহান স্বাধীনতা যুদ্ধের (যার নেতৃত্ব দিয়েছেন জাতির পিতা বঙ্গবন্ধু শেখ মুজিবুর রহমান) মূল লক্ষ্য ছিল শোষণ ও বৈষম্যহীন সমতাধর্মী এক অসাম্প্রদায়িক, উদার সামাজ্য প্রতিষ্ঠা করা। স্বাধীনতা পরবর্তিতে বঙ্গবন্ধু তাঁর আজীবন লালিত এ স্বপ্ন বাস্তবায়নে বাকশাল কর্মসূচীর আওতায় দ্বিতীয় বিপ্লবের ডাক দিয়েছিলেন। আর এ দ্বিতীয় বিপ্লব বলতে তিনি অর্থনৈতিক বিপ্লবকেই বুঝিয়েছিলেন (প্রথম বিপ্লব ছিল ১৯৭১ এর রাজনৈতিক বিপ্লব বা স্বাধীনতা লাভ)। দেশের সর্বত্র আজ নৈরাজ্য ও দুর্নীতির মচ্ছব চলছে। চলছে দখল-আত্মসাৎ ও জবর দল (০৯)। এভাবে কি জাতির পিতার স্বপ্ন বাস্তবায়ন সম্ভব? বাস্তবায়ন তো দূরের কথা আমার মনে হচ্ছে তাঁর স্বপ্ন থেকে আমরা ক্রমান্বয়ে দূরে সরে যাচ্ছি। মনে রাখতে হবে আমলাতান্ত্রিক প্রবৃদ্ধি নির্ভর পরিকল্পনা দ্বারা সমতাধর্মী সমাজ তথা সমাজতন্ত্র প্রতিষ্ঠা আদৌ সম্ভব নয়। আমরা আন্তরিকভাবে বিশ্বাস করি যে, একমাত্র প্রথম পঞ্চ বার্ষিক

পরিকল্পনার আদলে সংবিধানের চার মৌলনীতিকে সামনে রেখে রচিত পরিকল্পনা ও বাজেটই পারে জাতির পিতার স্বপ্ন তথা শোষণ-বৈষম্যহীন সমাজ প্রতিষ্ঠার কাজকে এগিয়ে নিতে। বিষয়টি নিয়ে ভাববেন কি বঙ্গবন্ধু কন্যা মাননীয় প্রধানমন্ত্রী জননেত্রী শেখ হাসিনা?

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## Impact of ‘Generalized System of Preferences’ Cancellation on the Readymade Garment Industry of Bangladesh

Md. Mahfuzur Rahman\*  
Dr. Md. Moazzem Hossain Khan\*

**Abstract:** *The Readymade Garment (RMG) sector in Bangladesh is a multi-billion-dollar manufacturing and export industry. With over 4 million workers employed in the sector, about 80 percent of whom are women, the growth of the garment industry has far-flung implications for the economy. The RMG sector’s export was \$25491.40 million in 2014-15, which is 81.68 percent of the total export earnings of our country (BGMEA). Given the dominance of the sector in our exports, any vulnerability and threat to this sector is a matter of concern. The US government suspended Bangladesh from the Generalized System of Preferences (GSP) which allows duty-free entry of over 5,000 items of commodities to the US market from least developed countries. This action comes as a result of Bangladesh government’s failure to improve working conditions in the country. Loosing GSP advantage in the US market has created a reputation problem and a little financial loss (insignificant). To save the employment generation and one of the largest foreign currency earning sectors, BGMEA, BKMEA and Government should adopt an integrated approach on the one hand and boost up the reputation of this industry and also for avoiding financial loss.*

**Key words:** Ready Made Garment, GSP, GSP Cancellation

### 1. Introduction

Bangladesh is a developing country. The rapid expansion of the manufacturing sector of Bangladesh is characterized by the emergence of some leading industries that cater for exports as well as domestic consumption. Bangladesh economy is now staying at “take off” stage in the growth process. Historically, at such a stage of industrial development, textiles and apparel are typically the first “take off” industry. (7th Five Year Plan) Definitely one of the success stories of our country is the Ready-made Garments (RMG) industry. But in recent years it is facing some

\* Lecturer, School of Business, Bangladesh Open University, Gazipur-1705 and Professor, Department of Economics, University of Rajshahi, Rajshahi-6205



problems. One of them is GSP cancellation. Under generalized system of preferences (GSP) US grants Least Developed Countries (LDCs) and some developing countries to export their products to US markets duty free or at preferential duty on certain terms and conditions. GSP eligibility is conditioned on the status of economic development of the exporting country. For example, it must be an LDC or a developing country whose per capita income is relatively low. Developed countries are not eligible for GSP privileges. The beneficiary country must also meet other conditions imposed by US government. According to United States Trade Representative (USTR), a country can be eligible for GSP, if it has a market economy, is not a member of OPEC, is not involved directly or indirectly in terrorism, has succeeded in maintaining good trade relations with US, comply with US property laws including those related to patents and copyrights and upholds internationally recognised workers' rights. US particularly emphasize the last condition. A country is eligible for GSP if it demonstrates, among other things, a genuine commitment to workers' rights, including right to form trade unions and bargain collectively, and acceptable working conditions related to wages, work hours, fire safety, safety of buildings in which workers work and working environment are free from health hazards. An LDC, if it is not a terrorist country, is automatically eligible for GSP privileges but all its products do not qualify for duty-free access. GSP privileges are subject to suspension or cancellation if a beneficiary country fails to comply with the eligibility requirements

In the past, the buyers and US government expressed their displeasure because factory owners did not take adequate measures to recognize the workers' rights; they were non-compliant on other grounds also. On November 24, 2012, the devastating Tazreen Fashion fire killed 112 workers and injured many who needed treatment for a long time. Official investigations revealed that the disaster occurred due to negligence and carelessness of the owners. Within a few months, the "Rana Plaza", a nine-story building complex in which five garment factories were housed collapsed and 1132 workers got killed under the debris. Thousands got injured, many maimed and unfit for reemployment in a garment factory for life. In both cases the negligence and law-breaking behavior of the factory owners were the major causes. The "Rana Plaza" disaster quickly drew the attention of the world. To appease the pressure groups and US consumers, President Obama suspended GSP privileges for Bangladesh on June 27, 2013 (Hafiz G. A. Siddiqi, 2015).

The great anxiety of the country will be to see a similar action adopted by the European Union (EU). The EU gave a stricture previously to remove preferential access to Bangladesh RMG products in the EU market if the government did not take measures to improve the working conditions in Bangladeshi factories. The EU is a big buyer of Bangladeshi garments.

## 2. Review of related literature:

A number of authors and authorities both Bangladeshi and United States have dealt with the GSP facilities. Now we will look at some literature on this issue of prime concern to Bangladesh.

**Gholam Kibria (2014)** authored an article on “Suspension of GSP: Image Crisis for Bangladesh”. In this study the author has pointed out some reasons for the suspension of GSP and its effect on the RMG industry in Bangladesh. He found that, in spite of all the signals, Bangladesh could not get workers rights improved, rather it went down. Our arrogant entrepreneurs (i.e. owners) and ruthless administrations did not pay any proper attention to improve workers rights as they are mostly first generation businessmen. They are lacking entrepreneurial competencies and experiences. Their main motto is to earn profit. But the owners attach little importance to workers rights and grievances.

**Vivian C. Jones (2013)** wrote an article entitled “Generalized System of Preferences: Background and Renewal Debate”. He found that the U.S. GSP program provides non-reciprocal, duty-free tariff treatment to certain products imported from designated beneficiary i.e. developing countries. The United States, the European Union, and other developed countries have implemented similar programs since the 1970s in order to promote economic growth in developing countries by stimulating their exports. On June 27, 2013, the US President announced the suspension of benefits under the GSP program for Bangladesh on the grounds that “it has not taken or is not taking steps to afford internationally recognized worker rights to workers in the country.”

An article entitled “GSP suspension, a wrong move: US think tank” is written by **Diplomatic Correspondent** published in *The Independent* (2013). According to the article, the suspensions of GSP benefits for Bangladesh’s poor would damage the trade relations between Dhaka and Washington. In response to poor labour conditions in Bangladesh, the Obama administration has moved to unilaterally impose trade sanctions by removing the country’s privileges under the GSP. The article opines that if the president truly wants to improve the lives and well-being of the workers, he should encourage free trade, work to lower barriers and increase economic dialogue with Bangladeshi authorities.

**Haque (2013)** pointed out that losing GSP is not all gloom and doom for the RMG sector of Bangladesh as it does not come under the GSP program. Bangladeshi products such as tobacco, plastic bags and articles, golf equipment, sleeping bags, bone China and porcelain kitchen/tableware, cereal based prepared foods, handloomed woven cotton carpets and other textile floor coverings, spectacles and goggles, head gear other than rubber and plastics, etc. are eligible to enter duty free under GSP in the US market. Due to GSP cancellation the producer and exporters of above mentioned products will face problems till its restoration. According to

the statistics of the Export Promotion Bureau (EPB), the total export of RMG to the USA (as of June 2013) was around \$ 407.8 million or 69 percent of the total exports, which is nearly \$584.1 million worth of exports to the USA. However, losing this status in the US does not symbolize the end of the world for the RMG sector as EU nations will have still continued to provide GSP to Bangladesh and there is a chance for the country to regain the status in the US by making improvements. Therefore government of Bangladesh should try to fulfill some of the conditions to regain GSP facilities by mainly improving the conditions of the RMG workers by the beginning of next year.

**Faruque (2013)** authored an article on “GSP cancellation to destroy the economy of Bangladesh”. He advocates for the reinstatement of the GSP facilities in Bangladesh. His advocacy is based on the policy position taken by the Heritage Foundation, a conservative think-tank that the cancellation of the GSP facilities in Bangladesh was not wise on the part of the Obama Administration since it was not wise for the workers of Bangladesh. Instead, the Heritage Foundation strongly advocated for the removal of any tariff on the garment products of Bangladesh even after the Rana Plaza tragedy. Taking a cue from the Heritage Foundation, the author also argues that removal of tariff from garment products as well as reinstatements of GSP were the best ways to help the workers of Bangladesh.

**Bhuiyan (2013)** wrote an article entitled “Reasonable Wages for Workers to Eliminate Unrest in Bangladesh’s Ready-made Garments (RMG) Sector”. The study was conducted to represent the conflict scenario in the garment sector and conflicts between workers and management. He has tried to highlight the main causes of unrest in the ready-made garment sector of Bangladesh. He has given some suggestions to resolve them. The author furnished some background on the degree of unrest in RMG sector, focusing on six major unrests from December 2010 to June 2012 and provided some information on conflict resolution processes. This is an empirical study. To prepare this article the author introduced RMG workers, management, and factory owners. The study attempts to depict that poor and discriminating wages are the underlying factor of unrest in the RMG sector. Along with wage issue labour rights should be implemented.

### **3. Objectives and Methodology** The main objectives of this paper are

- To analyse the financial impact (export loss) for Bangladesh due to the suspension of GSP by United States. Within this main objective, the following sub-objectives have been determined:
  - To analyse the present condition of the RMG sector;
  - To examine the reputation problem for Bangladesh due to the suspension of GSP by United States;
  - To identify the problem of this sector including GSP;

To recommend measures for solving these problems including GSP.

Our basic aim is to make awareness among factory owners, government and those related to improve this industry so that they develop working conditions which may help us to restore GSP advantages in the US market and avoid cancellation of the same by the European Union.

This study is mainly based on secondary data which are collected from some published sources. The study has been conducted to evaluate the impact of GSP cancellation on the garments sector in Bangladesh. The major sources of data are published articles, research reports, relevant journals, daily news papers, internet etc. However, exact sources of the data are: Bangladesh Economic Review, Export Promotion Bureau (EPB) and Bangladesh Garment Manufacturers' and Exporters' Association (BGMEA).

**4. Findings of the study:** The garment industry has played a pioneering role in the development of non-traditional industrial sector of Bangladesh. Though, it took a rather late start i.e., in 1976 but it soon established its reputation in the world market within a short span of time. Resultantly garment is now one of the main export items of the country. Besides, enriching the country's economy it has played a very important role in alleviating unemployment.

The "Made in Bangladesh" tag has also brought glory for Bangladesh, making it a prestigious brand across the globe. Bangladesh, which was once termed by cynics a "bottomless basket", has now become a "basket full of wonders". The country with limited resources has been maintaining 6% annual average GDP growth rate and has brought about remarkable social and human development.

It is really a matter of great interest to many – how the economy of Bangladesh continues to grow at a steady pace, sometimes even when rowing against the tide. Now we envision Bangladesh achieving the middle-income country status by 2021. We firmly believe that our dream will come true within the stipulated time and the RMG industry will certainly play a crucial role in materialising the dream.

The apparel industry of Bangladesh started its journey in the 1980s and has come to the position it is in today. The late Nurool Quader Khan was the pioneer of the readymade garment industry in Bangladesh. He had a vision of how to transform the country. In 1978, he sent 130 trainees to South Korea where they learned how to produce readymade garments.

With those trainees, he set up the first factory – Desh Garments – to produce garments for export. At the same time, the late Akhter Mohammad Musa of Bond Garments, the late Mohammad Reazuddin of Reaz Garments, Md Humayun of Paris Garments, Engineer Mohammad Fazlul Azim of Azim Group, Major (Retd) Abdul Mannan of Sunman Group, M Shamsur Rahman of Stylecraft Limited, the

first President of BGMEA, AM Subid Ali of Aristocrat Limited also came forward and established some of the first garment factories in Bangladesh.

Following their footsteps, other prudent and hardworking entrepreneurs started RMG factories in the country. Since then, Bangladeshi garment industry did not need to look behind. Despite many difficulties faced by the sector over the past years, it has carved a niche in world market and kept continuing to show robust performance.

The MFA-quota was a blessing to our industry to take root, gradually develop and mature. While the quota was approaching to an end in 2004, it was predicted by many that the phase-out would incur a massive upset in our export. However, the post-MFA era is another story of success. Proving all the predictions wrong, we conquered the post-MFA challenges.

Despite the epic growth of our RMG industry, and its bright prospects, challenges are still there. One of the biggest challenge currently faced by our RMG industry is to ensure workplace safety and better working conditions for the millions of garment workers.

Two major accidents, the Tazreen fire and the Rana Plaza collapse, have brought the issue of workplace safety to the fore and led all stakeholders to act accordingly. Following the unfortunate incidents, various platforms such as the Bangladesh Accord on Fire and Building Safety, the Alliance for Bangladesh Worker Safety and National Plan of Action have been formed to improve building and fire safety of Bangladesh's garment industry.

Present condition of the RMG industry have been analysed from the table:

**Table 1: Growth of RMG in Bangladesh during 1984 -2015**

Year	Number of Garment factories	Employment in Million Workers	Export of RMG in Million US \$	Total Export of Bangladesh in Million US \$	% of RMG's to National Export
1984-85	384	0.12	116.2	934.43	12.44
1985-86	594	0.20	131.48	819.21	16.05
1986-87	629	0.28	298.67	1076.61	27.74
1987-88	685	0.31	433.92	1231.2	35.24
1988-89	725	0.32	471.09	1291.56	36.47
1989-90	759	0.34	624.16	1923.70	32.45
1990-91	834	0.40	866.82	1717.55	50.47
1991-92	1163	0.58	1182.57	1993.90	59.31
1992-93	1537	0.80	1445.02	2382.89	60.64
1993-94	1839	0.83	1555.79	2533.90	61.40
1994-95	2182	1.20	2228.35	3472.56	64.17
1995-96	2353	1.29	2547.13	3882.42	65.61
1996-97	2503	1.30	3001.25	4418.28	67.93
1997-98	2726	1.50	3781.94	5161.20	73.28
1998-99	2963	1.50	4019.98	5312.86	75.67
1999-00	3200	1.60	4349.41	5752.20	75.61

2000-01	3480	1.80	4859.83	6467.30	75.14
2001-02	3618	1.80	4583.75	5986.09	76.57
2002-03	3760	2.00	4912.09	6548.44	75.01
2003-04	3957	2.00	5686.09	7602.99	74.79
2004-05	4107	2.00	6417.67	8654.52	74.15
2005-06	4220	2.20	7900.80	10526.16	75.06
2006-07	4490	2.40	9211.23	12177.86	75.64
2007-08	4743	2.80	10699.80	14110.80	75.83
2008-09	4925	3.50	12347.77	15565.19	79.33
2009-10	5063	3.60	12496.72	16204.65	77.12
2010-11	5150	3.60	17914.46	22924.38	78.15
2011-12	5400	4.00	19089.69	24287.66	78.60
2012-13	5876	4.00	21515.73	27027.36	79.61
2013-14	4222	4.00	24491.88	30186.62	81.13
2014-15	4306	4.00	25491.40	31208.94	81.68

Source: Export Promotion Bureau and BGMEA

From the table we can assess the number of garment factory, employment and garment export position of Bangladesh. Moreover, it is clear from the table-1 that the industry has a consistent development.

The growth of RMG sector in Bangladesh is shown in Table 1. From the table it is found that the number of garment factories in Bangladesh has increased significantly. In FY 1984-85, total number of garment factories was only 384 and it reaches to 4306 in FY 2014-15. Thus, it is clear within 30 years the garment sector has increased by 3922 factories.

Garment industry is an important source of employment of our labour force. In FY 1984-85 a total of 0.12 million labour was employed in the sector and it increase to 4.00 million in FY 2014-15. From FY 1984-85 to FY 2014-15, labour employment in garment has increased by 3.88 million.

Bangladesh Exports her RMG products to many countries and US is one of them. The export value of RMG products of Bangladesh is \$ 116.2 billion in FY 1984-85 which increased to \$ 25491.40 in FY 2014-15. The US cancels GSP of Bangladesh in 2013. In FY 2012-13, total RMG export earnings of Bangladesh from US was \$ 19089.6 and in FY 2013-14, it was \$ 21515.73. Although US cancelled GSP of Bangladesh, the RMG export has increased significant rate. This means that GSP cancellation virtually had no impact on the export earnings of Bangladesh from US.

The US suspended Bangladesh's trade benefits under the GSP programme on June 2013 that made Bangladeshi products ineligible for duty-free entry in US markets. GSP is a World Trade Organization (WTO) programme that gives poor countries special tariff treatment to select imports (The Wall Street Journal 2013). The GSP programme was first adopted internationally by the United Nations Conference on Trade and Development (UNCTAD) at the UNCTAD-II conference in 1968. It

was first adopted by the US with the passing of Trade Act of 1974. In course of time, the US GSP programme was referred to as a programme for providing non-reciprocal, duty free tariff treatment to certain products imported from Developing and Least Developed Countries (LDCs). Through this programme, United States in fact wanted to help Developing and LDCs that have no industrial experiences or tradition to achieve competitiveness in international trade, particularly in exports, and thus develop and improve their economics. Since its launch, 122 beneficiary countries and territories have received GSP facilities in exporting up to 5000 products in the US market (Hossain 2014).

Bangladesh is performing well in the new markets. According to the Export Promotion Bureau (EPB), garments export hit a record high \$ 24.50 billion in the fiscal year 2013-2014, and it is rising at 13.86 per cent rate year-on-year basis. Now the question is what is the impact of cancellation of US-GSP facility on the economy? Bangladesh's garments export to the USA has increased at an impressive pace of 13 per cent year over the 28 years between 1985 and 2013. Bangladesh is the third largest supplier of garments in the USA after China and Vietnam.

Now we will see Bangladesh's RMG Exports to USA

**Table 2: Bangladesh RMG Export to USA during 2012-2015**

Year	Million US \$
2012-13	4996.58
2013-14	5141.38
2014-15	5288.12

Source: Export Promotion Bureau

From the table we see that the value of RMG export to USA from Bangladesh has increased over the year. Table 2 shows the RMG export scenario of Bangladesh to USA. In FY 2012-13 total RMG export was \$ 4996.58 and it increased to \$ 5141.38 in FY 2013-14 and it further increased to \$ 5288.12 in FY 2014-15.

We know that US suspended the GSP facilities of Bangladesh after Rana Plaza collapse in FY

2012-13. However, despite GSP ban, it is clear that the export of RMG to USA has increased.

This export increase means that GSP virtually had no impact on export of Bangladesh RMG to US.

The biggest short-run fear for the economy is a similar action adopted by the European Union (EU). The EU had previously threatened to remove preferential access

of Bangladeshi RMG products in EU market if the government did not take measures to improve the working conditions in factories. If the working conditions does not change significantly and the government fails to improve, Europe would consider suspending GSP privileges. Suspension of GSP facilities by the EU would have a much more colossal impact than the American decision because the effect of US decision would be felt on many things but not on garments (The Financial Express, 2013). In this regard, German Ambassador to Bangladesh Albrecht Conze cautioned that the fear of loosing generalized system of preference (GSP) privilege in the EU countries has not yet been over. In his language – “I cannot say that the thunderstorm has gone away from the Bangladesh’s sky, which could erupt would Europe come to a decision to suspend (The Financial Express, 2013)”.

The negative impact of the US GSP removal is speculated to be a warning for future trade between Bangladesh and the United States including the prospect of retaining the MFN status which benefits Bangladesh’s economic growth.

According to the Bangladesh Economic Review (2014), during the last three years there was no significant foreign direct investment inflow from the US to Bangladesh. In such circumstances, the repeated attempts of the Bangladesh Government to regain the US GSP are crucial for the country’s continued economic growth.

Bangladesh should remember that GSP suspension hampered the prestige of the country and she lost the credibility of being a business partner. The image of Bangladesh as a trading partner of the USA is already questioned. These GSP incidents may discourage US and other investors, new and old. This may have a long term effect on the prospect of future export growth of the country.

**Problems of RMG industry in Bangladesh:** Though the RMG industry in Bangladesh have been passed successfully long time, but there are some problems in this sector. Those problems are given below:

**Import Dependency:** Bangladesh imports raw materials for garments like raw cotton, cotton yarn, woven fabrics, synthetic fibres, thread colour etc. This dependence on raw materials hampers the development of garment industry. Moreover, foreign suppliers often supply low quality materials, which result in low quality products.

**Unskilled Workers:** Most of the illiterate women workers employed in garments are unskilled and so their products often become lower in quality.

**Poor Working Condition:** Working condition has both direct and indirect influence on productivity. Productivity of workers depends on motivation and motivated people works very sincerely. From the very beginning of the advancement of the sector in Bangladesh, the adverse working conditions have been a matter of concern.



**Gas and Power Supply Crisis:** Gas and power supply is one of the major indicators of development for any country. But crisis exists in this sector in our country, which dampen the production of the Readymade Garment sector. At present, most of the economist anxious about that, the garment production will fall due to gas and power supply crisis.

**Lack of managerial knowledge:** There are some other problems which are associated with this sector. Those are- lack of marketing tactics, absence of easily on-hand middle management, a small number of manufacturing methods, lack of training organizations for industrial workers, supervisors and managers, autocratic approach of nearly all the investors, fewer process units for textiles and garments, sluggish backward or forward blending procedure, incompetent ports, entry/exit complicated and loading/ unloading takes much time, time-consuming custom clearance etc.

**Excess –Lead- Time:** Lead-time refers to the time required for supplying the ordered garment products after the export order has been received. In the 1980s, the usual lead time in the garment industry was 120-150 days for the main garment supplier countries of the world; it has been reduced to 30-40 days in the current decade. However, in this regard the Bangladesh RMG industry has improved little; for example, the average lead time is 90-120 days for woven garment firms and 60-80 days for knit garment forms. In Chain, the average lead time is 40-60 days for woven and knit products respectively; in India, it is 50-70 days for the same products respectively.

**Gendered Division of Labour:** In the garment industry in Bangladesh, tasks are allocated largely on the basis of gender. This determines many of the working conditions of women workers. All the workers in the sewing section are women, while almost all those in the cutting, ironing and finishing sections are men. Women workers are absorbed in a variety of occupations from cutting, sewing, inserting buttons, making button holes, checking, cleaning the threads, ironing, folding, packing and training to supervising.

Women work mainly as helpers, machinists, and less frequently, as line supervisors and quality controllers. There are no female cutting masters. Men dominate the administrative and managerial level jobs. Women are discriminated against in terms of access to higher-paid white collar and management positions.

When asked why they prefer to employ women for sewing, the owner and managers gave several reasons. Most felt that sewing is traditionally done by women and that women are more patient and more controllable than men.

**Infrastructure Bottlenecks:** Infrastructure bottlenecks are the serious weakness in Bangladesh. As various private sector representative organizations have repeatedly pointed out, poor infrastructure negatively affects their competitiveness.

**Working Hours:** Though the wages are low, the working hours are very long. The RMG factories claim to operate one eight-hour shift six days a week. The 1965 factory Act allows women to work delivery deadlines; however, women are virtually compelled to work after 8 o'clock. Sometimes they work until 3 o'clock in the morning and report back to start work again five hours later at 8 o'clock. They are asked to work whole months at a time the Factory Act, which stipulates that no employee should work more than ten days consecutively without a break.

**Poor Accommodation Facilities:** As most of the garment workers come from the poor family and comes from the remote areas and they have to attend to the duties on time, these workers have to hire a room near the factory where four to five huddle in a room and spend life in sub human condition. For four to five workers there is one common latrine and a kitchen for which they have to pay tk. 2000 to tk. 2500. They share this amount among themselves to minimize the accommodation expense.

One cannot believe their eyes in what horrible condition they have to pass out their time after almost whole day of hard work in the factory. After laborious job they come into their room, cook their food and have their lunch or dinner in unhygienic floor or bed and sleep where they take their food. They share the single bed or sleep on the floor.

**Safety Problems:** Because of the carelessness of the factory management and for their arrogance factory doors used to be kept locked for security reason defying act. Safety need for the worker is mandatory to maintain in all the organization. But without the facility of this necessary things a lot of accident is occur every year in most of the company.

**Political Instability:** Garments industries often pay dearly for political unrest, hartal, blockade, and terrorism etc. cause to a fall in production. Sometimes the opposition parties use the garment workers to make the unexpected chaos in the country and the workers are influenced by personal interest of the political parties, which is a curse for the RMG.

**GSP Suspension:** The US suspended GSP facility to Bangladesh after the Rana Plaza disaster in 2013. GSP suspension hampered the prestige of the country and Bangladesh lost the credibility of being a business partner. The image of Bangladesh as a trading partner of the USA is already questioned. These GSP incidents may discourage US and other investors to invest in Bangladesh. This may have a long term effect on the prospect of future export growth of the country.

## 5. Recommendations

In fact, the export business of Bangladesh depends on the RMG industry. That's why a coordinated action plan is needed to face the challenges. For achieving the export target in 2021, government and other stakeholders may take a number of

actions to stimulate the RMG industry. These include:

1. Government also have some responsibility to improve the situation by providing proper policy to protect the garment industries, quickly loading facility in the port, providing proper environment for the workers, keep the industry free from all kind of political problem.
2. The government should focus on production and procurement of high quality raw materials within the country. For this endeavor Government should use Public Private Partnership (PPP). This will reduce import dependency and will have a positive impact on export earnings.
3. Bangladesh's labour productivity is known to be lower when compared with Sri Lanka, South Korea and Hong Kong. Bangladesh must look for ways to improve the productivity of its labour force. If we can increase the labour productivity, then the future of this sector will be more prospective.
4. Solar energy can be a great source of solving power crisis in Bangladesh. Bangladesh is situated between 20.30 and 26.38 degrees north latitude and 88.04 and 92.44 degrees east longitude which is an ideal location for solar energy utilization.
5. The existence of sound infrastructural facilities is badly needed for economic development. The government should focus on separate routes for the export and import activities. It may be high way, metro line, more cargo ship etc. The development of infrastructure will help to solve the problem of safety, lead time, transportation problem and so on.
6. RMG industry is suffering from the dearth of professional and highly skilled marketing personnel. We need qualified, experienced, and skilled professionals with updated knowledge about international markets, proficiency in foreign languages especially in English and French. The Government, BGMEA, BKMEA and other stakeholders should undertake long-term training programmes to make skillful and professional marketing teams to meet the marketing challenges in this thriving sector.
7. Government should ensure that the garment sector fully comply with the factory act 1965 in order to construct a garment factory. The workers right and privileges must also be ensured. The following steps should be taken to improve the situation-
  - ◆ Building should be constructed with fire resisting materials;
  - ◆ Adequate exit and proper escape routes should be designed;
  - ◆ Protection against fire and smoke should be ensured;

- ◆ Electrical wiring must be properly designed, installed and maintained;
- ◆ Escape routes should be lighted all times, kept clear, be indicated by signs;
- ◆ Regular fire drill should be held;
- ◆ Door should be protected and should open along the direction of escape;
- ◆ Smoke/Fire alarm system must be installed;
- ◆ Adequate number of extinguisher should be provided;
- ◆ Prior relationship with local Fire Service.

Based on recent trends in the clothing market, analysts believe that there is scope for further expansion of Bangladesh's RMG sector, with potential exports to reach \$ 50 billion by 2021. For achieving this target government included some steps in the 7th Five Year Plan. In 7th five year plan it is mentioned that- both historical and cross-country evidence show that the prospects of rapid GDP growth with extensive job creation require a high-performance and diversified manufacturing sector at the early stage of the take-off period. Bangladesh faces an ever changing global landscape in which manufacturing sector development takes place. Four distinct phenomenon characterizes the global setting: (a) globalization and greater trade openness, which has resulted in the greater integration of the Bangladesh economy with the global economy, an integration that has yielded many benefits but also poses many challenges; (b) to be globally competitive, a high performing manufacturing sector must have reached a high level of industrial sophistication meeting internationally recognized standards of product quality within a compliant production environment; (c) technology has emerged as the key resource and input for industrial growth and development; and (d) fragmentation of production and vertical integration across countries through trade in intermediate goods is fast becoming the dominant trading pattern.

If the government can ensure above things in our economy then the RMG industry will get its apex position in the world market.

## 6. Conclusion

Bangladesh RMG industry has grown rapidly under the umbrella of MFA import quotas, GSP and with abundant supply of low- waged workers, but without strong domestic backward linkages. We should remember that development of the garment industry is directly related to the development of the economy and the development of women folk as well, especially in the rural areas. More than 80% garment workers are female, mostly with a rural background. So this industry plays a vital role in poverty alleviation and women's employment and empower-

ment in rural Bangladesh.

The suspension from the GSP is little more than a symbolic action by the US government to punish the wrong industries for the RMG industries in Bangladesh. Restoration and improvement of worker's rights and better working conditions is necessary for doing business in the world market. It's creating a image crisis for Bangladesh. To refurnish the image BGMEA, BKMEA and government should try in a coordinated way.

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## Problems & Prospects of Transport System of Rajshahi City Corporation: A Survey

Rabeya Basri\*  
Dr. Md. Moazzem Hossain Khan\*

**Abstract:** *In this paper, an attempt has been made to analyze the present condition of the transport system of Rajshahi City Corporation (RCC). In doing so, in the first part of the paper the authors have analyzed the feasibility of introducing city bus service in RCC. In the second part of the paper, they have tried to identify the problems and prospects of introducing city bus service. In the last part of the paper, they have made some recommendations for improving the transport system in RCC area.*

### 1. Introduction

Rapid improvement in living standard of the masses was the prime goal of Bangladesh liberation struggle in 1971. This vision for higher living standard for the masses has been enshrined in the Constitution of Bangladesh. The state of Bangladesh through its Constitution (article-15) committed to a higher living standard for its people by providing basic needs to all of its citizens through planned development. With this objective of planned development for the country, the Bangladesh Planning Commission was established in 31 January, 1972. The Cabinet Decision in establishing the Planning Commission laid down ten functions for the Commission. This can be brought down to three broad sets of functions as (a) to prepare the short and mid-term and long-term plans viz. Annual Development Programme, Five Year Plan and Perspective Plans; (b) to make recommendations as well as being involved in the process of deliberation on a range of policies and institutional changes which were necessary for the implementation and realization of the Plan objectives and (c) to co-ordinate the economic policies, both short and long-term, to be undertaken by the various ministries.

Till now seven five year plans and a two year plan have been taken in Bangladesh. The first five year plans was formulated in 1973-78, The second, third, fourth,

\* Lecturer, Department of Economics, University of Rajshahi, Rajshahi-6205 and Professor, Department of Economics, University of Rajshahi, Rajshahi-6205



fifth, sixth and seventh five year plans were formulated in 1980-85, 1985-90, 1990-95, 1997-2002, 2011-2015 and 2016-2020 respectively. A two year plan was formulated in 1978-80.

Bangabandhu Sheikh Mujibur Rahman, the father of the nation, dreamt of a 'Sonar Bangla' where the common citizens of the country would live in prosperity and have equitable access to quality education, healthcare, rule of law and employment opportunities. The Grand Alliance Government under leadership of Sheikh Hasina, resurrected that dream in its election manifesto 'Charter for change' in 2008 with the proclamation of Vision 2021 to drive the country's sustainable development agenda by striking the right balance between equitable national economic progress and human development. For the first time in the country's history, such a comprehensive and audacious vision, steeped in self-reliance, to reach middle-income status by the 5th anniversary of the nation was presented to the people. This vision greatly resonated with the aspirations of the people and received overwhelming support in the 2008 national elections. Accordingly, The Grand Alliance Government after taking the charge in 2009 declared a Perspective Plan named vision 2021. It was passed by the national economic council in 2010. This vision 2021 will be implemented by two consecutive five year plans, that is, sixth five year plan (2010-2016) and seventh five year plan (2016-2020). The chapters on the sectoral development strategies of the 7th five year plan have been structured to align with the recently adopted 14 uniform sectoral divisions. Previously, there was a lack of uniformity of sectoral classification among the ministries-Planning Commission followed 17 sectors; Ministry of Finance used 13 sectors for resource allocation while 6th five year plan focused on 10 thematic areas. In Seventh Five Year Plan, sector six has been devoted to Transport and Communication.

Development of modern transport systems both urban and rural are the objectives as well as targets of the vision 2021 and for that matter 6th and 7th five year plans. Development and Infrastructure are two important things in economics. Development is a process in which something changes and becomes more advanced. Where infrastructure is the basic equipment and structures such as transportation and communication systems, water and power lines, and public institutions including schools, post offices, hospitals etc, that are needed for a country, region or organization to function properly. So, development of infrastructure, especially transport and communication, is a precondition for achieving sustained and accelerated growth with immense distributional impact, especially for achieving balanced growth. This is more important for Bangladesh as the country is poised to take off to a new growth path, envisioning to achieve more than 7% growth for the next five years. The transport system of Bangladesh consists of roads, railways, inland waterways, ports, maritime shipping, and air transport. Among the different modes of transport, road transportation has become the dominant mode, carrying

over 70 percent of passengers and 60 percent of freight traffic.

Bangladesh is a developing country in South Asia. There are 11 city corporations in Bangladesh and Rajshahi is one of the oldest city corporations, which was established on 11 September 1988(RCC). Geographical location of Rajshahi City corporations is 24-05' to 25-14' North Latitude and 88-09' to 89-25' East Longitude and its area is 96.72 square kilometer. Present population of Rajshahi city is about 763,952 (RCC). In spite of being an ancient city corporation, true public transport, as we mean is that yet to develop here. Town service is almost absent in the area. The main causes of it is that every day about 26 buses of Rajshahi University run in the city. Besides some government and semi-government institutions including Rajshahi College, RUET and Rajshahi Medical College have buses plying in the city area to serve their purposes that deprive the common residents of Rajshahi City Corporation. Therefore, a public transport should be introduced in Rajshahi city in order to serve its citizens.

Before 2008, man-pulled rickshaw was the main vehicle for short distant transportation. But after 2008, battery driven auto-rickshaw has emerged as the main transport in the Rajshahi City Corporation. Now it is the most popular transport means. According to a private survey, there are nearly 15,000 battery-run auto-rickshaws, 35,000 rickshaws, 800 CNG-run auto-rickshaws, 1,500 human haulers, 1,200 rickshaw vans and 1,500 cars and minibuses in Rajshahi City (the independent 2015). According to the RCC (2016), there are 9,998 auto-rickshaws and 22,561 rickshaws running in the city area.

Everyday several thousands of battery driven unauthorized auto-rickshaws are plying on the main streets in the city, creating extreme traffic jams and sometimes deadly accidents. They do not follow the traffic rules and regulations. Many passengers of the auto-rickshaws said that, accidents and traffic jams are increasing on the streets due to plying of the auto-rickshaw by inefficient drivers. Most of the people, who earlier used to pull rickshaws and vans, are now driving the battery run auto-rickshaws without any training. Even, many of them do not have necessary valid papers like registration of the vehicle and driving license. As a result, accidents occur every day. For this reason, to remove traffic jam, reduce accidents and travel faster at low cost, it has become essential to introduce town service in Rajshahi City Corporation.

## **2. Literature Review**

Extended studies have been done on different aspects and issues of transportation system. Generally researchers used technique of tabular analysis in their papers.

Iqbal (2013) in his research paper included comparative study between battery operated easy bike and CNG operated auto rickshaw in terms of cost (operating cost, manufacturing cost, maintenance cost), user friendly and environment issue. From the study, in terms of cost, it was seen that the manufacturing cost and main-

tenance cost were little bit higher for CNG operated auto-rickshaw than that of battery operated easy bike. He showed the battery of battery operated easy bike is not environment friendly, because the battery is dumped into open space. Battery contains harmful chemical known as lead-acid battery. This makes the land as well as the air polluted.

Begum and Sen (2004) suggested in their paper about the income, health, livelihood and other indicators of well being of the rickshaw puller. They showed that most of the rickshaw pullers came from a very poor economic background consistent with the characteristics of chronic poverty. They were susceptible to systematic health risks, very limited schooling and the poor range of occupational choices for children. They suggested some policy for the improvement of the conditions of rickshaw pullers.

Siddique (2010) examined the use of public transit and the existing socio-economic characteristics of the lower and middle income group of Khulna city in Bangladesh in terms of trip generation. Role, efficiency and equity of public transit were also discussed in his study. The case study showed that the middle-income group generates relatively more trips than other income groups and they were mostly dependent on public transit. Again, lower income group can't afford personal vehicles. Therefore, efficient and equitable public transit is essential for the development of any city.

Chien et al. (2003) showed in their study that bus routing is one of the most important elements of public transit system in planning. This article presents a model for optimizing service headway and a bus route serving an area with a commuter (many-to-one) travel pattern. The bus route is optimized by minimizing the total system cost, including operator and user costs, while considering diagonal links in the study network. Results show that the optimal bus route is sensitive to demand distribution over the service area. The developed model is particularly useful for planning a new bus service and evaluating an existing one in many cities embedded with general grid networks.

Mahmud et al. took an attempt to point out the inherent weakness of Dhaka Metropolitan City in particular relation to transportation system and identified some of the forthcoming challenges for sustainable development. At the very outset of the paper, a brief outline of the existing land use and transport scenario and detailed quantitative analysis with accessibility and functionality of the existing road network had been presented.

Mahmud et al. discussed in their paper on characteristics of transportation and consequent mobility, safety and environmental effects. The purpose of the paper was to conceptualize a vision and identify supporting policies for sustainable transport development. The authors also made an attention on key transport issues and possible options for ensuring sustainable transport development in Bangladesh.

Mahmud et al. tried to show the deficiencies of existing mass transit system to put forward an appropriate rapid mass transit system to recover the huge demand. An overview of the existing modes of travel and operation characteristics was also described. Finally some potential rapid mass transit options were highlighted with the context of prevailing land use and transport characteristics, socio-economic context of Dhaka Metropolitan City.

### **Study Area and Sampling Procedure**

Among 11 City Corporations Rajshahi is one of the oldest in Bangladesh. According to 2001 and 2011 census, the population of Rajshahi City Corporation was 388,811 and 763,952 (RCC) respectively. 2011 to 2016, there has been substantial changes in the size of population caused by the changes in national, regional, socio-economic and political conditions. Therefore, we see the population of Rajshahi city has doubled in a decade.

Accordingly, the population may be about 1.5 million and 3 million in 2021 and 2031 respectively. So, it is high time to formulate plans for introducing town service to remove public sufferings. The number of rickshaws and auto-rickshaws registered till 19.05.2016 was 22,561 and 9,998 respectively in RCC. This registration process is going on. Besides, many unregistered rickshaws and auto-rickshaws are running in Rajshahi city.

We collected primary data from different points of Rajshahi City Corporation through sample survey to find out the conditions of existing transport system. For data collection purpose, we selected four main entry points of Rajshahi City, where maximum number of rickshaws and auto-rickshaws exit through and enter into the city. These four points are Binodpur, Railgate, Court Point and Court Station. The number of unregistered auto-rickshaws entered into and exited from the city from 7.30am till 11.30am was counted in these four points. An office day skipping Friday and Saturday was taken for this purpose.

### **3. Objective and Methodology**

The broad objective of this paper is to examine the feasibility of introducing City Bus Service in RCC area. Within this broad objective the following sub-objectives have been determined:

1. To examine the conditions of existing transport system of RCC;
2. To identify the problems of transportation of RCC;
3. To make recommendations for removing those problems and introducing town service of RCC like others city corporations.

In preparing this paper, we have used both primary and secondary data. Secondary data have been collected from Rajshahi University, RUET, Rajshahi College, Rajshahi Medical College, RCC, RDA, and BBS. Primary data have been

collected through field survey. We have used statistical method in data processing. Besides these, we have taken the help of different publications on transportation systems by different authors.

The limitation of this paper is that, we have failed to collect profit and loss of corresponding departments because they have refused to give these informations. Therefore, we may assume that they are losing concerns.

#### 4. Decision of Results

In this study, tabular technique and diagram were used to illustrate existing conditions and problems of transport system in RCC. Table-1 shows that maximum number of unregistered auto-rickshaws entered into RCC through court point. In 4 hours from 7:30am to 11:30am, total number of 74 auto-rickshaws entered into RCC and 56 exited through this point while 54 entered and 36 exited through Binodpur point. Another 50 and 32 auto-rickshaws entered and 44 and 19 exited crossing Railgate and Court-station points respectively. Therefore, most of the unregistered auto-rickshaws entered into and exited from RCC from 9:30am to 10:30pm. Due to increase in demand among school, college and office going passengers, the number of unregistered auto-rickshaws increase during this time. Table-1 portrays that a number of 210 unregistered auto-rickshaws entered into and 155 exited from RCC through Court, Binodpur, Court-station and Railgate points within only 4 hours from 7:30am to 11:30am.

**Table 1: Number of unregistered auto-rickshaws plying in RCC area**

Time (AM)	Court		Court-Station		Railgate		Benodpur	
	In	Out	In	Out	In	Out	In	Out
7.30-7.45	1	0	2	0	1	0	2	1
7.45-8.00	3	0	1	1	2	0	1	1
8.00-8.15	1	0	2	1	1	1	1	1
8.15-8.30	2	1	2	1	9	8	2	2
8.30-8.45	2	1	2	2	3	1	5	2
8.45-9.00	6	4	2	0	2	5	3	3
9.00-9.15	5	4	1	1	1	2	3	3
9.15-9.30	5	3	2	1	2	2	3	1
9.30-9.45	9	4	3	1	2	3	5	4
9.45-10.00	9	5	2	1	3	5	7	0
10.00-10.15	7	6	2	2	4	3	3	1
10.15-10.30	8	10	1	3	3	3	3	4
10.30-10.45	5	3	1	2	5	2	1	2
10.45-11.00	6	5	4	1	6	4	6	5
11.00-11.15	3	7	2	1	4	3	5	4
11.15-11.30	2	3	3	1	2	2	4	2
<b>Total</b>	<b>74</b>	<b>56</b>	<b>32</b>	<b>19</b>	<b>50</b>	<b>44</b>	<b>54</b>	<b>36</b>

Source: Sample Survey Results.

### Route wise number of trips by Rajshahi University Buses

Though Rajshahi University was established in 1953, its transport sector started in 1970. After our independence Bangabandhu Sheikh Mujibur Rahman donated 12 buses. As the number of students was small, the number of buses and their routes were also limited. Now the number of both buses and trips has increased with the increase of number of students. Route-wise number of trips of RU buses are given in table-2. Information presented in Table- 2 indicates that 26 buses take 120 trips through 16 routes every day. Moreover every Friday two buses are used for bazar trips for the teachers. Baneshwer is the remotest route in the east while Kasiadanga and Naohata are the remotest routes in west and north respectively.

**Table 2: Route-wise number of trips by Rajshahi University Buses**

Number of Routes	Number of Buses	Number of Trips
Baneshwer	3	7
Laxmipur	2	13
C&B	3	8
Court	3	8
Bornali	2	8
New-market	1	7
Naohata	1	5
Alluporti	1	7
Kashiadanga	2	7
Bihars	1	4
BGB sector	1	6
Katakhali	1	6
BRTA(am chottor)	1	7
Somsadipur	2	13
Rajshahi rail station	1	6
Naricalbaria krishi unit	1	3
Library trip	4	4
Club trip	1	1

Source: Rajshahi University transport department

### Route-wise number of trips by RUET buses

Rajshahi University of Engineering and Technology (RUET) established in 1964 as Rajshahi Engineering College with three engineering departments. Later it was converted into Bangladesh Institute of Technology (BIT), Rajshahi in 1986 to enhance technical education. The institute is upgraded as Rajshahi University of Engineering and Technology (RUET) in September, 2003 to expand education and

research. Currently, there are more than 3000 students and 254 academic staffs in RUET. The university provides its own regular bus service almost everywhere in Rajshahi City for the convenience of students and academic staffs. Table-2 shows that 8 buses provide 21 trips in 10 routes every day.

**Table 3: Route-wise number of trips by RUET buses**

Number of Routes	Number of Buses	Number of Trips
Court	1	4
Baya	1	2
Court-station	1	1
C&B - Vadra	1	3
Katakhali	1	2
RUET-Quarter	3	3
217 bellow- Quarter	1	3
Bazar trip	1	1
Mohila Hall	1	1
Nawdapara	1	2

Source: RUET Transport department

#### **Route-wise number of trips of Rajshahi College busses**

It is said to be the third oldest institutions of higher education in Bangladesh following Dhaka College and Chittagong College. Rajshahi College was established in 1873. After establishment the college became one of the main centers of higher education for the inhabitants of then East Bengal, North Bengal, Bihar, Purnia and Assam. Rajshahi College was the first institution in the territory to offer Bachelor and Honours degree courses in various disciplines since 1878. There are about 4000 students in Rajshahi College.

For smooth transport of the students, 11 buses are running on fare in different routes. These buses take 66 trips in 5 routes every day. In Table-3, Baneshwer, Belpukur, Naohata and Kasiadanga are the main routes locating 17 km, 12 km, 11.1km, and 6.8 km apart from the college campus. The number of buses compared to about 4000 students is not sufficient.

**Table 4: Route-wise number of trips of Rajshahi College busses**

Number of Routes	Number of Buses	Number of Trips
Baneshwer	4	24
Belpukur	1	6
Horian	1	6
Naowhata	3	18
Kasiadanga	2	12

Source: Rajshahi College Transport department

### Route-wise number of trips by RMC buses

Rajshahi Medical College established in 1958, is the first medical college in northern region of Bangladesh. Presently the college has only 2 buses for students transportation. Table-2 shows that 2 buses take total 4 trips to Dental and Court. Therefore it can be inferred that most of the students use local public vehicle for their transportation.

**Table 5: Route-wise number of trips by RMC buses**

Number of Routes	Number of Buses	Number of Trips
Dental	1	2
Court	1	2

Source: Rajshahi Medical College Transport department

### Comparison of transport informations of RU, RUET, RMC and RC

It is projected from Table-6 that a total number of 164 staff is working in RU, RUET, RMC and RC. Among them, 119 staff works in RU. In RC, 20 out of total 23 are contractual staffs as all the buses of this college are run on fare. The 4 institutions have a total of 46 buses among which RU has 26 buses of its own. In comparison with the route and trips, RU buses take 11 trips in 16 routes while RC buses takes 66 trips in 5 routes and RUET buses takes 21 trips in 10 routes.

**Table 6: Comparison of transport informations of RU, RUET, RMC and RC**

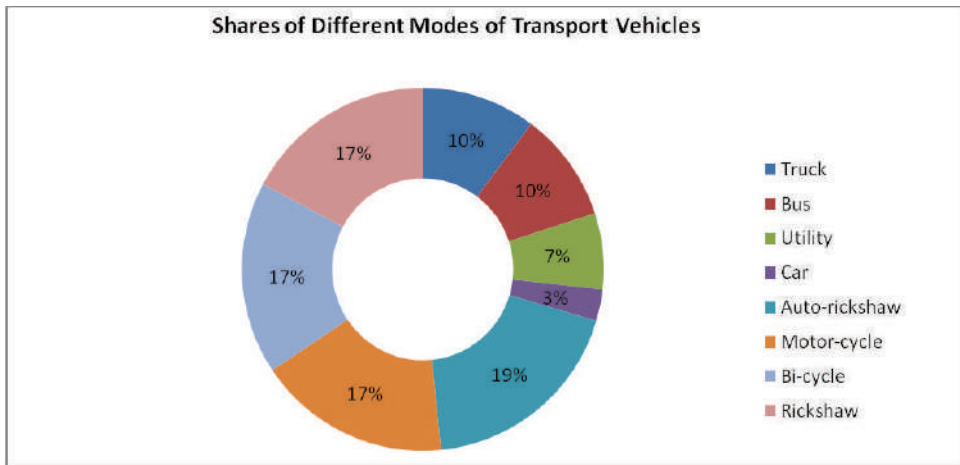
	Rajshahi University	RUET	Rajshahi Medical College	Rajshahi College
<b>Number of Staffs</b>	119	20	2	23
<b>Number of Buses</b>	26	8	1	11
<b>Number of Routes</b>	16	10	2	5
<b>Number of Trips</b>	120	21	4	66

Source: Sample Survey Results

Apart from the buses of Rajshahi University, RUET, Rajshahi Medical College and Rajshahi College, buses of different government, semi-government, and autonomous institutions located in RCC area move throughout the city. On the other hand the main mode of transport of the dwellers of the city is battery driven auto-rickshaws. There are 19% auto-rickshaws, 17% motorcycles, 17% bai-cycles and 17% rickshaws, 10% trucks, 10% buses, 7% utility vehicles and 3% cars running in the city area (Ashraful Haque, 2015). This is illustrated in diagram-1:

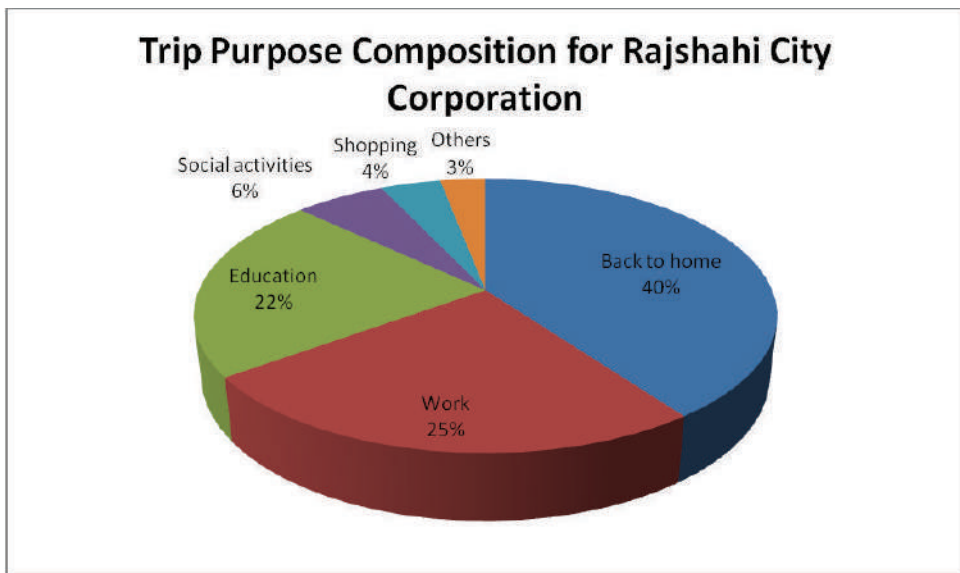


Diagram-1: Shares of different modes of transport vehicles plying within RCC area, 2016.



The purpose of traveling (Ashrafal Haque, 2015) of the dwellers is 40% to back home, 25% for work, 22% for education, 6% for social activities, 4% for shopping and 3% for other uses of their total trips (Diagram-2).

Diagram-2: Uses of transport vehicles by the city dwellers of RCC, (2015).



The number of battery driven auto- rickshaws and rickshaws is increasing day by day for their increasing demand and popularity among the travelers resulting traffic jam in important points. To portrait the scenario of traffic jam, two points named Monichattar and Zeropoint is shown in the picture. The illustration shows bigger number of rickshaws and auto-rickshaws compared to other vehicles.

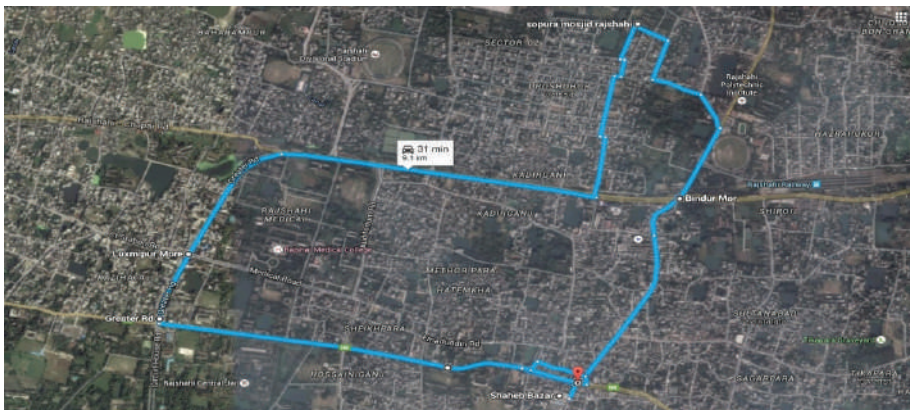
Photograph-1: Rickshaw and Auto-rickshaw in Monichattar and Zeropoint.



### 5. Policy Recommendations

It takes about 90 minutes to travel 23.6 km on auto-rickshaws and 45-50 minutes on CNG from Court to Baneshwer the main route crossing Rajshahi city which is much time consuming. It will take only 30 minutes to travel the same distance if town service is introduced. Other important routes say Baneshwer to Kasiadanga, Court to Naohata and Baneshwer to Naohata are of the same distance. Time is a very vital factor for every nation. In the developed countries, travel time is of highest consideration in city life. To reduce travel time in everyday life for work or school, they are constantly improving and updating their transport policy and modes of transportation. To do so, this is highly recommended that introduction of town service for all citizens of Rajshahi City like other city corporations would be the only solution to the existing traffic problem. To reduce the travel time and hassle, town service is now a situational demand for long-term solution to the traffic problem in the Rajshahi city. Besides, it will reduce the traffic jam and consequently lower road accident. Auto-rickshaws are running with electricity. Recently RCC is suffering from severe load shedding due to auto-rickshaws. If town service is introduced, this load shedding will be reduced.

Map-1 shows the proposed routes for town service in Rajshahi City Corporation area.



To introduce City Bus Service, our recommendations are as follows:

1. In order to introduce city bus service a new department named “RCC Bus Department” should be established.
2. At the initial stage the RCC should come in contract with the existing bus service departments of Rajshahi University, Rajshahi College, Rajshahi medical College and RUET for transferring their buses to the RCC Bus Department. The City Corporation may buy the buses or pay rents to this organizations. Their stuffs can be utilized for this purpose. Wages should be paid to the staff on monthly basis so that they can find job security and can work safely.
3. There may be six routes in RCC area. They are:
  - Baneshwer – Talaimari – Monicattar – Court ;
  - Baneshwer – Talaimari – Railgate – Kasiadanga ;
  - Baneshwer – Talaimari – Railgate – Naohata ;
  - Naohata – Railgate – Laxmipur – Court ;
  - Baneshwer – Belpukur – Amchattar – Naohata ;
  - C&B – Zero-point– Railgate – Rajshahi Polytechnique Institute– Cantonment Road –Bornali (Circle route).
4. In every the routes, there must be specific stoppages. Without stoppage no busses will stop and take passengers. Buses can leave their stations every 10 minutes.
5. Different sorts of cards like hourly, daily, weekly, monthly, half-yearly, yearly etc. fare cards (in future smart fare card) may be introduced on consetion for fare collection.
6. According to RDA, two road construction projects from Airport road to Baipas road and from Kapasia bazaar to Sucorno Moor will be completed by June 2018. Within June 2020 another two projects of constructing overpass from Greater Road to Shahid Captain Monsur Ali Park and four lane upgradation of Baipass road will be completed. Upgradation of roads from Chotobongram Purbopara to Meherchandi and from Barind Medical to Chakpara will be completed by June 2020. Besides these projects, following RDA master plan, many other projects will be incorporated very soon. These upcoming projects will gradually pave the way for smooth town service system.
7. In the main center point of the city having busy and narrow roads,

rickshaw and auto-rickshaw can run there as buses cannot move without specific routes.

In this paper an attempt has been made to present conditions of existing transport system in Rajshahi City Corporation and also try to identify the problems of transportation of RCC. It is a well established fact that adequate an efficient mass transportation service plays an important role in combating the ever worsening problems of traffic congestion and improving safety within urban areas. So, city service system is essential for safe, comfortable and mobility need of the city dwellers of RCC.

At present the population of Rajshahi city is about 7 lac. The population is rising day by day. So, RCC authorities should take steps to build underground rail system (metro) in the near future. Otherwise Rajshahi city would be a congested and blocked city like Dhaka. Besides RCC other cities like Chittagram, Khulna, Sylhet, Barisal, Rangpur and Mymensingh should plan to construct under-ground railways. Otherwise Bangladesh would not be able to establish modern economic system.

## **6. Conclusion**

Rajshahi City Corporation is the oldest City Corporation in Bangladesh. But, still no city bus service has developed in it. This is because of the presence of transport departments in Rajshahi University, RUET, Rajshahi Medical College and Rajshahi College. Therefore, these institutions must reach at consensus with the RCC in order to introduce a city bus service system within its area. The sooner it happens the better will it be for dwellers in RCC.

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## Poverty, Food Security Status and Coping Strategies of Small Farm Households in Mymensingh Region of Bangladesh

M. Mohiuddin\*  
M. S. Islam\*  
M. T. Uddin\*

**Abstract:** *The present study was conducted in Mymensingh region of Bangladesh during 2012-13 to know the present status of poverty, food insecurity and coping strategies adopted by small farm households during food crisis. Descriptive analytical tools such as Cost of Basic Need (CBN) method and Direct Calorie Intake (DCI) method were used to analyze the data. The study employed mainly farm level cross sectional data collected from 150 farm households taking 50 from each upazila of three districts namely Mymensingh (Phulpur), Netrokona (Kendua) and Kishoreganj (Kishoreganj Sadar) of Bangladesh. According to CBN method, about 23% of the small farm households lie below the lower poverty line and about 35% lie below the upper poverty line. Based on DCI method, about 16% lie below the hardcore poverty line and about 32% lie below the absolute poverty line. The study observed that on an average, the rural households are more or less secured in relation to availability of food round the year. However, Kartik (October-November) and Chaitra (March-April) are the two food-insecured months common for almost all the small farm households. As a whole, the Ashwin (Sept-Oct) is also a food insecured month along with Ashar and Sravan. About 62% of the respondents identified landlessness as the prime cause of their food insecurity followed by income generating activities and natural calamities, respectively. About 45% of farm households relied on less expensive food for everyday as consumption coping strategy during food shortage where about 5% took less food and 1% borrowed food for everyday. Irrespective of location, about 53% reliant upon borrowing money for coping with food insecurity followed by sale of households assets (45%), reduce food cost (40%) and wanting help from relatives (36%). It is also recommended that creation of employment opportunities throughout the year, especially in the lean season, and government supports are suggested to tackle the food insecurity problems for the study areas.*

\* The authors are respectively Senior Scientific Officer, Bangladesh Agricultural Research Institute, RARS, Jamalpur and Professors Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh



## 1. Introduction

Bangladesh is one of the low income economies of the world having per capita income of only around US\$ 1314 (Deb, 2016). The economy of Bangladesh is developing over the years. Bangladesh had made significant achievement in food grain production and food availability. Availability of sufficient food at the country or local level does not mean that all people within that geographic unit are food secured. Despite a significant progress in domestic food grain production, Bangladesh is still facing food insecurity. Approximately 40% of the population lacking the resources to acquire enough food and consequently remaining below the poverty line (Hossain, 2009). Based on purchasing ability, incidence of poverty came down gradually during the last decade from 63 million poor people in 2000 to 47 million in 2010 (HIES, 2010).

The prevalent rates of global acute and chronic malnutrition among children under two years old in Bangladesh are alarming. Growth retardation, an outcome of chronic malnutrition, is widespread affecting an estimated 48.6% of the country's 20 million children (Mahzabin, 2011). Approximately one third of adolescent girls in Bangladesh suffer from anemia and micronutrient deficiency (HFSNA, 2009). Bangladesh is ranked 129th out of 169 countries in the 2010 Human Development Index (UNDP, 2010). In rural areas, poverty incidence remains especially high among households headed by a member working in agricultural sectors (48.2%) as well as among landless rural households (66.6%) (NFPPoA, 2008). The under-nourishment according to DCI method indicate that the recent decline in "hardcore poverty" (from 20% to 19.5%) and in "ultra-poverty" (from 8.2% to 7.8%) has been less impressive than the decline in absolute poverty (from 47.5% to 40.4%), suggesting that many people tend to be "trapped" in the vicious cycles of hunger and poverty. The percentage of population living under the poverty line came down to 31.5 in 2010 from 40 in 2005 due to consistent economic and remittance growth. However, 17.6% of the population is still extremely poor (HIES, 2010).

It is often argued that land available for crop cultivation has been shrinking at around 1% per annum, which means a reduction of average farm size with concomitant increase in fragmentation and sub division of holdings (Mandal, 2007). Above all, these scarce cultivable lands are being used for making new houses. The number of landless, marginal and small farmers has, therefore, been increasing at alarming rate day by day in rural Bangladesh. These groups is forced to rely on labour selling/crop farming, fishing, petty business, service and other non-farm activities and often on a piecemeal, daily or seasonal basis. Due to the seasonal variation in agriculture employment and limited employment opportunities in non-farm sector, millions of people suffer from chronic and transitory food insecurity. The average Bangladesh diet is deficit in energy by about 15 percent (Amin and Farid, 2005). Normal diet of Bangladeshi people is also seriously imbalanced; carbohydrates contribute nearly 74 percent to the total dietary energy

and 57 percent by protein (BBS, 2003). The extent of poverty in terms of calorie intake is relatively high in Bangladesh where about 49% households are poor and 23% are extreme poor (PDO-ICZMP, 2003). Poverty stricken people usually use their natural environment in unsustainable ways, leading to further deterioration of their livelihood conditions (FAO, 2005). As a consequence, food security for these people has become very challenging task. The ultra poor usually consume less than minimum calorie intake (1805 kcal/day) and any further reduction in food consumption will certainly deteriorate their physical ability and future potentiality (BBS, 2007; FPMU, 2007). Under this tenuous food situation, how these rural households cope with the food insecurity situation is really unknown.

There have been substantial amounts of literature found on different aspects of food security at home and abroad (Dash, 2005; Rahman, Haque and Talukder, 2005; Amin and Farid, 2005), but very few of them dealt with the strategies adopted by the people suffering from poverty and food insecurity. There is hardly any study found conducted in the above mentioned population in this specific region of the country though they are recognized as one of the most vulnerable groups where food security needs to be ensured.

This study is an attempt to assess the status of poverty and food insecurity of small farm households and investigate the mechanisms; both consumption and non-consumption, that the small farm households adopt to cope with the situation.

The specific objectives of the study are as follows:

- i. to assess the poverty status of the small farm households;
- ii. to determine food security status of selected farm households; and
- iii. to investigate the coping strategies adopted during food crisis by farm households

## **2. Methodology**

For this study, multi-stage simple random sampling was used for selecting the sample. The first stage involved purposively selection of three districts (i.e., Mymensingh, Netrokona and Kishoreganj) out of six in the greater Mymensingh region. After selecting three districts, one upazila from each district was selected again purposively considering the level of food security on the basis of the report of RDRS, 2004. Because of RDRS survey report on food security and hunger in Bangladesh divided all upazilas of Bangladesh into four categories; a) Very high food insecure; b) High food insecure; c) Moderate food insecure; and d) Low food insecure upazila based on availability, accessibility and utilization of food and vulnerability. From the above classification this study investigates prospective food security strategies in very high food insecure upazila of Phulpur (Mymensingh) and Kendua (Netrokona), moderate food insecure upazila of Kishoreganj sadar (Kishoreganj). Stage two involved a random selection of two

third villages from the list of villages in a union of a upazila of the selected districts. From these three districts, a total of 12 villages/*Paras* were randomly selected taking 5 villages/*Paras* from the selected upazila of Mymensingh, 4 villages/*Paras* from the selected upazila of Netrokona, and the remaining 3 villages/*Paras* from the selected upazila of Kishoreganj district. The third stage involved a random selection of fifty farming households from the selected villages. Thus, total numbers of sample farm households owning 0.2 to 1.0 ha of land were 150.

### Analytical techniques

Generally, two methods are used in estimating poverty. The first one is based on Direct calorie Intake (DCI) and the other one is the Cost of Basic Needs (CBN) method. Direct calorie intake method is used to determine whether an individual/family lives below or above a certain poverty threshold. These thresholds are predetermined for Bangladesh, e.g., 2122 kcal for absolute poverty line and 1805 kcal for hardcore poverty line. The first threshold (absolute poverty line) is used to determine 'poor' and 'non-poor'. If daily food intake of an individual/family falls below the hardcore poverty line, then the individual/family is termed as hardcore poor. The DCI method allows estimation of the magnitude of food poverty base upon one's food intake. In this study, threshold levels have been estimated based upon the calorie-value and nutrition information from multifarious types of food intake, as provided by a specialized entity in Bangladesh (Cogill, 2003).

In the CBN method, 'upper' and 'lower' poverty lines were determined. Poverty lines are used to find a poor household which represents the level of per capita expenditure at which the members of households can buy an exogenously determined low-cost but adequate diet plus other objects of basic needs. In this study, both DCI and CBN methods have been used to estimate the poverty line at the household level.

### Cost of Basic Needs (CBN) method

The CBN method estimates the poverty level in a year in three steps. First, the cost of a bundle of fixed food items is estimated. The food items are rice, wheat, pulses, milk, oil, meat, fish, potato, vegetables, sugar and fruits which provide minimal nutritional requirements corresponding to 2,122 kcal per day per person.

The required quantities in the food bundle is denoted by  $(F_1, F_2, \dots, F_N)$  to meet the calorie requirement; that is,  $F_j$  is the required per capita quantity of the food item  $j$ . The food poverty line is computed as  $Z_f = \sum P_j F_j$ , where  $P_j$  is the unit price of  $j$ -th food item. In the second step, two non-food allowances for non-food consumption are computed. First one was obtained by taking the amount spent on non-food items by those households whose total consumption is equal to their food poverty line  $Z_f$ . These households spend less amount on food than the food poverty line and

spend only on the essential items in non-food consumption. Algebraically, if the total per capita consumption is denoted by  $y$  and food per capita consumption by  $x$ , the “lower” allowances for non-food consumption are estimated as  $ZL_n = E[y_i - x_i | y_i = Z_f]$ , where  $E$  denotes the mathematical expectation. The second one is “upper” allowances, which is obtained by taking the amount spent on nonfood items by those households whose food expenditure is equal to the food poverty line. These households do meet their food requirement comfortably. Mathematically, the “upper” allowances for non-food items can be expressed as  $ZU_n = E[y_i - x_i | x_i = Z_f]$ . Obviously,  $ZU_n$  is larger than  $ZL_n$ , because the share of food expenditure in total consumption decreases as consumption increases.

In the third step, estimation of the poverty lines consisted simply of adding to the food poverty line with the “lower” and “upper” non-food allowances to yield the total lower and upper poverty lines.

Lower poverty line:  $Z_L = Z_f + ZL_n$  where  $ZL_n = E[y_i - x_i | y_i = Z_f]$

Upper poverty line:  $Z_U = Z_f + ZU_n$  where  $ZU_n = E[y_i - x_i | x_i = Z_f]$

The difference between the two lines is due to the difference in estimation of the allowances for non-food consumption. The lower poverty line incorporates a minimal allowance for non-food goods, while the upper poverty line includes more allowance.

In practice, some adjustments are necessary to estimate  $ZL_n$  and  $ZU_n$ , because it is not feasible to get desired data whose total consumption is equal to the food poverty line ( $Z_f$ ) or whose food expenditure is equal to the food poverty line. To avoid this problem, expectation should be taken for those households whose total consumption is less or equal to the food poverty line, in the computation of “lower” allowance for non-food consumption. Similarly, “upper” allowance can be computed by taking the expectation for those households whose food expenditure is less or equal to the food poverty line.

### **Direct Calorie Intake (DCI) method**

The direct calorie intake method estimates the per capita calorie intake at household level. In this method, food consumed during the last three days in a household is first averaged and then the average content of food per day per household is converted into kilocalorie. The amount of calorie intake is then converted into per capita per day. According to this method, a household is considered as ‘hardcore poor’ with per capita calorie intake is less than 1,805 kcal per day, and ‘absolute poor’ with less than 2,122 kcal per day. Irrespective of male and female, two children under six years old was considered one adult member in this study (Omotesho et al., 2006). The tables of nutrient composition of Bangladeshi foods (Darnton-Hill et al., 1988) was used to calculate the calorie and nutrient values of the foods.

### 3. Results and discussions

#### Estimation of poverty using CBN methods

It is recognized that an adult person in Bangladesh requires on an average minimum amount of 832 gm of food a day, which is converted to 2112 kcal energy (BIDS, 1997). The food combination suggested by BIDS (1997) was 397 gm of rice, 40 gm of wheat, 40 gm of pulse, 58 gm of milk, 20 gm of oil, 12 gm of meat, 48 gm of fish, 27 gm potato, 150 gm of vegetables, 20 gm of sugar, and another 20 gm of fruits. In practice, the rural people are dependent more on rice than on other items. BBS (2000) used a larger combination of food and per capita per day intake of rice was suggested as 455 gm. However, the per capita per day food combination for this study has been prepared by considering the food combination suggested by BBS (2000) and BIDS (1997).

The per capita per day intake of food, calorie contents and price of food for this study population are presented in Appendix Table 1. In the estimation, the per capita per day requirements of food intake were fixed at 874.39 gm containing 460.96 gm of rice, which incurred cost amounted Tk. 36.57 at the survey point in time (Appendix Table 1).

**Table 1 Estimation of the incidence of poverty at household level by CBN method**

Per capita Food Poverty Line ( $Z_f$ )*		13348	
Per capita lower allowance ( $ZL_n$ )**	1639	Per capita lower poverty line ( $ZL = Z_f + ZL_n$ )	14987
Per capita upper allowance ( $ZU_n$ )**	3066	Per capita upper poverty line ( $ZU = Z_f + ZU_n$ )	16414
Per household lower poverty line expenditure	73436	% HH below the lower poverty line expenditure	22.70
Per household upper poverty line expenditure	80429	% HH below the upper poverty line expenditure	34.87

source: Field survey, 2012.

Note: \*The food poverty line is estimated by considering the price for the annual food quantity of minimal nutritional requirements corresponding to 2,122 kcal per day per person.

\*\*  $ZL_n = E[y_i - x_i \mid y_i = Z_f]$  and  $ZU_n = E[y_i - x_i \mid x_i = Z_f]$ , where  $y$  denotes the total per capita consumption;  $x$  denotes the food per capita consumption and  $Z_f$  denotes the food poverty line.

By converting the per capita poverty lines into household level, the “lower” and “upper” poverty lines for the study population had been estimated at Tk. 73436, and Tk. 80429, respectively (Table 1). The result suggests that about 22.7% households lie below the lower poverty line and about 34.87% households lie below the upper poverty line. The incidence of poverty in the study population was found consistent with the national figures (23.5 % by lower poverty line and 38.8 % by upper poverty line for rural area of Dhaka division of Bangladesh) which was reported by HIES (2010).

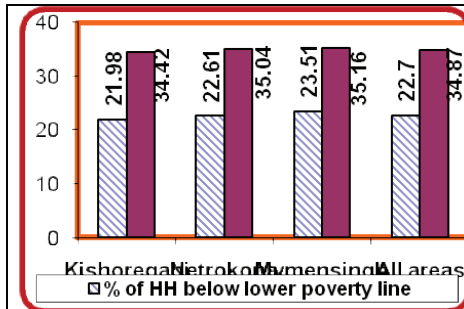


Figure 1 Incidence of poverty by CBN method

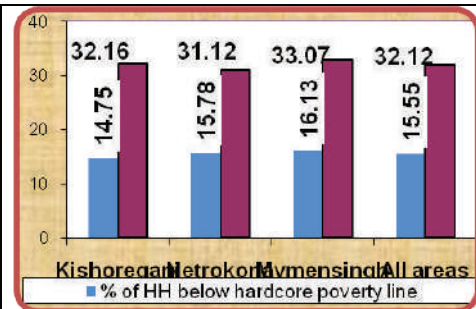


Figure 2 Incidence of poverty by DCI method

### Poverty estimation using DCI method

Figure 2 presents the incidence of poverty by using direct calorie intake (DCI) method described earlier. Considering the average household consumption of food during the last three days prior to the survey, the average per capita calorie intake was estimated at 2349.08 kcal (Table 2). However, the average per capita intake of calorie was obtained as 1693.64 kcal and 1995 kcal for the households fell below the hardcore and absolute poverty line, respectively. The head count ratio indicates that 15.55% households fell below the hardcore poverty line and 32.12% households fell below the absolute poverty line (Table 2). The poverty rate estimated by DCI method was relatively lower than that of by CBN method and that might be because of ingestion of more rice generally containing higher calorie value than other items of food.

**Table 2 Estimation of the extent of poverty at household level by DCI method**

Heads	Small farm households
Per capita average intake of calorie	2349.08
Per capita average intake of calorie below hardcore poverty line	1693.64
Per capita average intake of calorie below absolute poverty line	1995.00
% of households below hardcore poverty line	15.55
% of households below absolute poverty line	32.12

source: Field survey, 2012.

### Differentials of poverty by selected background characteristics

The aim of the study of differentials of poverty by selected background characteristics is to identify the sectors of the population where the incidence of poverty is high and need to be addressed through policy formulation. The background characteristics are: district, occupation and education of the household head, sanitation facilities and NGO membership and so on.

**Using CBN method:** The result suggests that proportion of households below the lower poverty line was almost identical in all districts under study, while significant ( $p < 0.01$ ) variation was observed in the proportion of households below the upper poverty line (Table 3). The proportion of households below the upper

poverty line was found highest (39.99%) in Mymensingh district and lowest (38.70%) in Kishoreganj. The incidence of poverty was found to vary significantly ( $p < 0.01$ ) across the occupation of household head. The incidence of poverty was striking among labourer-headed households; nearly half of them in each category (agriculture and non-agriculture) fell below the upper poverty line. The incidence of poverty was found lower for the households whose heads were engaged in agriculture and job/service. There was a little variation in the incidence of poverty according to the education of the household heads may be because of the poor variation in their educational level. Family size was also appeared to have positively correlated with the incidence of poverty: about 45% of the larger households fell below the upper poverty line, but it was about 25% for small sized households (1-3 members) (Table 3).

**Table 3 Differentials of Poverty using CBN method according to selected characteristics**

Characteristics	% of HHs below lower poverty line	P-value	% of HHs below upper poverty line	P-value
<b>District</b>				
Kishoreganj	24.14	$P > 0.1$	38.70	$P < 0.05$
Netrokona	24.82	$(\chi^2 = 0.10)$	39.54	$(\chi^2 = 22.0)$
Mymensingh	25.43		39.99	
<b>Occupation of household head</b>				
Agriculture	22.14	$P < 0.01$	37.16	$P < 0.01$
Business	24.39	$(\chi^2 = 32.5)$	39.89	$(\chi^2 = 84.4)$
Agril. Labourer	32.71		44.61	
Non-agril. labour	31.59		43.07	
Job/service	22.07		36.17	
Others	25.34		42.18	
<b>Education of the household head</b>				
No education	33.09	$P > 0.10$	45.28	$P < 0.01$
1-5 yrs schooling	26.41	$(\chi^2 = 8.5)$	39.16	$(\chi^2 = 21.1)$
6-10 yrs schooling	24.98		39.21	
10+ yrs schooling	21.03		34.17	
<b>Family size</b>				
1-3	14.06	$P < 0.05$	25.17	$P < 0.01$
4-6	21.37	$(\chi^2 = 72.4)$	39.39	$(\chi^2 = 89.6)$
7 & above	29.97		45.11	
<b>Sanitation facilities</b>				
Sanitary toilet	27.64	$P < 0.05$	41.27	$P < 0.05$
pucca toilet	25.93	$(\chi^2 = 9.5)$	38.59	$(\chi^2 = 9.2)$
Katcha toilet	29.67		43.62	
Open field/others	33.58		43.31	
<b>NGO membership</b>				
Yes	29.95	$P < 0.10$	48.61	$P < 0.01$
No	26.78	$(z = 1.63)$	37.45	$(z = 3.32)$

source: Field survey, 2012.

The incidences of poverty was found to vary significantly across the sanitation facilities ( $p < 0.05$ ). The proportion of households fell in the poverty lines decreases as the sanitation facilities increases. The incidence of poverty was significantly

higher (49%) for the households who were the member of any NGO than among non-member households (37%) which was consistent with the findings of Kazal et al., (2012).

**Using DCI method:** The findings indicate that proportion of households below the hardcore poverty did not vary significantly across the districts, while significant ( $p < 0.01$ ) variation was observed in case of absolute poverty (Table 4). Like CBN method, the incidence of absolute poverty was found to vary significantly ( $p < 0.01$ ) by DCI method. The incidence of poverty by DCI method was found lower for the households with heads in agriculture, business and engaged in job/service; however, it was found higher for the households whose heads were engaged in agricultural and non-agricultural labour.

**Table 4 Differentials of poverty using DCI method according to selected characteristics**

Characteristics	% of HHs below hardcore poverty line	P-value	% of HHs below absolute poverty line	P-value
Over all	18.43		35.40	
<b>District</b>				
Kishoreganj	17.54	$P > 0.1$	35.09	$P < 0.01$
Netrokona	18.52	$(\chi^2 = 2.35)$	34.87	$(\chi^2 = 72.4)$
Mymensingh	19.23		36.24	
<b>Occupation of household head</b>				
Agriculture	17.01	$P < 0.01$	34.15	$P < 0.01$
Business	17.65	$(\chi^2 = 33.52)$	33.89	$(\chi^2 = 77.4)$
Agril. Labourer	19.38		36.61	
Non- agril. labour	19.59		37.74	
Job/service	16.32		34.28	
Others	21.23		36.18	
<b>Education of the household head</b>				
No education	19.36	$P > 0.10$	36.43	$P < 0.01$
1-5 yrs schooling	18.05	$(\chi^2 = 5.41)$	35.19	$(\chi^2 = 19.14)$
6-10 yrs schooling	18.17		35.91	
10+ yrs schooling	17.26		34.56	
<b>Family size</b>				
1-3	10.37	$P < 0.05$	28.79	$P < 0.01$
4-6	19.62	$(\chi^2 = 33.42)$	36.51	$(\chi^2 = 49.65)$
7 & above	23.75		39.08	
<b>Sanitation Facilities</b>				
Sanitary toilet	17.60	$P > 0.05$	36.20	$P < 0.05$
pucca toilet	15.49	$(\chi^2 = 2.5)$	34.09	$(\chi^2 = 11.2)$
Katcha toilet	19.63		37.13	
Often field/others	23.05		38.01	
<b>NGO membership</b>				
Yes	19.36	$P > 0.10$	37.11	$P > 0.10$
No	18.65	$(z = 0.53)$	36.62	$(z = .22)$

source: Field survey, 2012.

The incidence of poverty in both the form (hardcore and absolute) was found lowest for the households with heads of 10 and above years of schooling, while it was found highest in absolute poverty for the households with illiterate heads. Like



the CBN method, the positive impact of family size on the incidence of poverty was obviously found in the DCI method since an increasing trend was observed in the percentages of households falling below the poverty lines, both hardcore and absolute, with the increase in family size. The findings on the basis of sanitation reveal that the poverty in terms of hardcore and absolute level was observed lowest (15.49% in hardcore poverty and 34.09% in absolute poverty) for the households having pit/pucca toilet. Unlike the impact of NGO-membership on the incidence of poverty by CBN method, this vary characteristic puts no significant impact in terms of variation on the incidence of poverty by DCI method. The overall findings of DCI method mostly differed from those of CBN method because of substantial inclusion of rice in the diet by rural people, which influenced and generally inflated the value of their calorie intake.

The above discussion indicates that the incidence of poverty in terms of percentage of households by both CBN and DCI methods varies according to location, occupation of the household head, family size and to some extent, the education of the household head. Therefore, policy implications should be formulated by properly addressing these salient factors to reduce the poverty and improve food security situation of the rural people in Bangladesh.

**Month-wise household food security status:** The study also investigated the food security status of farm households by months during 2012. The respondents had been requested to answer the month-wise food security status of the households during of the twelve months during the calendar year 2012. The respondents had three qualitative options for assessing their monthly food security status: (i) secured, (ii) more or less secured, and (iii) insecure. During the data processing, each of the qualitative values had been assigned with a numeric value in the following manner: 3 for secured, 2 for more or less secured and 1 for insecure. Thus, for each of the sample households have twelve numeric values on their food security status. All the numeric values of sample households for each of the twelve months have been added by all farms. Average value for food security status for a particular month is being estimated by dividing the estimated total value by the respective sample size. It is to note that the minimum and maximum limits of the average values must lie between 1 and 3, where the minimum value will be equal to or greater than 1 and the maximum value must be less or equal to 3. The aggregated food security status is estimated in the identical fashion by adding household status for the same for all twelve months together; and then average value was estimated using the procedure stated above.

**Table 5 Average aggregate values of food security status by months**

Food security status by months	Small farm households
<i>Mag</i> (Jan-Feb)	2.6
<i>Falgun</i> (Feb-March)	2.4
<i>Chaitra</i> (March-April)	1.6

<i>Baishak</i> (April-May)	2.3
<i>Jaistha</i> (May-June)	1.9
<i>Ashar</i> (June-July)	1.6
<i>Sravan</i> (July-Aug)	1.5
<i>Bhadra</i> (Aug-Sept)	2.3
<i>Ashyin</i> (Sept-Oct)	1.6
<i>Kartik</i> (Oct-Nov)	1.3
<i>Augrahayana</i> (Nov-Dec)	2.6
<i>Poush</i> (Dec-Jan)	2.7
All months 2012	2.0

source: Field survey, 2012.

It is to note that the average values contain some fractional parts along with whole numbers. However, during the interpretation, the whole numbers are considered and the fractions are ignored. Two methods were applied for interpretation of the average numeric values: (i) conservative and (ii) moderate approach. According to conservative approach, only the whole numbers were given their respective qualitative interpretations. For example, the values like 1.2 and 2.4 are respectively interpreted as unsecured and more or less secured months (Table 5). The above analysis reveals that on an average the rural households are more or less secured in relation to availability of food round the year (Table 5). However, Kartik (October-November) and Chaitra (March-April) are the two food-insecured months common for almost all the farm households. As a whole, the Ashyin (September-October) is also a food insecure month along with Ashar and Sravan.

**Causes of food insecurity**

There are various causes responsible for food insecurity at small farm household. About 62% of the respondents identified landlessness as the prime cause for food insecurity. The other major causes were: lack of income generating activities i.e., seasonal unemployment, natural calamities, lack of credit and damage of crop generally caused by unexpectedly earlier heavy downpour and stone-slab as a considerable cause for food insecurity (Figure 3).

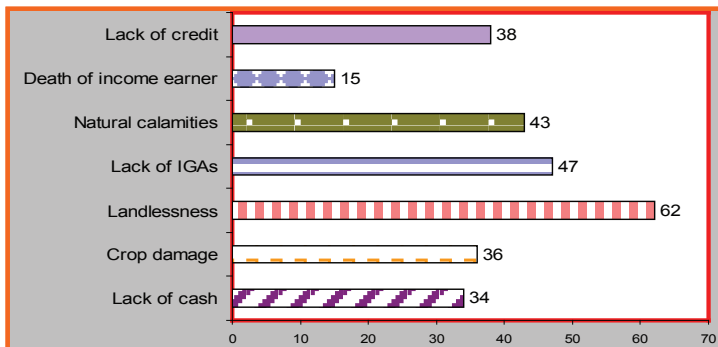


Figure 3 main reasons for households food insecurity

### 3.1 Coping strategies adopted by small farm households

Food insecurity stricken households always try to cope with the situation in adopting various strategies. Coping strategies can be successful when they are able to preserve vital assets, or negative when they are unable to do so and may lead to downward spirals of impoverishment. Any response should aim to support existing positive coping strategies and release households and communities from dependence on negative ones (FAO and ILO, 2008). Two types of coping strategies are usually adopted by the victims of food insecurity: consumption based or immediate measures and non-consumption based or general measures. Consumption coping strategies are specially related to food consumption and non-consumption coping strategies are related to asset sales and not directly related to food; for example, selling fuel wood is non-consumption but eating seed stock held for next season is a consumption coping strategy which was articulated by Maxwell et al., (2003). In this analysis, consumption coping strategies were further divided into four types, such as: i) Dietary change, ii) Short-term measures to increase household food availability, iii) Short-term measures to decrease numbers of people to feed, and iv) Rationing or managing the shortfall. Consumption coping strategies were identified by asking a simple question to the respondents and the answers were taken following different frequencies such as, every day, sometimes, rarely and never. The coping strategies of the sample households are presented in the Tables 6.

#### Consumption coping strategies

It was found that 45 and 32 percent of the respondents relied on less expensive foods for ‘everyday’ and ‘sometimes’, respectively as consumption coping strategy during food shortage (Table 6). Relying on cheaper and less preferred foods “everyday” and “sometimes” means comparing the quality of the diet and can lead to inadequate intake of micronutrients and increased rates of malnutrition. Not a single farm household was found to be taking wild food and to be remaining without food in a whole day among the small farm households.

**Table 6 Consumption coping strategies adopted by small farm households**

Coping strategies	% of farmer reported on food taken			
	Every day	Sometimes	Rarely	Never
<b>1. Dietary Change</b>				
a. Rely on less expensive foods	45	32	10	13
<b>2. Increase Short-term household food availability</b>				
b. Borrow food	1	29	45	25
c. Purchase food on credit	-	40	43	17
d. Gather wild food or hunt wild animal	-	-	-	-
e. Harvest immature crops	-	18	22	61
f. Consume seed stock held for next season	-	9	17	74

**3. Decrease number of people**

g. Send household members to eat elsewhere	-	5	21	75
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**4. Rationing Strategies**

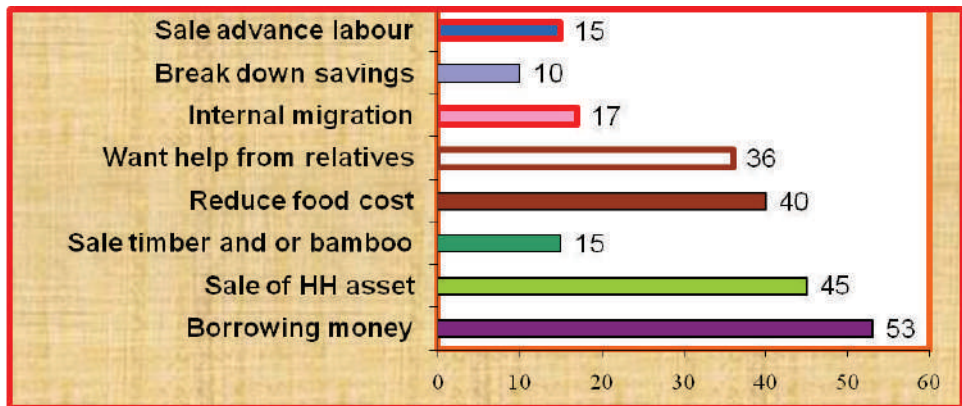
h. Cut quantity of food per meal	-	18	42	40
i. Adults took less food in order to feed small children	5	28	37	30
j. Reduce number of meals eaten in a day	-	7	35	58
k. Keep entire day without eating	-	-	-	100

Source: Field survey, 2012.

**Non-consumption coping strategies**

The interviewees were asked about the strategies they mainly adopt to cope with food insecurity. They spontaneously expressed the strategies they resorted during different periods of time over their life span (Figure 4). Very interestingly, the highest percentage of respondents (53 percent) reiterated their reliance upon borrowing money for coping with food insecurity problem obviously bearing the testimony of pervasive existence of exploiting money-lending culture in the survey areas where formal credits are almost inaccessible.

Figure 4 Non-consumption coping strategies adopted by small farm households



Source: Field survey, 2012.

The second and the third highest percentages of respondents (45 and 40 percent, respectively) hinged upon sale of household assets and reducing food cost as they reported for coping with food insecurity. Though the third largest adopted strategy was at their disposal, it results in hazards on their health in terms of hunger and malnutrition in future leading less productivity for the economy; while the fourth largest strategy undermines their prestige and causes indirect moral captivity to their relatives. In the midst of most of the pessimistic strategies, a highly optimistic strategy taken by a considerable percentage of respondents (17%) deserves special mention, which is internal out-migration to other places for livelihood adding

some value to GDP through participating and/or generating temporary economic activities for food insecure people. Further, a significant percentage of respondents rely on the sale of trees and bamboo (15%) and broken down their savings (10%) in resilience with food insecurity.

### Measures for household food security

The food insecure respondents were invited to express their perceptions regarding actions/measures for ensuring food security. Table 7 shows those perceived actions to be taken to maintain household food security. Over four fifth of the respondents (85%) mentioned that they need to have work opportunities in all seasons, about three fourths (74%) strongly opted for ensuring agricultural land for farming and more than two third (66%) mentioned for government support programmes. Slightly higher than two-thirds responses advocated for provision of funds for alternative income generating activities and more than half for introducing food bank while 45% for membership under safety net food programme and appropriate actions from NGOs to ensure food security. From the results, it can easily be inferred that provision of government interventions is a must for a secure food situation in the study areas along with complementary support programmes of the private sector, especially of the NGOs.

**Table 7 Necessary actions to be taken to maintain households' food security**

Actions	% of households reported
Ensuring agricultural land for farming	74
Ensuring work opportunity in all seasons	85
Introducing food bank for ensuring food security during crisis period	52
Providing fund for alternative IGA	67
Membership under the safety net food programme	45
NGOs should adopt appropriate action for tackling the situation	46
Government support programme is a must	66

Source: Field survey, 2012.

### 4. Concluding Remarks

The incidence of poverty by CBN method was found higher than that by the DCI method. According to CBN method, the highest percentage of small farm household lie below the lower poverty line was found in Mymensingh (23.51) followed by Netrokona (22.61) and Kishoreganj (21.98). But in the case of DCI method, the highest percentage of small farm household lie below the absolute poverty line was found in Mymensingh (33.07) followed by Kishoreganj (32.16) and Netrokona (31.12). The incidence of poverty was striking among labourer-headed households, nearly half of them in each category (agriculture and non-agriculture) fell below the upper poverty line. However, the prime strategies for coping with food insecurity for the study area are borrowing money and food, reducing family

expenditure, especially on food and out-migration (particularly temporarily internal migration) in both short run and long run. It is worth mentioning that the coping strategies that deplete the productive assets indirectly are reducing family expenditures and borrowing money; moreover, the sale of land or household assets depletes the productive assets directly. Finally, the findings of the study indicate that food insecurity is existing in the study areas. They need sustainable food security by adopting new adapted technologies and alternate income generating sources along with increasing crop productivity and real income of farm households.

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Appendix Table 1 Per capita per day intake of major food items for 2122 kcal and amount of costs incurred

Food item	Per capita per day intake (gm) ( $F_i$ )	Total calorie content	Calorie content per gm	Av. price/kg	Ave. price of required quantity ( $P_i * F_i$ )
Cereals					
Rice	460.96	1594.96	3.46	32	14.75
Wheat	36.56	125.035	3.42	32	1.158
Pulses	15.47	53.07	3.43	110	1.7017
Fish	29.09	33.30	1.1447	150	4.3635
Meat	9.19	11.239	1.2229	280	2.5732
Eggs	3.22	5.58	1.7329	260	0.8372
Milk	33.12	22.19	0.7471	60	1.9872
Vegetables	57.26	18.89	0.33	20	1.1452
Potato	61.19	59.35	0.97	18	1.10142
L.vegetables	106.12	47.01	0.44298	22	2.33464
Fruits	20.20	18.58	0.9198	100	2.02
Oil	8.64	77.76	9	125	1.08
Spices	6.63	17.24	2.60	55	0.36465
Onion	19.74	9.87	0.50	40	0.7896
Sugar	7	27.87	3.98	52	0.364
Total	874.39	2121.94			36.57

## Adoption of IPM Technology on Bitter Gourd Production in Comilla District of Bangladesh

Shamima Islam\*  
M. Serajul Islam\*  
Romaza Khanum\*

**Abstract:** *The present study was conducted to assess adoption of IPM technology on bitter gourd production at Chandina upazila under Comilla district of Bangladesh. Out of 70 farmers, 35 for IPM and other 35 for Non-IPM farmers were selected. Data were collected with structured questionnaire and analyzed by using descriptive and statistical techniques. In the study some independent variables such as age distribution of the sample farmers, family size, sex and work involvement of the sample farm households, educational status, occupational status, size of land holding, training experience, annual household income and expenditure of the sample farmers were considered. The study revealed that about 60% IPM farmers were young, where only 31% belong to Non-IPM farmers. The average annual household income for IPM farmers was found to be Tk. 255074 but in case of Non-IPM farmers, it was Tk. 18867 only. The findings indicated that farmers having higher level of education and greater farm income caused increase the probability of adopting IPM technology by renovating their production system which was more helpful to increase bitter gourd production. On the other hand, larger family size and greater non-farm income decreased the probability of adopting IPM technology.*

### 1. Introduction

Bitter gourd is one of the most popular cucurbitaceous vegetable in Bangladesh for its nutritive and medicinal value for diabetic patients. It is grown extensively throughout the country during Kharif season which was cultivated in 23890 acres and 52020 metric tons (BBS, 2013) per annum. It was homestead vegetable in the past years but now it is grown as field crop. However, bitter gourd farmers often fail to obtain the expected yield due to heavy damage caused by various insect, pests and diseases and farmers sprayed pesticides quite frequently. The word

\* The authors are respectively Lecturer, Department of Agricultural Economics, BSMRAU, Gazipur, and Professor, PhD fellow, Department of Agricultural Economics, BAU, Mymensingh

"pest" refers to organisms such as insects, pathogens, weeds, nematodes, mites, rodents and birds that cause damage or annoyance to man, his animals, crops or possessions. Due to pest alone annual yield loss was 25 percent for vegetables crops in every year (FAO, 2001). For increasing productivity and better market, farmers are intensively using the improved food production technology and pesticides both in quality and quantity. Pesticide being toxic can become a potential hazard to the manufacturers, users, the public at large and the environment. Both overuse and misuse of pesticides lead to loss of effectiveness of pesticides due to the development of resistance and cause human health hazards and environmental pollution. To overcome increasing problems associated with the strategy of exclusive and indiscriminate use of pesticides, the concept of integrated control was first articulated by entomologists (Stern *et al.*, 1959) as an approach that applied ecological principles in utilizing biological and chemical control methods against insect pests. IPM is a means of controlling pests on the basis of sound biological knowledge and principles. To reduce pesticides use on vegetables, Bangladesh has introduced Integrated Pest Management (IPM) practices on vegetables as well as other crops.

Presently a large number of farmers of the different regions in Bangladesh are producing huge amount of vegetables using eco-friendly pheromone trap instead of harmful pesticides and are being financially benefited by using the trap at lesser cost compared to pesticides (The New Nation, 2015). Although pesticides may provide temporary relief, it is now widely accepted that indiscriminate and excessive use of pesticides and the long-term dependency on them threaten the sustainability of agricultural production. Over dependence on chemical pesticides is not only expensive but also leads to negative environmental impacts, in addition to increased health hazards to both growers and consumers of vegetables. IPM has a broad approach to vegetable production based on a sound ecological understanding. IPM enables farmers to grow healthy vegetables and to increase their farm output and income on a sustainable basis while improving the environment and community health at the same time.

Few studies (Islam *et al.*, 2013, Chowdhury, 2011 and Suraia, 2008) have been conducted on economic impact of IPM technology on bitter gourd production. Some studies (Rashid, 2001 and Hoque, 2001) addressed the attitudes, problems etc. But there is no any systematic study which attempted to analyze the factors that are affecting on IPM technology adoption for bitter gourd production. For this reason, the present study makes an attempt to analyze adoption of IPM technology on bitter gourd production in Comilla district with following specific objectives: i) to document the socioeconomic characteristics of bitter gourd producing farmers; ii) to determine the factors affecting adoption of IPM technology on bitter gourd production and iii) to suggest policy options for overcoming problems and exploring possible opportunities.

## 2. Methodology of the Study

Methodology refers to the ‘the strategy, plan of action, process, or design lying behind the choice and use of particular methods, and linking the choice and use of methods to the desired outcomes’ (Crotty, 1998). The study conducted in Comilla district which were selected purposively. Two villages were selected namely Atbarpur and Chaykot under Chandin upazila considering the higher bitter gourd production under supervision of the Department of Agricultural Extension (DAE) during summer season. Out of 70 farmers, 35 for IPM adopted farmers and other 35 for Non-IPM farmers were selected using purposive sampling technique. Moreover, both IPM and Non-IPM farmers were categorized into three categories such as as marginal farmer (having land up to 0.40 hectors), small farmer (having land 0.40- 1.01 hectors) and medium farmer (having land 1.01-3.03 hectors).

For the present study, data were collected during field visit for the period July-August, 2015. Data were collected through direct face to face interview method and analyzed with a combination of descriptive and statistical techniques. Descriptive statistics such as sum, average, ratio, percentages etc. were derived and calculated by using Microsoft Excel. Graphical representation was also done in Microsoft Excel. Logit model with marginal effect was done in STATA-13. The final results of the analysis were summarized and presented in tabular forms with their interpretations.

### Analytical Tools

The logit model was used to identify the determinants of adoption of IPM technology on bitter gourd production. The implicit form of the model was as follows:

$$Y = \ln \left( \frac{P_i}{1+P_i} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon_i$$

Where,

$P_i$  is the probability of adoption and non-adoption of IPM technology;

$P_i = 0$  indicates non-adoption and  $P_i = 1$  indicates adoption.

Dependent variable (Binary):

Y = Probability of adoption of IPM technology.

Independent variables:

$X_1$  = Age of the respondent (years);  $X_2$  = Family size (number);  $X_3$  = Educational level of the respondent (number of years);  $X_4$  = Farm size (ha);  $X_5$  = Farm income (Tk.);  $X_6$  = Non-farm income (Tk.);  $\beta_0$  = Intercept;  $\beta_1$  to  $\beta_6$  = Regression coefficients of the dependent variable; and  $\varepsilon$  = Disturbance term or error term.

According to Gujrati (1995), the marginal probabilities of the key factors of adopting IPM technology to be estimated based on expressions derived from the marginal effect of the logit model which will be estimated as:

$$dy/dx = \beta_i \{ P (1-P_i) \}$$

Where,

$\beta_i$  = Estimated logit regression coefficient with respect to the  $i^{\text{th}}$  factor; and

$P_i$  = Estimated probability of a respondent adoption status.

Marginal effects are computed differently for discrete (i.e., categorical) and continuous variables. With binary independent variables, marginal effects measure discrete change, i.e., predicted probabilities change as the binary independent variable changes from 0 to 1. Marginal effects for continuous variables measure the instantaneous rate of change (defined shortly). They are popular in some discipline (e.g., economics) because they often provide a good approximation to the amount of change in  $Y$  that produced by a 1 unit change in  $X_k$ . But then again, they often do not.

To identify the major problems, a four point rating scale was used such as ‘high for 3’, ‘medium for 2’, ‘low for 1’ and ‘not at all for 0’ respectively. The problem confrontation score could vary from 0-24, 0 indicating ‘no problem’ and 24 indicating ‘highest problem’. For making rank order, Problem Confrontation Index (PCI) was computed (Hosseini and Miah, 2011) by using the following formula:

$$PCI = P_h \times 3 + P_m \times 2 + P_l \times 1 + P_n \times 0 \quad (3.9)$$

Where,

$P_h$  = Total number of farmers expressed problem as ‘high’;

$P_m$  = Total number of farmers expressed problem as ‘medium’;

$P_l$  = Total number of farmers expressed problem as ‘low’; and

$P_n$  = Total number of farmers expressed problem as ‘not at all’.

Thus, PCI of any problem could range from 0 to 210, 0 indicating ‘no’ problem confrontation and 210 indicating ‘high’ problem confrontation.

### 3. Results and Discussions

At first, the difference of socioeconomic characteristics between IPM and Non-IPM farmers with a set of variables, then factors affecting adoption of IPM technology and finally some major problems were presented in this section

### 3.1 Socioeconomic Characteristics Differences between IPM and Non-IPM farmers

Socioeconomic characteristics can be used as an important indicator in making comparison among different categories of the respondents. Demographic characteristics mainly illustrate the wide ranges of interrelated social attributes of the farmers and their family members which largely influences their economic activities, living condition and decision making process. This part provides the information on age distribution of the sample farmers, family size, sex and work involvement of the sample farm households, educational status, occupational status, size of land holding, training experience, annual household income and expenditure of the sample farmers, women’s participation etc.

Table 1 reported that majority of IPM farmers (60%) were young and 40% were middle and old. In case of Non-IPM farmers, only 31% belong to young and 49% were middle age. About 54% IPM farmers were in small family, while only 11% Non-IPM farmers were small family. The average family size of IPM farmers was 4.51 which is lower than the national average of 4.53 (HIES, 2010) but the average family size of Non-IPM farmers was 5.92 which is higher than the national average.

In IPM farm households, male family members were 51%, 58% and 55% for marginal, small and medium farmers, respectively and average female family members for marginal, small and medium farmers were 49%, 42% and 45%, respectively. Most of the household members were engaged in agricultural activities and some of them were engaged in agriculture cum business, agriculture cum service and other activities including day laborer, rickshaw puller, shop keeping etc. Between the working members of the farm households male members were 73%, 70% and 75%, respectively and female members were 27%, 30% and 25%, respectively. For Non-IPM farm households, about 55%, 54% and 57% were male for marginal, small and medium farmers, respectively and about 45%, 46% and 43% were female for marginal, small and medium farmers, respectively. About 68%, 71% and 86% male were working members and 32%, 29% and 15% working members were female members, respectively.

**Table 1: Socioeconomic Characteristics of IPM and Non-IPM farmers**

Particulars	IPM farmers				Non-IPM farmers			
	Marginal	Small	Medium	All	Marginal	Small	Medium	All
<b>Age</b>								
Young (18 to 35)	8 (80)	7 (50)	6 (55)	21 (60)	5 (33)	3 (25)	3 (37)	11 (31)
Middle aged (36 to 50)	1 (10)	7 (50)	4 (35)	12 (34)	7 (47)	6 (50)	4 (50)	17 (49)
Old (above 50)	1 (10)	0 (0)	1 (10)	2 (6)	3 (20)	3 (25)	1 (13)	7 (20)
<b>Family size</b>								
Small (up to 4)	6 (60)	9 (64)	4 (36)	19 (54)	2 (13)	1 (8)	1 (12)	4 (11)
Medium (5 to 6)	4 (40)	5 (36)	6 (55)	15 (43)	8 (53)	7 (58)	4 (50)	19 (54)
Large (above 6)	-	-	1 (9)	1 (3)	5 (34)	4 (34)	3 (38)	12 (35)
<b>Average family size</b>	4.30	4.23	5.00	4.51	5.80	5.83	6.13	5.92

<b>Sex</b>								
Male	22 (51)	35 (58)	30 (55)	87 (55)	48 (55)	38 (54)	28 (57)	114 (55)
Female	21 (49)	25 (42)	25 (46)	71 (45)	39 (45)	32 (46)	21 (43)	92 (45)
<b>Working members</b>								
Male	11 (73)	14 (70)	12 (75)	37 (73)	17 (68)	15 (71)	12 (86)	44 (73)
Female	4 (27)	6 (30)	4 (25)	14 (28)	8 (32)	6 (29)	2 (15)	16 (27)
<b>Educational status</b>								
Illiterate	0	0	0	0	2 (13)	0	0	2 (6)
Sign only	0	0	0	0	2 (13)	1 (8)	0	3 (9)
Primary	1 (10)	3 (21)	1 (9)	5 (14)	8 (53)	8 (67)	6 (75)	22 (63)
Secondary	8 (80)	5 (36)	4 (36)	17 (49)	3 (20)	2 (17)	2 (25)	7 (20)
Higher secondary	1 (10)	4(29)	4 (36)	9 (26)	0	1 (8)	0	1 (3)
Graduate	0	2 (14)	2 (18)	4 (11)	0	0	0	0
<b>Occupational Status</b>								
Agriculture	1 (10)	4 (29)	2 (18)	7 (20)	3 (20)	3 (25)	2 (25)	8 (23)
Agriculture and business	5 (50)	8 (57)	6 (55)	19 (54)	10 (67)	6 (50)	4 (50)	20 (57)
Agriculture and service	1 (10)	2 (14)	2 (18)	5 (14)	0	0	2 (25)	2 (6)
Agriculture and others	3 (30)	0	1 (9)	4 (11)	2 (13)	3 (25)	0	5 (14)
<b>Land holding</b>								
Owned land	0.33 (89)	0.52 (66)	0.99 (78)	0.61 (75)	0.29 (83)	0.34 (57)	0.63 (58)	0.42 (62)
Leased in	0.02 (5)	0.08 (10)	0	0.03 (4)	0.04 (11)	0.17 (28)	0.15 (14)	0.12 (18)
Leased out	0.17 (46)	0.05 (6)	0.11 (9)	0.11 (14)	0.13 (37)	0.02 (3)	0.02 (2)	0.06 (9)
Homestead area	0.05 (14)	0.05 (6)	0.07 (6)	0.06 (7)	0.04 (11)	0.03(5)	0.06 (6)	0.04 (6)
Garden and pond area	0.14 (38)	0.17 (22)	0.31 (24)	0.21 (26)	0.10 (29)	0.07 (12)	0.25 (23)	0.14 (21)
Fallow land	0.004 (1)	0.01 (1)	0.09 (7)	0.10 (12)	0.01(3)	0.01 (2)	0.01 (1)	0.01(2)
<b>Area under bitter gourd</b>	0.08 (22)	0.09 (11)	0.10 (8)	0.09 (11)	0.08 (23)	0.08 (13)	0.09 (8)	0.08 (12)
<b>Annual income</b>								
Farm income	130820 (64)	182426 (77)	235873 (73)	183039 (71)	111002 (61)	104642 (66)	121875 (55)	112506 (60)
Non-farm income	74280 (36)	55788 (23)	86036 (27)	72035 (29)	72331 (39)	54525 (34)	100125 (45)	75661 (40)
<b>Annual expenditure</b>								
Food expenditure	85322 (52)	97191 (51)	126188 (49)	104070 (51)	79200 (54)	67486 (53)	90576 (51)	81777 (53)
Non-food expenditure	78758 (48)	93380 (49)	131339 (51)	99989 (49)	67466 (46)	59847 (47)	87024 (49)	72519 (47)

Figures in the parentheses indicate the percentage of total

Source: Field survey, 2015

Table 1 revealed that there were no illiterate IPM farmers but about 6% of Non-IPM farmers were illiterate. Again most of the IPM farmers (49%) received secondary level of education while 63% of Non-IPM farmers had primary level of education. In the study area, majority (54%) of the IPM farmer's and 57% of Non-IPM farmer's occupation were agriculture cum business. A good number (14%) of IPM farmers were engaged in various services including teaching, driving, government services, NGO services, etc. Other occupational activities included rickshaw/van puller, day laborer, wage laborer etc. Table 1 revealed that the average area under bitter gourd was 11% and 12% of total land holding by IPM farmers and Non-IPM farmers. The average annual household income of IPM farmers was found to be Tk. 255074 of which 71% of total income from farm activities. On the other hand, total annual household income of Non-IPM farmers was estimated to

be Tk. 188167 of which 40% from non-farm resources.

### 3.2 Factors Affecting Adoption of IPM Technology on Bitter Gourd Production

The result of logit regression was presented in Table 2. The result showed that the model was accurate in explaining the determinants of adopting IPM technology on bitter gourd production. Out of six variables, 4 were significant in adopting IPM technology for bitter gourd production. These variables were family size, education level, farm income, non-farm income of the sample farmers in the study areas.

Therefore, the estimated equation is as follows:

$$Y_i = 1.918 - 0.036X_1 - 2.125X_2 + 2.680X_3 + 0.004X_4 + 0.000047X_5 - 0.000019X_6$$

Each coefficient increases the odds by a multiplicative amount, the amount is  $e^b$ . Every unit increases the odds by  $e^b$ . Here,  $e^b$ = Expected (B)

#### Logistic regression

Number of observations	=70
LR chi <sup>2</sup> (6)	=71.64
Prob> chi <sup>2</sup>	= 0.0000
Log likelihood	= -12.699075
Pseudo R <sup>2</sup>	= 0.7383

#### Family size

The empirical result shows that the coefficient of family size of the respondents has negative value (-2.125), which was statistically significant at 1percent level. It indicated that, smaller family size had higher probability of adopting IPM technology for bitter gourd production.

**Table 2: Estimates of the logistic regression of determinants of adopting IPMtechnology on bitter gourd production**

Variables	Coefficient (β)	Std. Err	z	P value
Constant	1.918	3.646	0.53	0.599
Age(X <sub>1</sub> )	-0.036	0.074	-0.48	0.632
Family size (X <sub>2</sub> )	-2.125***	0.816	-2.61	0.009
Education level (X <sub>3</sub> )	2.680***	0.992	2.70	0.007
Farm size (X <sub>4</sub> )	0.004	0.008	0.55	0.582
Farm income (X <sub>5</sub> )	0.000047**	0.000021	2.20	0.028
Non-farm income (X <sub>6</sub> )	-0.000019*	0.000011	-1.69	0.090

Source: Field survey, 2015.

Note: \*\*\* indicates significant at 1 percent level; \*\* indicates significant at 5percent level; and \* indicates significant at 10percent level.

#### Education level

The parameter of education level estimated a positive result (2.680) and statistically highly significant at 1percent level. It implies that the higher level of educa-



tion, the greater probability of adopting IPM technology in bitter gourd production. This result evidently demonstrates that education emerges as an important factor in influencing adoption of IPM technology.

### **Farm income**

This result implies that annual average farm income of the respondents was positive which was 0.000047 and significant at 5 percent level. This implies that the higher farm income, the greater probability of adopting IPM technology in bitter gourd production.

### **Non-farm income**

The empirical result shows that the coefficient of annual average non-farm income of the respondents had negative value, significant at 10 percent level. It indicated that, the higher non-farm income lowers the probability of adopting IPM technology for producing bitter gourd.

Age of the respondents explained the negative effect on the probability of adopting IPM technology, which was statistically insignificant. Farm size presents positive effect but it was statistically insignificant.

### **3.3 Marginal Effect after Logistic Regression**

Marginal effects are computed differently for discrete (i.e., categorical) and continuous variables. Marginal effects measure discrete change i.e., how predicted probabilities change as the binary independent variable changes from 0 to 1. Marginal effects for continuous variables measure the instantaneous rate of change.

### **Family size**

The result of marginal effect shows that the farm size has negative value of  $dy/dx$  (0.514), which was statistically significant at 1percent level. It indicated that, one unit decrease in the family size may increase the probability of adopting IPM technology by 0.514 unit, keeping other factors held constant. So, the marginal effect on the probability of adopting IPM technology on bitter gourd production was 0.514 units greater for small family size than the larger, keeping all others factors constant.

**Table 3: Estimates of the marginal effect of determinants of adopting IPM technology on bitter gourd production**

Variables	$dy/dx$	Std. Err.	z	P value
Age ( $X_1$ )	-0.009	0.017	-0.48	0.629
Family size ( $X_2$ )	-0.514***	0.217	-2.37	0.018
Education level ( $X_3$ )	0.648***	0.245	2.64	0.008

Farm size ( $X_4$ )	0.001	0.001	0.56	0.574
Farm income ( $X_5$ )	0.000011***	0.000	2.34	0.019
Non-farm income ( $X_6$ )	-4.49e-06*	0.000	-1.69	0.091

Source: Field survey, 2015.

Note: \*\*\* indicates significant at 1 percent level; and \* indicates significant at 10percent level.

### Education level

The level of education has a positive value of  $dy/dx$  (0.648), which is statistically highly significant at the level of 1percent. It indicated that,one unit increase in the level of education of the respondentwill increase the probability of adopting IPM technology on bitter gourd production by 0.648 units, keeping other factors remaining constant. The results of marginal effect showed that, the predicted probability of adoption was 0.648 units higher for the higher educated farmers than relatively less educated, held other factors remain equal.

### Farm income

This result of marginal effect i.e.,  $dy/dx$  implies that annual average farm income of the respondents was positive and significant at 1 percent level. This indicates that, if other things being equal, one unit increase in the level of farm income increased the probability of respondent to be adopted IPM technology on bitter gourd production by 0.000011unit. The results of marginal effect confirmed that, the predicted probability of adoption was 0.000011 units higher for the higher farm income than the lower farm income earner, other things being equal.

### Non-farm income

The result of marginal effect shows that the annual average non-farm income of the respondents has a negative value (-4.49e-06), which was statistically significant at 10 percent level. It indicated that, one unit increase in the non-farm income decreased the probability of adopting IPM technology for producing bitter gourd by 4.49e-06unit, keeping other factors held constant. The results of marginal effect showed that, the predicted probability of adoption was lower (4.49e-06) for receiving higher non-farm income, held other factors remain equal.

### 3.4 Problem Confrontation Index (PCI)

To find out the problem confronted by the farmers in practicing and adopting IPM technology, several consultations were held with the relevant personnel. Various problems were faced by the farmers in adopting and practicing IPM technology in the study areas. The computed PCI of the 8 problems ranged from 42 to 184 (against a possible range from 0 to 210) and have been arranged in rank order according to their problem indices which presents in Table 4.

Majority of the farmers point out that lack of proper training facilities was the main problem in the study areas in practicing and adopting IPM technology. It was also a major problem faced by the Non-IPM farmers in case of adopting IPM technology because they did not get any training on practicing IPM technology and detailed information about this technology. Out of 70 farmers, 51 farmers confronted this problem at high extent, 15 farmers at medium extent, 1 farmer at low extent but only 3 farmers were indifference with the problems. In this case, the computed value of PCI was 184  $[(51 \times 3) + (15 \times 2) + (1 \times 1)]$  against a possible range from 0 to 210 and hence was considered as the 1<sup>st</sup> ranked problem. A good number of farmers point out that, lack of technological knowledge in using IPM technology was an important problem in the study areas. Basically, the reason behind was the lack of training facilities in the study areas. Most of the farmers did not have clear ideas about IPM technology. In this case, the calculated value of PCI was 160  $[(36 \times 3) + (18 \times 2) + (16 \times 1)]$  against a possible range from 0 to 210 and was considered as the 2<sup>nd</sup> ranked problem.

**Table 4: Farmers' problem confrontation along with rank order**

SL No.	Problems	Extent of problem confrontation (N=70)				PCI	Rank order
		High (3)	Medium (2)	Low (1)	Not at all (0)		
1	Lack of proper training facilities	51	15	1	3	184	1
2	Lack of technological knowledge in using IPM technology	36	18	16	0	160	2
3	Weak extension services	38	15	14	3	158	3
4	Unavailability of pheromone trap	0	12	18	40	42	8
5	Labor scarcity	11	17	6	36	73	5
6	Lack of knowledge on the harmful effect of insecticides	2	16	13	39	51	6
7	Unavailability of skilled labor	17	11	5	37	78	4
8	Lack of awareness	3	9	23	35	50	7

Source: Field survey, 2015.

Note: PCI = Problem confrontation index (Possible score range 0 to 210).

In this way, comparatively fewer problems were identified as unavailability of pheromone trap. During field survey the farmers were asked to indicate probable suggestions to overcome the problems in practicing and adopting IPM technology. Majority of the farmers suggested that training facilities should be improved. The rate of adoption of IPM was low due to the ignorance of growers. Therefore, adequate training should be provided to the vegetables growers on different aspects of IPM technology. Farmers awareness and motivation should be increased through training, demonstration plot, group meeting of farmers, field day etc.

Knowledge of the input retailers and Sub Assistant Agricultural Officers (SAAOs) on IPM should be increased through training exposure, visit etc. in order to provide

appropriate initiatives for the farmers. Extension services should be improved because there was lack of coordination between farmers and extension workers in the study areas. It should be an opportunity to get services by the extension workers in time of necessity. DAE should take initiative to increase IPM technology adoption and proper practices for more profitable vegetable as well as crop production without harming the environment. Community approach should be done to popularize IPM method. Educated, commercially oriented and lead farmers should be involved to introduce IPM technology at farmers' level for vegetable and crop production to increase farm income. It would also be an easy way to introduce IPM technology at farmers' level by the establishment of more IPM clubs. Finally, the reasonable price of the IPM-applied vegetables should be ensured through cooperative markets or growers' market so that the growers are motivated to use IPM and grow vegetables and other crops that are safe and of superb quality.

#### **4. Conclusions and Policy Implications**

Findings of the study and the logical interpretation of their meanings in the light of other relevant facts enabled the researcher to draw the conclusions. The idiosyncratic factors (i.e. age, family size, education level, farm size, farm income and non-farm income etc.) have been influenced on adopting IPM technology, and farmers faced various problems in practicing and adopting IPM technology. Moreover, lack of training facilities was the major problem in the study areas and as a result many of them were not aware about the benefit of the use of IPM technology.

The farmers also suggested the probable solutions to get rid of those problems. On the basis The policy implications ensure from the findings of the study.

- The training facilities should be increased. For the better adoption and practices of this technology farmers need better skills and knowledge. Strategy for different training programs should be based on community participation and principles of field-based experimental learning in the light of Non-Formal Adult Education.
- The extension services should be strengthened to increase coordination between farmers and extension workers and to give support to the farmers for the adoption and practice of IPM technology by which they can determine their factors, which influences their adoption and practices, and change those according to their influence.
- A regular system for monitoring and evaluation of and follow-up to IPM activities and its impacts at the farmers' level should be established.
- IPM related publicity should be promoted through the mass media and awareness on dangers of pesticides, pesticide residues in food, health and environmental hazards of pesticides will be created.

- Government of Bangladesh should make an annual budget allocation for IPM activities and place the fund with the National IPM Program. As a result more farmers could be interested on adopting IPM practices in future.

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## **Impact of Homestead Gardening on Livelihood Improvement of Farmers of the Greater Mymensingh District**

**Md. Enamul Haque\***  
**M. Saidur Rahman\***  
**Kazi Shek Farid\***

**Abstract:** *The study was endeavored to analyze the impact of homestead gardening on livelihoods of rural women in some selected areas of Mymensingh district. A total number of 360 households were selected for this study of which 288 were 'homestead garden practicing household' and 72 were 'non-practicing household farmers'. The study revealed that the average working hours/week for respondent was 4.37 and 3.93, respectively for 'homestead garden practicing farmers' and 'non-practicing household farmers'. The average monthly income of homestead garden practicing and non-practicing household farmers were Tk 13218 and Tk 12579, respectively. Annual contribution of household income from homestead gardening by women was about 98% higher for homestead garden practicing household farmers than homestead garden non-practicing household farmers. Women decision making power is increasing day by day in different sectors. But the increasing rate is higher for homestead garden practicing household farmers than non-practicing household farmers at family level. The access to human capital, social capital, natural capital, physical capital and financial capital for homestead garden practicing household farmers were increased by 84.49%, 81.16%, 29.62%, 59.09% and 66.17%, respectively due to involvement in homestead gardening. The above findings showed that homestead gardening had a significant impact on farm households' women livelihood patterns than homestead gardening non-practicing household farmers.*

**Key words:** Homestead gardening, impact, livelihood, women

### **1. Background of the study**

Bangladesh is one of the world's poorest countries, which is predominantly rural

\* The authors are respectively Scientific officer at the Department of Agricultural Economics, Bangladesh Rice Research Institute, Gazipur, Professor and Head at the Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh and Assistant Professor at the Department of Rural Sociology, Bangladesh Agricultural University, Mymensingh



with 116.2 million (74.5 per cent) of its 156 million people living in rural areas. Among them about 50 millions are poor (BBS, 2013). Women are among the poorest of the rural poor, especially when they are the sole heads of their households, such as widows or wives of men who have migrated in search of employment. They have scarce income-earning opportunities and their nutritional intake is often inadequate. Malnutrition is a serious public health problem in Bangladesh, which is acute among women especially in rural areas. For poor households, vegetables and local homestead fruits are often the only source of micronutrients in the family diet (Talukder et al., 2000). Moreover, cultivable land is a scarce resource in densely populated Bangladesh, which is mostly employed for production of rice and other field crops. However, many small homesteads (around 20 million) of Bangladesh remains unutilized/underutilized/not scientifically managed, which could be brought under year round the year vegetable cultivation for reducing the above mentioned problems. Homesteads are the resources that provide major share of livelihood especially for poor farmers. Those resource poor farmers (RPF) get about 50% of their food and cash from homestead equally important, home gardening has been shown to be a source of additional income, because the household can sell a portion of the garden's produce. Home gardening activities provides most significant income generating activities for poor households (Talukder et al. 1997). Home gardening is especially important in overcoming seasonal availability of foods and promoting household self-sufficiency. Home gardening activities are centered on women and it is a source of employment opportunity for mostly unemployed and unpaid rural women and it can also increase the income of women, which may result in the better use of household resources and improved caring practices. All these (employment generation and increased income) may in turn contribute to the women empowerment since additional income can make them educated more and improve their livelihood. These activities involved an excellent source of employment mainly for female labour, which is an important component of family labour and also provide the bulk of total family income.

Therefore, homestead gardening can be an important strategy for providing productive employment opportunities to the women, increasing their income and improving their livelihood status. This study is a rigorous attempt to estimate the impact of homestead gardening on livelihood improvement of the farm households.

The specific objectives of the study are to examine the impact of homestead gardening on employment generation opportunities for women, to evaluate the livelihood improvement of the homestead garden practicing household farmers and non-practicing household farmers and to evaluate the contribution of women in households' incomes and decision making process.

## 2. Methodology

Three districts of greater Mymensingh namely, Mymensingh, Kishoregonj, and Jamalpur were selected. Two Upazilas were selected from each district randomly (i.e., Muktagachcha, Gouripur, Pakundia, Tarail, Melandah, Jamalpur sadar). Two villages were selected randomly from each Upazila and from each village 30 homestead garden households were selected randomly. Therefore, total sample size of 360 farm households was chosen for the present study (Table1). Data were divided into two categories. One was homestead garden practicing household and another was homestead garden non-practicing household. The farmers who produced two, three or more enterprises in the Rabi season were considered a homestead garden practicing household farmers. The farmers who produced one from where he received little amount of vegetable or no enterprise in the Rabi season were considered homestead garden non-practicing household farmers.

Therefore, homestead garden practicing household farmers were 288 and homestead garden non-practicing household farmers were 72.

**Table 1: Distribution of sampled farmers in the study areas**

Sl. No.	Upazila	Villages	No. of respondent	No. of practicing household	No. of non-practicing household
1	Muktagachcha	Tarati Purba	60	288	72
		Para			
2	Gouripur	Raythora	60		
		Achintapur			
3	Pakundia	Yusofabad	60		
		Mirjapur			
4	Tarail	Mandarcandi	60		
		Basati			
5	Melandah	Rawti	60		
		Bagadoba			
6	Jamalpur Sadar	Sampur	60		
		Mohespur			
	Total	Nobabpur	360	360	
		12			

Source: Haque, 2015.

Data were collected by the researchers themselves and other participations through personal interviews with the respondents. Data were collected during the period from August to October 2015.

A draft questionnaire was prepared for recording information from the sample farmers in conformity with the objectives of the study. Before preparing the final questionnaire, the draft questionnaire was pre-tested in the study area by interviewing a few farmers. After pre-testing and making necessary correction, the

questionnaire was finalized in such a logical sequence so that the sample farmers could answer systematically.

The collected data were coded, summarized and processed for analyses. To avoid possible errors and inconsistencies, the collected data were verified. All the collected data were summarized and scrutinized carefully. It may be noted that information were collected in local units, after checking it was converted into standard international units. Data entry was done in computer and analysis was done using the concerned software, e.g., Microsoft Excel and Statistical Package for Social Science (SPSS). Collected data were classified, tabulated and analyzed in terms of the objectives set for the study. Both descriptive and analytical techniques were used to find out important relationships among the relevant variables. Asset pentagon model were used for livelihood improvement.

### 3. Results and Discussions:

#### Income generation

An analysis of income sources adds further insight into the income generation process. There are two sources of income for homestead garden practicing and non-practicing household farmers. The average monthly income from farm activities of homestead garden practicing and non-practicing household farmers were Tk 4524 and Tk 3071, respectively. Table 2 reveals that livestock rearing and crop cultivation was about 14.5% and 10.92% of the largest sources of farm income for all farming systems in homestead garden practicing and non-practicing households, respectively. They also gain income from vegetables, poultry rearing, fish farming, and forestry. The table clearly indicates that homestead garden practicing household farmers farm income were about 32% higher than homestead garden non-practicing household farmers income. The major non-farm income sources are business, servicing, tailoring, garments worker as well as labour selling to agricultural and non-agricultural farms.

**Table 2: Average monthly income of sample farmers from different sources**

Income sources	Practicing household		Non-practicing household	
	Amount (Tk)	percentage	Amount (Tk)	percentage
<b>Farm income</b>				
Crop	1374	10.39	1374	10.92
Vegetables production	266	2.01	00	00
Livestock rearing	1919	14.52	1266	10.06
Fish culture	417	3.15	141	1.12
Fruits production	263	1.99	179	1.42
Forestry	127	0.96	46	0.36
Others	158	1.19	65	0.52
<b>Total farm income</b>	<b>4524</b>	<b>34.22</b>	<b>3071</b>	<b>24.41</b>

<b>Non -farm income</b>				
Service	2019	15.27	2889	22.96
Business	2841	21.49	3650	29.01
Tailoring	464	3.51	222	1.77
Wage labor	589	4.45	729	5.79
Others	2781	21.03	2017	16.03
<b>Total non-farm income</b>	8694	65.77	9507	75.58
<b>Total income</b>	13218	100	12579	100

Source: Haque, 2015.

The total monthly income from non-farm activities of homestead garden practicing and non-practicing household farmers were Tk 8694 and Tk 9507, respectively. The average monthly income from non-farm activities was 9% higher for homestead garden non-practicing household farmers than homestead garden practicing household farmers. But the total monthly income was about 5% higher for homestead garden practicing household farmers than homestead garden non-practicing household farmers income.

### Employment generation for women by homestead gardening

The labour hour spent by both men and women has increased in the research sites. Women were mainly involved in homestead gardening. They spent more times for homestead gardening.

**Table 3: Employment pattern on yearly basis for homestead garden practicing and non-practicing household farmers**

Farming system	Workings hours/week			Duration (man-days/year)			Wage/day		
	Self	Husband	Son/daughter	Self	Husband	Son/daughter	Self	Husband	Son/Daughter
Practicing household									
Vegetable production	2.5	1	1	16	7	7	220	300	250
Livestock rearing	12	12	2	77	77	14	220	300	250
Poultry rearing									
Fish farming	2	2.5	0.5	14	13	4	220	300	250
Fruits production	1	1.6	0.4	7	10	3	220	300	250
Average	4.37	4.27	0.98	28.5	26.75	7	220	300	250
Non-practicing household									
Livestock rearing	9	10	1	58	64	7	220	300	250

Poultry rearing									
Fish farming	2	2	0.3	13	13	2	220	300	250
Fruits production	0.8	1	0.2	5	7	1	220	300	250
Average	3.93	4.33	0.5	25.33	28	3.33	220	300	250

Source: Haque, 2015

Women also worked in the field but it was not considered in the table. There was a significant difference in the wage rate between male and female workers. However, female labour got about 26% lower wage than the male. Table represents that homestead garden practicing household farmers worked the highest (12 hours per week) while the homestead garden non-practicing household farmers worked 10 hours. The average working hours/week for respondent was 4.37 and 3.93, respectively for homestead garden practicing and non-practicing household farmers. The highest employment duration for respondents was 77 man days/years for the homestead garden practicing household farmers and for homestead garden non-practicing household farmers; it was 58 man days/year. The wage rate is similar both for homestead garden practicing household farmers and for non-practicing household farmers (i.e., for women, husband and sons/daughter Tk 220, Tk.300 and Tk. 250) (Table 3). Finally, it revealed that homestead garden practicing household farmers spent more time in work in comparison to homestead garden non-practicing household farmers. Thus, it can be said that homestead garden creates more employment opportunity in the study areas.

### Livelihood improvement

The sustainable livelihood framework includes the assets pentagon which is composed of five types of capitals namely human capital, social capital, natural capital, physical capital and financial capital.

**Table 4: Livelihood status of farm households (in percentage)**

Items	Practicing households			Non-practicing households		
	Increased	Decreased	Constant	Increased	Decreased	Constant
<b>Human capital</b>						
Knowledge	84.37	4.17	7.98	52.78	13.88	33.33
Health and sanitation	85.41	4.17	6.94	48.61	11.11	40.28
Average	84.49	4.17	7.46	50.69	12.49	36.81
<b>Social capital</b>						
Self-managerial capacity	83.33	6.94	6.25	55.55	6.94	44.44
Social mobility	69.44	6.94	23.61	27.78	12.5	59.72
Involved in social activities	80.21	3.47	16.31	58.33	6.94	34.72

Decision making	91.66	2.43	5.90	27.78	13.88	58.33
Average	81.16	4.94	13.01	42.36	10.06	49.30
<b>Physical capital</b>						
Building	18.05	4.51	72.22	6.94	15.28	77.78
TV/Radio	84.38	2.78	12.84	55.55	8.33	36.11
Mobile phone	53.81	5.55	16.67	48.61	4.17	47.22
Tube well	82.29	7.29	10.42	41.67	13.89	44.44
Furniture	56.94	5.20	37.84	34.72	13.89	51.39
Average	59.09	5.07	29.99	37.49	11.11	51.38
<b>Natural capital</b>						
Cultivable land	57.99	11.80	30.20	66.66	16.67	16.67
Forest	19.44	12.84	67.70	6.94	25.00	68.05
Open water resources	11.45	16.31	72.22	5.56	5.5	88.89
Average	29.62	13.65	56.70	26.38	15.72	57.87
<b>Financial capital</b>						
Cash in hand	81.25	4.51	14.23	34.72	9.72	55.55
Bank savings	65.20	3.47	30.20	13.88	13.88	72.22
Donation/aid	52.08	7.29	33.68	27.78	6.94	65.27
Average	66.17	5.09	26.04	25.46	10.18	64.3

Source: Haque, 2015

### Human capital

In the present study, two components under human capital were considered. Among the sampled farmers, the access on human capital for households farmer was increased by 84.49 % due to the adoption of homestead gardening, where health and sanitation increased by 85.41% and knowledge increased by 84.37%. Meanwhile, the access on human capital for homestead garden non-practicing household farmers were increased by 50.69% which was less than homestead garden practicing household farmers (Table 4).

### Social capital

The components of social capital are involvement in social activities, for example, social mobility, decision making, and self-managerial capability, etc. The social capital influenced by the adoption of homestead gardening in the study areas. The self-managerial capability of homestead garden practicing household farmers were increased by 83.33% and the social mobility or decision making was also increased by 69.44% and 91.66% for the homestead garden practicing household farmers. Majority of the homestead garden non-practicing farmers' self-managerial capability, involvements in social activities, and decision making were increased but it was less from the homestead garden practicing household farmers. (Table 4)

### **Physical capital**

The changing state of physical assets has been shown in Table 4. Almost all the asset category showed positive trends for the homestead garden practicing household farmers. The total access of physical capital was increased by 59.09% while it was 37.49% for homestead garden non-practicing household farmers. The access of using radio/TV was increased by 84.38% for the homestead garden practicing household farmers where it was 55.55% for the homestead garden non-practicing household farmers (Table 4).

### **Natural capital**

Overall natural resource access by the homestead garden practicing household farmers were constant which was 56.70% and majority of the homestead garden non-practicing household farmers also had constant access to different types of natural capital which was 57.87% (Table 4).

### **Financial capital**

Financial capital includes financial resources such as bank savings, cash in hand, Donation/aid/grant, etc. The capital cash in hand was increased by 81.25% which covered majority of the homestead garden practicing household farmers, where it was 34.72% for homestead garden non-practicing household farmers. Cash at bank or savings were increased by 65.20% for the homestead garden practicing household farmers. Donation/aid also increased for the homestead garden practicing household farmers comparing to the homestead garden non-practicing household farmers (Table 4).

### **Asset pentagon**

The pentagon was used to enable probable information about farmer's assets to be presented visually, thereby bringing to life important inter-relationships between the various assets. The shape of the pentagon displayed schematically the variation in farmer's assets. Figure 1 shows that the significant improvement took place in farmer's livelihood by the adoption of homestead garden practicing household farmers in contrast to the homestead garden non-practicing household farmers in the study areas.

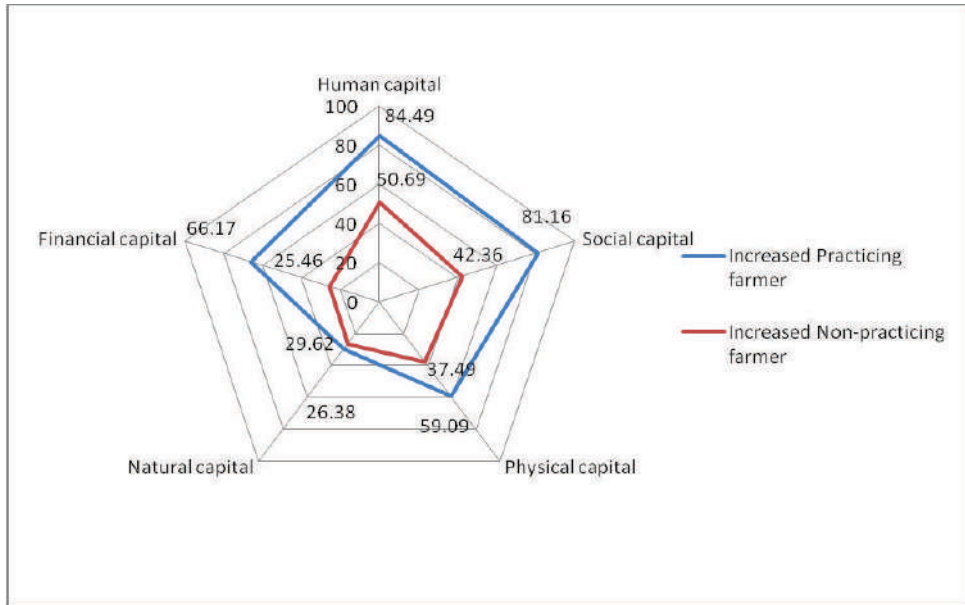


Figure 1: Livelihood status of sample farm household

From the above discussion it can be said that the livelihood patterns improved more and in an average it was about 43% higher for homestead garden practicing household farmers than homestead garden non-practicing household farmers. Because, the rural women are now involved in different activities in the homestead area. They cultivated different vegetables and fruits in the homestead area and improved their livelihood patterns.

**Household income from homestead gardening**

From the time immemorial women have been playing an important role in homestead based food production system. In Bangladesh, there is a clear division of between the male and female worker. Actually male activities are outside the home and these activities include earning cash income for buying inputs from market, selling the surplus crops to the market and purchase the daily necessities of life. Activities of women are confined within the home grounds. The activities cover homestead gardening, reproduction, child rearing, household management and most harvest crop processing activities (Aireen, 1992). In homestead based food production system women engaged in various activities related to farm. Yet the rural women in Bangladesh have long remained an unorganized contribution to household production activities, however, in recent times, there occurred a significant change in women’s socioeconomic status and a large number of women are now wage earners and are involved non-farm activities outside their homes. Women were engaged in different activities of homestead gardening such as vegetable production, fruits production, dairy cow rearing, goat rearing and fish farming. The contributions of women in household income were Tk. 15218 annu-



ally for per household who are involved in homestead gardening, and Tk. 7683 for homestead garden non-practicing household farmers. Homestead garden practicing household farmers contributes about 21% of total income from vegetable production. On the other hand, homestead garden non-practicing household farmers income was almost zero from vegetables production. The highest percentage of income was earned from dairy cow rearing both for homestead garden practicing and non-practicing household farmers (Table 5).

**Table 5: Annual contribution of household income from different entities (Tk./entities)**

Homestead activities	Practicing household	% of total	Non-practicing household	% of total
Vegetable production	3194	20.98	-	-
Fruits production	1579	10.38	1076	14.00
Dairy cow rearing	7456	48.99	4881	63.52
Goat rearing	996	6.54	569	7.41
Poultry rearing	1493	9.81	988	12.86
Fish farming	500	3.29	169	2.20
Total	15218	100	7683	100

Source: Haque, 2015

From the Table 5 it can be said that annual total contribution to household incomes were about 98% higher for homestead garden practicing household farmers than homestead garden non-practicing household farmers at family level.

### **Changes in decision making status of women**

Participation of women in homestead-based food production activities is increasing; it also tends to have a positive impact on women's participation in household decision making process. The qualitative categories were developed in this study, namely male, female and both to investigate the women involvement in decision making process of homestead production system and household activities. In the category of male, only male took part in decision making process. Under the category of female, women take part in different aspects of decision making. In both category male and female are jointly taking decision for the activities, they performed from family level.

In decision making process there are many items such as land preparation, variety selection of fruits or vegetables or breed of livestock and poultry, taking care of items, weeding, fertilizing, etc. harvesting of output from the enterprises, marketing of products, and irrigation are considered. The participation of women in decision making process is presented in Table 6. Land preparation is necessary to grow vegetables or fruits. In the study areas, women are often prepared land themselves taking some help from their husband and sons. It is seen that 29.16 percent

women worked for land preparation for homestead-based food production system (Table 6) for practicing homestead garden household farmers. But in selection of variety, collection and preservation of vegetables and fruits, weeding and irrigation women participation was higher as 40.27, 44.09, 39.24 percent and 36.81 percent, respectively. Male counterpart is dominant in marketing of output from the enterprises shown in Table 6.

**Table 6: Decision making process for the household and vegetables production enterprises**

Decision items	Practicing household (%)			Non practicing household (%)		
	Male	Female	Both	Male	Female	Both
Homestead land preparation	25.00	29.16	45.83	-	-	-
Selection of variety (fruit, vegetables, livestock, fishes )	18.70	40.27	41.31	-	-	-
Collection and preservation of vegetables seed	17.01	44.09	38.88	-	-	-
Weeding	21.88	39.24	39.58	-	-	-
Irrigation	26.04	36.81	37.15	-	-	-
Fertilizer application	37.15	24.31	38.54	-	-	-
Harvesting of household products	43.05	22.92	34.03	-	-	-
Marketing of output	66.31	16.31	17.36	-	-	-
Other decision involved in family (not related with production)						
To educate children	20.8	14.93	64.23	23.61	11.11	65.27
Acceptance of family planning	10.66	8.33	81.59	13.88	6.94	79.16
Marriage of sons and daughters	13.88	6.25	79.86	12.5	4.16	83.33
Land holding	22.91	5.90	71.18	22.22	5.55	72.22

Source: Haque, 2015

In traditional sense, it was thought that women don't have any absolute right to take any decision in any aspect of family affairs. But in the study area, it is found that the participation of women in taking decision for family affairs is increased. In case of educating their children both of them taking decision and it was 64.23 percent for both (male and female) who are involved in homestead garden practicing household and it was 65.27 percent for non-practicing household farmers.

In case of acceptance of family planning, increasing family land holding ability

and marriage of sons and daughters both play the dominant role. Male and female individually take decision sometimes but in 81.59, 79.86 and 71.18 percent respondents take decision jointly for those items for homestead garden practicing household farmers and it was 79.16, 83.33 and 72.22 percent for homestead garden non-practicing household farmers. Female most often seen to make decision in rare case where family is female headed particularly for death of senior citizen of that family or for case of divorce female. From the above discussion it can be said that the women decision making power is increasing day-by-day in different sectors. But the increasing rate is higher for homestead garden practicing household farmers than homestead garden non-practicing household farmers at family level.

#### **4. Conclusion**

Generally, homestead gardening is a combination of different agricultural enterprises within the homestead to meet the basic demand of the poor family and generates some income with in a small investment and resources. If the modern inputs can be available to farmers in time, production of these enterprises may increase which can help them in alleviating poverty in many areas. More homestead based enterprises can help increasing household income and improved the livelihood status of the rural poor. This study was mainly analyzed with the contribution of homestead gardening in improving rural households' livelihood. Results showed a significant improvement took place in farmer's livelihood by the adoption of homestead gardening practice in the study areas. The annual contributions of household income were 98% higher for households, which were involved in practicing homestead gardening than those of non-practicing household homestead garden farmers. From the total income about 21% income came from vegetables production, which were involved in practicing homestead gardening. On the other hand, non-practicing homestead garden farmers could not earn any income from vegetable production. The decision making power and livelihood improvement also increased due to the adoption of homestead gardening. There is a reason to believe that the people of this country will be self-improved by their small earnings and the rural society will be far better off in near future. In fact, livelihood and standard of living of the farmers involved in homestead-based vegetable production have improved to some extent.

Thus, the study recommended that homestead gardening system should be encouraged specially for small land holding farmers. The weather of Bangladesh is suitable for vegetables production. If vegetables are produced round the year in this country it could also be contributed to improve health status of rural poor. The concerned departments of the government and non-government organizations should take necessary steps and encourage the poor people, especially resource-poor rural women to cultivate vegetables their homestead areas.

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## **Economic Liberalization and Structural Change in Major Agricultural Sub-Sectors in Bangladesh**

**K. M. M. Rahman\***

**M. S. Rahman\***

**A. K. M. Abdullah Al-Amin\***

**Abstract:** *A structural change has taken place in agricultural sub-sectors since 1990 when tax in the agricultural sector had been replaced by subsidy. To know the impact of subsidy in the crops, livestock and fisheries in Bangladesh, 'Kinked Exponential Growth Model' was used to estimate the impact of subsidy and other liberalization policies on those sectors. The results show that growth in the above mayor sub-sectors since 1990 are significantly higher than before. This was caused due to the different liberalization measures taken by the government in the concerned sub-sectors. This study justifies the governments' investment (subsidy) in agricultural sub-sectors.*

### **1. Introduction**

The economy of Bangladesh is primarily dependent on agriculture. Agriculture is one of the most important sectors of Bangladesh economy (Nargis and Lee, 2013). The sector contributes around 16.77 percent to the gross domestic product (GDP) of the country and employs around 47.5 percent of the total labour force. Moreover, the sector feeds up around 160 million people of the country and provides food and nutrition for the farm households of rural areas (GoB, 2014). In addition, this sector provides raw materials to argo-based and other industries operating in the country. Agriculture being a pillar of Bangladesh economy, has been using more than 70 percent of land area (FAOSTAT, 2009) and accounting for nearly 20 percent of gross domestic product and 65 percent of the labour force, employed primarily on small-holder farms (Yu *et al.*, 2010).

The agricultural sector being the single largest contributor to income and employment generation is a vital element in the country's challenge to achieve food secu-

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\* The authors are respectively Professor, Department of Agricultural Statistics, Professor Department of Agricultural Economics and Lecturer Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh.

rity, reduce poverty and foster sustainable economic development. Agricultural growth as an indicator of economic development is necessary for rural poverty alleviation (Ravallion and Datt, 1996; Odhiambo and Nyangito, 2005). However, this sector's relative contributions as well as the contribution of crop sub-sector to the GDP have decreased over time. Several reasons may be responsible for this phenomenon: reduction in arable land, deterioration of land productivity, lack of proper land use planning and lack of capital and appropriate technologies.

Government can play an important role to sustain agricultural productivity and growth by reforming agricultural policy and execution of it. This study is designed to evaluate the impact of the government policy reforms on agricultural growth for the period of 1971-2012. The objective of the study is to evaluate the impact of government subsidy policy along with liberalization policy on agricultural growth.

This paper is organized into five sections. Section 2 describes government's activity in agriculture, while Section 3 deals with the analytical techniques. Results are presented and discussed in Section 4. Conclusions and policy implications are presented in the final section.

## **2. Economic Liberalization and Agriculture**

Recently the terms 'governance' and 'good governance' are being increasingly used in development literature. Governance describes the process of decision-making and the process by which decisions are implemented. Good governance is epitomized by predictable, open and enlightened policy making (that is, transparent processes) in which a bureaucracy is imbued with a professional ethos and an executive arm of government is accountable for its actions. Good governance is an essential ingredient to ensure appropriate public expenditure management for rural services and to create a positive climate for private sector investment in rural areas. To generate substantial agricultural growth, Bangladesh also needs good governance. Like many other developing countries, Bangladesh needs appropriate steps from the government to strengthen its agriculture and fulfill the demands of the population. The government has therefore accorded the highest priority to this sector to enable the country to meet the demands of the people and to make this sector commercially viable. In Bangladesh, the government has been taking several steps to boost agriculture for several years. Now the government is giving 25 percent fertilizer subsidy to reduce the production cost for farmers and allocated Taka 12 billion in 2005-2006, which is double the amount of Taka 6 billion in 2004-2005 (Rahman, 2005). In fiscal year 2010-11, an amount of Tk. 5000.00 crore was allocated in the revised budget to provide subsidy on fertilizer and for other agricultural inputs. It is a temporary measure of the government to encourage farmers to produce more output. The government has also established the National Agricultural Research System (NARS) consisting of ten research institutes under the umbrella of Bangladesh Agricultural Research Council. Goletti (1994) men-

tioned that two main features of the food grain sector in Bangladesh emerged in the 1970s and 1980s. First, a sustained growth of rice production moved the country toward declining food gaps. Second, policy removed several constraints to the operations of private markets and reduced the presence of government intervention in the sector. Other policy reform measures of the government are described below:

- I. **Liberalization of trade in minor irrigation sector and the promotion of the private sector for the supply of minor irrigation equipments in the country:** This happened gradually in step with the removal of import restrictions on small diesel engines in 1986-87 followed by the withdrawal of duties on such imports in 1988-89. The subsidy on deep tube wells (DTW) was removed in 1992 and the government organization BADC was removed from the procurement and distribution of minor irrigation equipment. These reform measures had a tangible effect on increasing the demand for irrigation equipment and consequently the rate of increase in the area under minor irrigation.
- II. **Privatization of fertilizer trade with the objective of transferring fertilizer management and distribution services exclusively to the private sector:** Imports of all fertilizers, including urea that has already been imported by the private sector, are now being undertaken by the private sector. All fertilizers are being distributed by private dealers through their network. The government has issued the revised Fertilizer Control Ordinance in 1995 in consultation with the private sector and the IFDC for quality control and regulation of fertilizer prices. This has led to the increased availability and the wider adoption of chemical fertilizer at the farm level and economic activities in rural areas have also increased manifold due to the withdrawal of government from fertilizer distribution.
- III. **Liberalization of trade and foreign exchange for the enhanced participation of the private sector in the trade of agricultural machinery:** The government has been continually reviewing the conditions affecting competitive trade and took actions to remove barriers.
- IV. **Liberalization of production, processing, distribution and importing of seeds to ensure the participation of private seed dealers for the seed industry's development:** The private sector is now allowed to import any germplasm for research and development and to develop its own facilities for producing foundation seeds. They are also allowed to import and sell seeds except those of five notified crops, (rice, wheat, sugarcane, potato, and jute). As regard to the notified crops, there are procedural formalities to be observed by the private sector before any



import. The private sector has now taken up programs for the production of hybrid rice seeds in the country.

- V. **Liberalization of imports of agricultural machines including power tillers:** This move has positive effects on the import of power tillers. The area under power tiller utilization also grew by about 3.5% per annum after the introduction of the liberalization policy.
- VI. **Structural changes were also made in food supply and management system:** Open market sale (OMS), procurement of food grains from farmers at market prices, abolition of rural rationing system, and allowing the import of food grains by the private sector were the measures so far implemented by the Government of Bangladesh.

### 3. Analytical Technique for Measuring Agricultural Growth

This study is based on secondary or time series data. Forty five years (1971-2012) time series data derived from the Bangladesh Bureau of Statistics (BBS) were used in this study. Both descriptive and inferential statistics have been used to describe the impact of government's agricultural policy on agricultural growth. To identify the government's influence on productivity and growth, a Kinked Exponential Growth Regression analysis has been carried out. In this analysis, total time period is divided into two sub-periods: 1980-89 and 1990-2012. In the mid-1980s, the Government of Bangladesh reformed agricultural input markets and deregulated the import of minor irrigation equipment (Hossain, 1996). But Bangladesh has experienced a democratic government since 1990 and most of the policy reforms have taken place since 1990. The democratic government is assumed to be more accountable to the society and the people. That is why the period is sub-divided as mentioned above in this study.

#### Kinked Exponential Growth (single-kink) Model

Now let  $K$  be the year in which a structural change took place. The growth rate can be seen from the following trend regression:

$$\ln(Q_t) = \mu + \beta t + \varepsilon_t \quad (1)$$

Typically, to account for such change, the equation can be transformed as follows:

$$\ln(Q_t) = \mu_1 D_1 + \mu_2 D_2 + (\beta_1 D_1 + \beta_2 D_2)t + \varepsilon_t \quad (2)$$

Where  $D_1$  and  $D_2$  are the values of dummy variable  $D$ , which takes the value 1 up to year  $k$  and zero otherwise.

Since equation (2) is equivalent to running two separate regressions, the trend lines may not necessarily intersect at the break point  $k$ . To eliminate this discontinuity, we follow BOYCE (1986) by imposing the following linear restriction:

$$\mu_1 + \beta_1 k = \mu_2 + \beta_2 k \quad (3)$$

Restriction (3) ensures that the trend lines intersect at  $k$ . Solving (2) for  $\mu_2$ , substituting the resulting expression in (2), and rearranging the terms, we get the restricted form:

$$\ln(Q_t) = \mu_1 + \beta_1(D_1t + D_2k) + \beta_2(D_2t - D_2k) + \varepsilon_t \quad (4)$$

The hypothesis that  $\beta_1 = \beta_2$  is then tested and rejection would indicate that a structural break did occur in year  $k$ . As Boyce (1986) argued, equation (4) is preferable to (2) in the absence of special circumstances. Further, equation (4) has the advantage of ruling out the possibility that the growth rate derived from equation (1) falls outside the interval  $(\beta_1, \beta_2)$  as derived from equation (2).

The growth rates in the two sub-periods are now given by the OLS estimates of the coefficients of the resulting composite variables. The Kinked Exponential Growth model reduces discontinuity bias, provides better basis for growth rate comparison, reduces instability or cyclical fluctuations, and uses a full set of available information to estimate the growth rates for each sub-period in a single step.

#### 4. Results and Discussion

The growth rates of two sub-periods are reported in this section. To allow for a structural break due to the policy reforms of the government, growth rates were estimated for the sub-periods 1971-89 and 1990-2012 by using a Kinked Exponential Growth regression following Boyce (1986). A Kinked Exponential Growth regression ensures continuity in the growth path at the time the structural break (kink) occurs, allowing for the path dependency on the growth rate. Boyce (1986) mentioned that the 'discontinuity bias' and the sensitivity of growth rate estimates to instability are reduced by the Kinked Exponential Methods.

For the sub-periods 1971-89 and 1990-2012, the annual growth rates in total rice production were estimated at 0.022 and 0.033 percent. It is obvious (Table 1) that growth in total rice production was significantly higher in the 1990-2012 compared to the 1971-1989 sub-period. Meaning is that a positive structural change (kinked) took place in farming practices in the sub-period 1990-2012 rather than in the sub-period 1971-1989. The middle panel of Table 1 also reports that growth in total maize production was significantly higher in the 1990-2012 compared to the 1971-1989 sub-period. It indicated that a highly positive structural change (kinked) took place in farming practices in the sub-period 1990-2012 rather than in the sub-period 1971-1989. These structural breakthroughs might have taken place due to the positive impact of policy reforms by the government on farm efficiency and productivity in the 1990s. However, the lower panel of Table 1 indicates that total wheat production was significantly lower in the 1990-2012 compared to the 1971-1989 sub-period. This is due to the substitution of wheat production by Boro rice production. The principle of enterprise choice is applicable in this case.

**Table 1. Growth rates of crop sub-sector in Bangladesh**

Variable	Parameter	Coeff.	Std. Error	t-value	Sig
<b>Rice production</b>					
Intercept	$\mu_1$	9.285	0.024	386.819	0.000
D1t + D2k	$\beta_1$	0.022	0.002	12.191	0.000
D2t - D2k	$\beta_2$	0.033	0.001	22.828	0.000
R-Square		0.977			
Adjusted R-square		0.976			
F-value		781.640**			
<b>Maize production</b>					
Intercept	$\mu_1$	0.842	0.396	2.127	0.040
D1t + D2k	$\beta_1$	-0.037	0.030	-1.222	0.230
D2t - D2k	$\beta_2$	0.331	0.024	13.844	0.000
R-Square		0.879			
Adjusted R-square		0.873			
F-value		134.736**			
<b>Wheat production</b>					
Intercept	$\mu_1$	11.874	0.175	67.694	0.000
D1t + D2k	$\beta_1$	0.135	0.013	10.022	0.000
D2t - D2k	$\beta_2$	-0.032	0.011	-2.992	0.005
R-Square		0.756			
Adjusted R-square		0.743			
F-value		57.270**			

Source: Authors' calculation based on secondary data. \*\* indicates significance at 0.01 probability level.

Table 2 reveals that large animals and poultry production were significantly lower in the 1990-2012 compared to the 1971-1989 sub-period. It could happen because of the fact that this sub-sector was not liberalized during that period and no subsidy was given to develop livestock sub-sector.

**Table 2. Growth rates of livestock sub-sector in Bangladesh**

Variable	Parameter	Coeff.	Std. Error	t-value	Sig
<b>Large animals</b>					
Intercept	$\mu_1$	3.108	0.064	48.225	0.000
D1t + D2k	$\beta_1$	0.093	0.011	8.335	0.000
D2t - D2k	$\beta_2$	0.008	0.004	2.067	0.051
R-Square		0.867			
Adjusted R-square		0.855			
F-value		68.547**			

<b>Poultry</b>					
Intercept	$\mu_1$	3.686	0.237	15.568	0.000
D1t + D2k	$\beta_1$	0.119	0.041	2.912	0.008
D2t - D2k	$\beta_2$	0.080	0.014	5.771	0.000
R-Square		0.810			
Adjusted R-square		0.792			
F-value		44.712**			

Source: Authors' calculation based on secondary data. \*\* indicates significance at 0.01 probability level.

Table 3 reports that marine fish production was significantly lower in the 1990-2012 compared to the 1971-1989 sub-period because marine fish culture was not influenced by the government's liberalization policy. Many uncontrolled factors are associated with marine fish culture. For the sub-periods 1971-89 and 1990-2012, the annual growth rates in inland fish production were estimated at -0.004 and 0.070 percent. The growth in inland fish production was significantly higher in the 1990-2012 compared to the 1971-1989 sub-period. The result confirmed a positive structural breakthrough in inland fish production. The result of the total fish production revealed that a positive structural change (kinked) took place in farming practice in the sub-period 1990-2012. This occurs due to the positive impact of policy reforms by the government in the 1990s.

**Table 3. Growth rates of fisheries sub-sector in Bangladesh**

Variable	Parameter	Coeff.	Std. Error	t-value	Sig
<b>Marine fish production</b>					
Intercept	$\mu_1$	11.247	0.033	339.692	0.000
D1t + D2k	$\beta_1$	0.062	0.003	24.228	0.000
D2t - D2k	$\beta_2$	0.041	0.002	20.326	0.000
R-Square		0.985			
Adjusted R-square		0.984			
F-value		1239.016**			
<b>Inland fish production</b>					
Intercept	$\mu_1$	13.408	0.044	302.855	0.000
D1t + D2k	$\beta_1$	-0.004	0.003	-1.110	0.274
D2t - D2k	$\beta_2$	0.070	0.003	26.106	0.000
R-Square		0.965			
Adjusted R-square		0.963			
F-value		505.068**			
<b>Total fish production</b>					
Intercept	$\mu_1$	13.503	0.038	355.053	0.000
D1t + D2k	$\beta_1$	0.008	0.003	2.753	0.009

D2t - D2k	$\beta_2$	0.064	0.002	27.759	0.000
R-Square		0.973			
Adjusted R-square		0.972			
F-value		677.729**			

Source: Authors' calculation based on secondary data. \*\* indicates significance at 0.01 probability level.

## 5. Conclusions and Policy Implications

Based on the findings of the impact of economic liberalization on major agricultural sub-sectors in Bangladesh, it can be concluded that a positive structural change (kinked) took place in farm practices during 1990-2012 compared to the 1971-1989 sub-period. The positive impact of economic reforms by the government on agricultural sub-sectors in the 1990s might have contributed to this structural breakthrough. Rice and maize production are highly benefited from economic liberalization, although livestock production and marine fish culture failed to enjoy the benefit. On the other hand fisheries sub-sector, especially inland fisheries growth rate were highly increased due to policy reforms by the Government of Bangladesh. However, the future prospects for growth in agricultural sub-sectors are not promising for Bangladesh as the potentials for most of the growth promoting factors are likely to be exhausted in the near future. As a policy option, a preemptive action by the government is necessary to promote and sustain the growth in agriculture for some years in future. Government needs to ensure the sustainability of present growth for all the sub-sectors of agriculture. Like other developing countries, Bangladesh needs to take proper measures for sound environment and also needs to ensure safe food for her large population in the coming years. To make it possible, government can continue with subsidy policy in agriculture.

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## **An Empirical Analysis of Investment, Trade Openness and Economic Growth in Bangladesh: 7<sup>th</sup> Five Year Plan Perspective**

**Md. Raihan Islam\***

**A. N. K. Noman\***

**Abstract:** *Investment is the emotive force for economic growth. FDI complement's the process of attaining the saving investment gap by supplying foreign capital while trade openness maintains an important channel for country's investment and the economic growth. This paper, attempts to find out the impact of domestic investment, FDI and trade openness on economic growth and their causalities in Bangladesh. It undertakes sample of 42 annual observations covering the period of 1972 to 2013. To attend the objectives a disaggregated econometric analysis has been carried out in this paper. The instability index for each of the variables is higher during pre-liberalization than that of the post-liberalization period (1990). The variables of the function have been found non-stationary at their levels but they all stationary after the first difference. That is, they are integrated of order one I(1). The cointegration test confirms that there are 2 (two) long run cointegrated stable relationships between pair wise labour, domestic investment, FDI, trade openness and economic growth in Bangladesh. The OLS estimated coefficients of the growth function indicate that domestic investment positively affects GDP by 70 percent while the impact of labour is also positive but insignificant. GDP of Bangladesh is negatively influenced by FDI and trade openness but they are insignificant. This may be due to their insignificant contribution To The domestic economy of Bangladesh. VECM confirms that there is short run dynamics to the long run equilibrium between domestic investment and GDP growth while a long run causality but with a divergence relation exists among stock of labour, FDI, trade openness and growth in Bangladesh. VAR result shows that the long run significant elasticities exist among stock of labour (negative), domestic investment (positive) and GDP growth while the short run significant but negative elasticities exist among stock of labour, FDI and GDP growth. Granger Causality test shows that there are short run bidirectional causalities between stock of labour and the GDP growth otherwise, unidirectional*

\* Assistant Professor, Directorate of Secondary and Higher Education, Bangladesh, PhD Fellow, Institute of Bangladesh Studies, University of Rajshahi, and Prof. Dr. Department of Economics, University of Rajshahi, Bangladesh respectively.



*causality exists in Bangladesh. From the findings of the study, it has been imperative for the government of Bangladesh to formulate policy to create more avenues towards the capital formation through instigating national savings for domestic investment. The constraints regarding inward FDI inflows should be abolished. The export-led growth policy should be improved for favourable external balance. But, the first emphasis should be given on the enhancement of domestic investment.*

## 1. Introduction

Investment is considered as the nucleus for the economy. It is viewed as beneficial to employment creator-as it brings about economic growth and economic development in the long run. It can be termed as capital flowing from a firm or individual within the country or in one country to a business or businesses in another country involving a share of at least 10%. Investment is generally classified into four major components: the private domestic investment, the public domestic investment, the foreign direct investment and the portfolio investment. Private domestic investment refers to gross fixed capital formation plus net changes in the level of inventories whereas; public investment includes investments by the government of a country and public enterprises on social and economic infrastructure, real estate and tangible assets. The combination of private and public investment is normally referred to as gross fixed capital formation while the tangible asset is referred to as direct foreign private investment. Foreign private capital flows come in two forms: equity and debt. The largest of all capital flow (long term investment with management control) to developing countries is called FDI. Portfolio equity includes direct purchases of shares by foreign investors as well as share purchases through country funds and depository receipts. The distinction between equity and debt flows is that with equity, capital is repatriated only when an investment is profitable (Perkins et al., 2001, pp. 522-523). The issue of economic prosperity is often linked to domestic investment i.e. the gross internal capital formation of a country, massive inflow of FDI into a nation, and the impact of FDI through trade openness (the ratio of export and import to GDP) on economic growth. Many researchers have conducted studies to investigate the fundamental theories of domestic investment, FDI, various influential macroeconomic variables, the impact of economic integration on the movements of FDI and the benefits and costs of FDI in developing countries (Yusop, 1992; Jackson and Markowski, 1995; Cheng and Yum, 2000; Lim and Maisom, 2000). Most of them agree that there exists a positive causal relationship between FDI and economic performance, either in the short run or in the long run, or both. Diversified relationships exist between domestic investment and FDI. FDI helps to overcome capital shortage in the host countries and complements domestic investment when FDI flows to high risk areas or new industries where domestic investment is limited (Noorzoy, 1979). When, FDI occurs in resource industries, domestic investment related industries may be

stimulated. Moreover, FDI is believed to be a pulsating implement for the growth of the income and employment, technological advancement, socio-economic development parallel to improve income distribution or poverty reduction especially for the developing countries of the world like Bangladesh. The nexus of domestic investment, FDI, and trade openness in promoting economic growth has been the subject of much debate among development specialists, researchers, aid donors as well as recipients in Bangladesh in particular. In spite of this, there are only few empirical studies that investigate the interrelationships of domestic investment, FDI, trade openness and economic growth in Bangladesh. This paper however, tries to assess the impact of and the nexus among domestic investment, FDI, trade openness on economic growth in Bangladesh.

## 2. Review of the Literature

This paper has reviewed the existing literatures related to the topic. **Alfaro, et al.** (2000) finds that FDI may reduce the savings and thus, less domestic investment which may result in the reduction in growth. **Ghosh and Hendrik** (2006) focus on how foreign direct investment (FDI) transfers technology from developed economies to less developed economies. FDI is found to have a significant, positive and economically important impact on U.S. growth. **Rahman and Shahbaz** (2011) investigate the effects of imports and foreign capital inflows on economic growth in Pakistan and found the long run relationship between foreign capital inflows and economic growth while foreign capital inflows have positive and significant effect on the economic growth in Pakistan. **Ahamed and Fahian** (2010) state that FDI inward to the middle-income countries has the evidence for export-oriented manufacturing sector as a major stimulus to the economic growth. It has a positive spillover and significant impacts on economic growth in Bangladesh. **Miao** (2009) states that FDI in manufacturing sector has a significant and positive effect on economic growth in the host economies while FDI inflows in non-manufacturing sectors do not play a significant role in enhancing economic growth. **Chakraborty and Nunnenkamp** (2008) assess that FDI stocks and output are mutually reinforcing in the manufacturing sector whereas, any causal relationship is absent in the primary sector. **Shujie and Kailei** (2006) present that FDI is a mover of production efficiency reducing the gap between the actual level of production and a steady state production frontier. **Alguacil et al.** (2005) observe the mixed findings in the FDI-growth nexus. **Akinlo** (2004) investigates the impact of FDI on economic growth in Nigeria, for the period 1970–2001. He found that both private capital and lagged foreign capital have small, and not a statistically significant effect, on the economic growth. **Choong et al.** (2004) investigate that the presence of FDI inflows creates a positive technological diffusion in the long run only if the evolution of the domestic financial system has achieved a certain minimum level. **Borensztein et al.** (1998) test the effect of FDI on economic growth that FDI is an important vehicle for the transfer of technology, contributing relatively more to

growth than domestic investment. **Shahbaz** (2012) investigates effect of trade openness on economic growth. The results confirm that trade openness promotes economic growth in the long run. **Zambe and Yue** (2010) found a long run relationship between FDI, trade openness and output whereas, unidirectional causal relationship running from FDI, trade openness to output and from output, FDI to trade openness in Cote d'Ivoire. **Yucel** (2009) examines that trade openness has a positive effect and the presence of bi-causal relationship between financial development, trade openness and growth. **Metwally** (2004) develops a simultaneous equations model to test the process of interaction between FDI, exports and economic growth in three Middle Eastern countries: Egypt, Jordan and Oman. He found that interest rate differentials exert a much stronger effect than economic growth on the attraction of foreign capital in the case of Egypt. **Hye** (2011) constructs a financial development index (FDI) for the Indian economy. He found that longrun relationship is present among the economic growth, FDI, real-interest rate (RIR), labor force and capital. But, FDI is negatively associated with economic growth. **Tang et al.** (2008) investigate the causal link between FDI, domestic investment and economic growth in China for the period 1988-2003. He found that there is a bi-directional causality between domestic investment and economic growth while there is only single-directional causality from FDI to domestic investment and to economic growth. **Kim and Seo** (2003) provide empirical evidence on the dynamic relationship between inward FDI, economic growth and domestic investment in Korea. They find that FDI has some positive but insignificant effects on economic growth. **Hossain and Kamal** (2012) found that there is no co-integration between FDI and GDP in both long and short run in Bangladesh and India while the co-integration between them in Pakistan. Conversely, there is no causality between GDP and FDI for Bangladesh and uni-directional relationship is found for Pakistan and India. **Shafiun et al.** (2009) attempt to find the long run cointegrated relationships between FDI and economic growth for Bangladesh. They find that FDI and GDP are not cointegrated while FDI and openness are not significantly causing the GDP both in the short and long run. **Islam et al.** (2005) observe that there is a uni-directional causal relationship running from economic growth to investment in Bangladesh. **Adhikary** (2012) investigates the impact of FDI, trade openness, domestic demand, and exchange rate on the export performance of Bangladesh. He does not trace any significant causal relationship for the cases of trade openness, domestic demand, and exchange rate.

### 3. Objective and Methodology

From the above background, this paper is guided by the following specific objectives:

- i) to examine the current states of domestic investment, FDI, trade openness and economic growth in Bangladesh;

- ii) to assess the impact of domestic investment on economic growth in Bangladesh;
- iii) to assess the impact of FDI inflows in Bangladesh on economic growth;
- iv) to assess the impact of trade openness in Bangladesh on economic growth;and
- v) to examine the causal relationships between domestic investment, FDI, trade openness and economic growth in Bangladesh.

### **Methodology**

The data for this paper have basically been collected from the secondary sources, those are: the Statistical Yearbook of Bangladesh, Bangladesh Economic Review of various years, Bangladesh Economic Survey, and Economic Indicators of Bangladesh Bank. Data of this paper have been obtained majorly from the World Development Indicators (WDI) of World Bank database and the Direction of Trade Statistics (International Monetary Fund). Other sources of data have also been used for the requirement of the estimations. Since, all the relevant variables are the macroeconomic in nature; the secondary data are obviously required to estimate the functions. The variables that have been used are: GDP proxy of economic growth, stock of labour, domestic investment proxy for domestic capital formation, FDI and trade openness. The collected data have frequently been transformed into logarithmic and generated in accordance with the requirement of the time series econometric analysis. Analyses of trends and characteristics of investment, foreign transactions and in national income (GDP) have been made mainly in terms of constant data based on 2005. This is done for avoiding the inflationary effect in the data. The area of this study is the whole country with the disaggregated level discussion of domestic investment, FDI, trade openness and economic growth. The sample of this study has covered forty two (42) annual observations (1972-2013).

### ***Model Specification***

Standard growth models have at their core one or a series of production functions. At the national or economy wide level, production functions describe the relationship of the country's labour force and its stock of capital with the level of that country's gross national product. In this case, the Neoclassical (Solow growth model), Endogenous (Romer growth model) and Aggregate Production Function (APF) growth models have been used to attend the objectives and estimating the regression function.

### ***Econometric Estimable Growth Function***

On the basis of the objectives, this paper aims to assess the impact of domestic investment, FDI, trade openness on economic growth and their short and long run

causal relationships. In this context, this paper tries to form the following estimable regression function for Bangladesh with only systematically affecting variables. The aggregate production function (APF) which includes FDI and other relevant variables in the modeling is used which is widely supported by the literature (Feder, 1983; Fosu, 1990; Herzer, 2010; Kohpaiboon, 2004; Mansouri, 2005; Ukpolo, 1994; Fosu and Magnus, 2006) and it assumes, along with traditional input of production-labor and capital, other unconventional input like FDI, trade openness which can be influential to growth. Following Fosu and Magnus's (2006) APF model which is based on Cobb-Douglas production function using logarithmic in both sides:

$$\ln y_t = c + \alpha \ln l_t + \beta \ln di_t + \delta \ln fdi_t + \phi \ln to_t + \varepsilon_t \dots \dots \dots (6.3.1)$$

Where, all variables are as defined and  $c$  is constant term and  $\varepsilon_t$  is white noise error term;  $\alpha$ ,  $\beta$ ,  $\delta$ , and  $\phi$  are expected to be positive. From the equation (6.3.1),  $y$  is defined as real domestic product per capita,  $l$  is labor force proxy of active population age group (15 to 65),  $k$  is real gross capital formation per capita, as data of fixed capital is not available for Bangladesh, gross capital formation has been used as a proxy of domestic investment ( $di$ ),  $fdi$  is the foreign capital inflows in the country to percentage of GDP,  $to$  is the ratio of the sum of export and import values to the GDP. The data of the variables of GDP function has been transformed into natural logarithms because, the coefficients of the cointegrating vector can be interpreted as long run elasticities; the log first difference can be interpreted as growth rates; it reduces the heteroscedasticity problem from the model; and the log data tends to be stationary.

### ***Econometric Designs***

In order to attend the objectives and to test the hypotheses improved econometric analytical techniques with up to date available data have been carried out throughout this paper. The econometric procedure of this paper thus proceeds as: **First**, as the pre-estimation techniques, the procedures, the nature of the data distribution have been examined successively. **One**, the standard descriptive statistics are to be analyzed with the summary statistics. **Two**, if a time series contains trend, seasonality or some other systematic components, the usual summary statistics can be seriously misleading and should not be calculated. In the  $k$ -variable regression model, we shall have in all  $k(k-1)/2$  zero-order correlation coefficients. These  $k(k-1)/2$  correlations can be put into a matrix, called the correlation matrix  $R$  (Gujarati, 2012, pp. 937-938). Where, the subscript 1, denotes the dependent variable  $Y$  ( $r_{12}$  means correlation coefficient between  $Y$  and  $X_2$  and so on) and where use is made of the fact the coefficient of correlation of a variable with respect to itself is always 1 ( $r_{11} = r_{22} = \dots = r_{kk} = 1$ ). In this way the correlation among domestic investment, FDI, trade openness and GDP growth are to be examined. **Three**, there is one assumption of chosen CLRM that one should like to

check, namely, the normality of the disturbance term that is, the  $t$  and  $F$  tests used before require that the error term follow the normal distribution. The J-B test of normality is an asymptotic, or large-sample, test. It is also based on the OLS residuals. The test first computes the skewness and kurtosis measures of the OLS residuals. The value of the J-B statistic is expected to be 0. If the computed  $p$  value of the J-B statistic in an application is sufficiently low, which will happen if the value of the statistic is very different from 0, one can reject the hypothesis that the residuals are normally distributed. But the  $p$  value is reasonably high, which will happen if the value of the statistic is close to zero, the normality assumption will not be rejected (Gujarati, 2012, pp. 147). **Four**, generally time series data suffers from structural break problem. The Chow test is essential for long run time series to identify parameter stability over the period of investigation. In this study, the period is broken by two sub-periods such as pre liberalization (1972-1990) and post liberalization (1991-2013). Therefore, the Chow test is very much appropriate to apply to test the parameter stability. The structural change can be measured by the two intercepts or two slopes of the models in pre-liberalization and post-liberalization periods. The Chow test is simply the  $F$ -test. If the value of computed  $F$ -statistic is greater than the critical value then we reject the null hypothesis (there is no significant change in the time series data between two periods) of structural stability is rejected, otherwise accepted (Maddala, 2001, pp. 173). Five, the pattern of stability of time series data during both periods (pre and post-liberalization) as well as overall study is measured by the Coppel's Instability Index (1962). The Coppel Instability Index thus, can be measured them by the following algebraic formula:

$$CII = [Anti \log(\sqrt{\log v - 1})] \times 100 \dots\dots\dots (6.4.1)$$

**Second**, any time series data is said to be stationary if its mean and variance are constant over time and the value of the covariance between two-time series does not depend on the actual time at which the covariance is computed (Gujarati, 1995). On the other hand a series is non-stationary if it fails to satisfy any of the conditions, i.e. its mean, variance or covariance change overtime. The time series tend to exhibit non-stationary stochastic process is in the following form:

$$Y_t = \delta + \rho Y_{t-1} + u_t \dots\dots\dots (6.4.2)$$

Where,  $\delta$  is a constant,  $u_t$  is the stochastic error term. If the coefficient of  $Y_{t-1}$ , in fact equal to 1 ( $\rho = 1$ ). Then,  $Y_t$  is said to have unit root. In other words,  $Y_t$  could be characterized as having a unit root and a drift (random walk with a drift). The time series property of each variable is investigated under a univariate analysis by implementing the ADF (Augmented Dickey- Fuller), D-F (GLS), PP test and the correlogram test for the unit root (non-stationarity) problem. **One**, the Augmented Dickey-Fuller test is used to test for the existence of unit roots and determine the order of integration of the variables. The tests are done both with and without a

time trend. Akaike method is used to choose the optimal lag length, which is found to be 1 for all variables. The presence of a unit root problem which indicates non-stationarity, cannot be rejected for levels of the variables at the 5% significance level. It may be also found in the first difference. However, the non-stationarity problem then may be vanished after second difference and so on. The ADF test however, requires modifying as:

$$\Delta Y_t = \delta_1 + \delta_2 t + \zeta Y_{t-1} + \theta \sum_{i=1}^m \Delta Y_{t-i} + u_t; i=1,2,\dots,m. \dots\dots\dots (6.4.3)$$

Where,  $u_t$  is assumed to be identical and independently distributed random variable. **Two**, the D-F (GLS) t-test is performed by testing the hypothesis  $a_0 = 0$  in the regression:

$$\Delta y_t^d = \alpha_0 y_t^d + \alpha_1 \Delta y_{t-1}^d + \dots\dots\dots + \alpha_p \Delta y_{t-p}^d + u_t \dots\dots\dots (6.4.4)$$

Where  $y_t^d$  is locally de-trended series  $y_t$ . The local de-trending depends on whether we consider a model with drift only or a linear trend. Thus the DF-GLS test is the popular solution to the problem of size distortions and low power of unit root tests. If the critical value of DF-GLS test is lower than the calculated value, the null hypothesis of existence of unit root problem accepted otherwise rejected and the data series are non-stationary. But, the data series may be stationary in the first or second difference. The critical values of DF-GLS test are shown by Elliott et al. (1996) for a model with linear trend (Maddala, 2001, pp. 550-551).

**Three**, Phillips-Perron (1988) test is used to deal with serial correlation and heteroscedasticity. An important assumption of the DF test is that the error term  $u_t$  is independently and identically distributed. The ADF test adjusts the DF test to take care of possible serial correlation in the error terms by adding the lagged difference terms of the regressand. The PP test is the t value associated with the estimated coefficient of  $\rho^*$ . The series is stationary if  $\rho^*$  is negative and significant. The test is performed for all the variables where both the original series and the difference of the series are tested for stationarity. **Four**, the non-stationarity of time series data can be tested by using autocorrelation function (ACF) based on the so-called Correlogram test. The ACF at lag  $k$ , denoted by  $\rho_k$ , is defined as:

$$\hat{\rho}_k = \frac{\gamma_k}{\gamma_0} = \frac{Co\ variance}{Variance} = \frac{\sum (Y_t - \bar{Y})(Y_{t+k} - \bar{Y})}{n} = \frac{\sum (Y_t - \bar{Y})^2}{n} \dots\dots\dots (6.4.5)$$

Where,  $n$  is the sample size and  $\bar{Y}$  is the sample mean. Bartlett (1946) has shown that if a time series is purely random that is, if it exhibits white noise, the sample autocorrelation coefficients are approximately normally distributed with zero mean and variance  $1/n$ , where  $n$  is the sample size. Following the properties of the standard normal distribution, the 95 percent confidence interval for any  $\hat{\rho}_k$  will be,  $\pm 1.96(1/n)$ . Thus, if an estimated  $\hat{\rho}_k$  falls inside the interval,  $(-1.96(1/n), +1.96(1/n))$  the hypothesis cannot be rejected that the true  $\hat{\rho}_k$  is zero. But, if it lies outside this confidence interval, the hypothesis can be rejected that the true  $\rho_k$  is zero. If none of the estimated correlations lies in the interval, the estimated autocorrelation shown by the table will be statistically significant (Gujarati, 2011). **Third**, In the event of

the non-stationarity of each variable, the cointegrating relationship among variables (tendency for variables to move together in the longrun) is studied by the Johansen-Juselius procedure (Johansen 1988, Johansen-Juselius 1992, 1999) to overcome the associated problem of spurious correlation and misleading inferences. Johansen (1988) suggests a maximum likelihood procedure to obtain cointegrating vectors and speed of adjustment coefficient identifying the number of cointegration vectors within the vector autoregressive (VAR) model. To identify the number of cointegration vectors, a likelihood ratio test of hypothesis is used. The following Vector Autogressive (VAR) model is the basis of multivariate cointegration of Johansen Maximum Likelihood approach:

$$Z_t = A_1 Z_{t-1} + \dots + A_k Z_{t-k} + u_t \dots \dots \dots (6.4.6)$$

Here,  $Z_t$  is an  $(n \times 1)$  vector of  $I(1)$  variables including both endogenous and exogenous variables.  $A_t$  is an  $(n \times n)$  matrix of parameters,  $u_t$  is  $(n \times 1)$  vector of white noise errors. The equation (6.4.6) can be estimated by OLS because each variable is  $Z$  is regressed on the lagged values of its own and all other variables in the system. Since,  $Z_t$  is assumed to be non-stationary, it is convenient to rewrite (6.4.6) in its first difference or error correction form as:

$$\Delta Z_t = \Gamma_1 \Delta Z_{t-1} + \dots + \Gamma_{k-1} \Delta Z_{t-k+1} + \Pi Z_{t-k} + u_t \dots \dots \dots (6.4.7)$$

Where,  $F_j = -(1 - A_1 - A_2 - \dots - A_j)$ ,  $(j = 1 - \dots - k - 1)$ , and  $\Pi = -(1 - A_1 - A_2 - \dots - A_k)$

The specification (6.4.7) provides information about the short- run and long- run adjustments to the changes in  $Z_t$  by estimating  $\Gamma$  and  $\Pi$  respectively. Equation (6.4.6) differs from the standard first difference form of the VAR model by only the inclusion of the term  $\Pi Z_{t-k}$ . This term shows about the long- run equilibrium relationship between the variables in  $Z_t$ . Information about the number of cointegrating relationship among the variables in  $Z_t$  is given by the rank of the number matrix  $\Pi$ . If the rank of the  $\Pi$  matrix  $r$  is  $0 < r < n$ , there are liner combinations of the variables that are stationary. The matrix can be decomposed into two matrices  $\alpha$  and  $\beta$  such that  $\Pi = \alpha\beta$ , where  $\alpha$  is the error correction term and measures the speed of adjustment in  $\Delta Z_t$  and  $\beta$  contains  $r$  distinct cointegrating vectors. The cointegrating rank of the above matrices, can be formally tested with the Maximum Eigenvalue test ( $\lambda$  max) and the Trace test ( $\lambda$  trace). Fourth, If the data series are cointegrated, the ordinary least squares (OLS) method has been applied for functional estimation by minimizing its error term with sum and squares method. For  $K$ -variable case, the prominent matrix technique is to be applied for the estimation of the function. In case of multiple regressions or the  $K$  variable regression model, the ordinary least squares (OLS) method can be written more compactly in matrix notation as:

$$y = X\hat{\beta} + \hat{u} \dots \dots \dots (6.4.8)$$

Where,  $\hat{\beta}$  is a  $K$ - element column vector of the OLS estimators of the regression



coefficients and where  $\hat{u}$  is a column vector of  $n$  residuals. As in the two and three variable models, in the  $k$ -variable case the OLS estimators are obtained by minimizing the residuals that gives,  $\hat{u} = y - X\hat{\beta}$ ; Thus, by simple calculation,

$$\hat{\beta} = (X'X)^{-1} X'y \dots\dots\dots (6.4.9)$$

Where,  $(X'X)^{-1}(X'X) = I$  is an identity matrix of order  $(k \times k)$ . Equation (6.4.9) is a fundamental result of the OLS theory in matrix notation for the case multiple regression model. It shows the  $\hat{\beta}$  vector can be estimated from the given data that provides the best linear unbiased estimator that is BLUE (Gujarati, 1995, pp. 287-288). The Wald test for the multiple regression models to test the hypothesis  $\beta_i = 0$ , use this test statistics with the corresponding partial  $r^2$  substituted in the place of the simple  $r^2$ . The test statistics has a  $\chi^2$  distribution with *d. f. k*. The Wald test has a  $\chi^2$ -distribution with *d. f. r*. if the test statistics is significant at the level, rejecting the hypothesis of coefficient stability (Maddala, 2001, pp. 176-177). **Fifth**, the purpose of VECM model is to indicate the speed of adjustment from the short-run dynamics to the long-run equilibrium state. The model is specified as:

$$\ln gdp_t = \alpha + \lambda e_{t-1} + \sum_{i=1}^n \beta_i \ln l_{t-i} + \sum_{i=1}^k \delta_i \ln fdi_{t-i} + \sum_{i=1}^r \phi_i \ln fdi_{t-i} + \sum_{i=1}^p \varphi_i \ln to_{t-i} + \dots\dots\dots (6.4.10)$$

In this specification, the variables are cointegrated if the parameter ( $\lambda$ ) of the error correction term is negative and statistically significant in terms of its associated-*t* value. In case of  $\lambda$  being positive and statistically significant, still there exists a long-run causality but with a divergence. **Sixth**, VAR methodology superficially resembles simultaneous-equation modeling in that it is considered several endogenous variables together. But each endogenous variable is explained by its lagged, or past, values in the model. In such models, some variables are treated as endogenous and some as exogenous or predetermined (exogenous plus lagged endogenous). The seeds of this model are shown in the Granger causality test.

The test involves estimating the following regressions on the basis of GDP and FDI for instance:

$$\ln gdp_t = \sum_{i=1}^n \alpha_i \ln fdi_{t-i} + \sum_{j=1}^n \beta_j \ln gdp_{t-j} + u_{1t} \dots\dots\dots (6.4.11)$$

$$\ln fdi_t = \sum_{i=1}^m \lambda_i \ln fdi_{t-i} + \sum_{j=1}^m \delta_j \ln gdp_{t-j} + u_{2t} \dots\dots\dots (6.4.12)$$

Where, it is assumed that the disturbances  $u_{1t}$  and  $u_{2t}$  are uncorrelated. The first equation postulates that current  $\ln gdp$  is related to past values of GDP itself as well as of FDI, and the second equation postulates a similar behavior for  $\ln fdi$ . It is essentially, treated that GDP and FDI as a pair of endogenous variables. There are no exogenous variables in this system. This example is the illustrations of vector autoregressive model; the term autoregressive is due to the appearance of the lagged value of the dependent variable on the right-hand side and the term vector is due to the fact that are dealt with a vector of two (or more) variables (Gujarati, 1995, pp-746).

**Seventh**, Granger (1988) developed a test to check the causality between variables.

Granger causality examines to what extent a change from past values of a variable affect the subsequent changes of the other variable. In order to obtain the estimated residuals  $e_t$ , the Granger models with a dynamic error correction are as follows:

$$\ln gdp_t = \alpha + \lambda e_{t-1} + \sum_{i=1}^m \gamma_i \ln l_{t-i} + \sum_{i=1}^r \phi_i \ln di_{t-i} + \sum_{i=1}^n \varphi_i \ln fdi_{t-i} + \sum_{i=1}^q \lambda_i \ln to_{t-i} + \varepsilon_t, \dots \dots (6.4.13)$$

Where,  $\Delta$  indicates the difference operator,  $e$  implies nonzero serially independent random error terms, and  $\lambda t-1$  is the lagged error correction term obtained from the longrun cointegrating relations between the variables. The F statistics are the Wald statistics for the joint hypothesis, no causal relationship. It means that, the null hypothesis is that  $X_t$  does not Granger cause  $Y_t$  and that  $X_t$  does not Granger cause  $X_t$  in case of two variable regression model for example. **Eighth**, just as an autoregression has a moving average representation, a vector autoregression can be written as a vector moving average (VMA) model as:

$$x_t = \mu + \sum_{i=0}^{\alpha} A^i e_{t-1} \dots \dots \dots (6.4.14)$$

Where,  $\mu = (\bar{yZ})^i$  and the unconditional mean of  $x_t$  is  $\mu$ . This equation is the VMA representation in that the variables are expressed in terms of the current and past values of the two types of shocks (i.e.,  $e_{1t}$  and  $e_{2t}$ ). The VMA representation is an essential feature of Sim's (1980) methodology in that it allows tracing out the time path of the various shocks on the variables contained in the VAR model. Impulse response analysis (IRA) is performed in this study by giving a shock of one standard deviation ( $\pm 2$  S.E. innovations) to stock of labour, domestic investment proxy of capital formation, FDI, and trade openness to visualize the duration of their effects on the GDP growth rates of Bangladesh. **Ninth**, the variance decomposition analysis reveals that the variance of GDP growth is primarily caused by its own variance followed by the volume of stock of labour, domestic investment, FDI and trade openness. It is to be noted that the role of labour, domestic investment, FDI and trade openness in explaining the volatility of GDP growth is to be found to be more influential from the subsequent years. **Finally**, if the error term in one time period is correlated with the error term in the previous time period, there is first-order autocorrelation. Most of the applications in econometrics involve first rather than second- or higher-order autocorrelation. Two popular correcting autocorrelation methods are the B-G and the L-M test. **One**, to avoid some of the pitfalls of the Durbin-Watson d test of autocorrelation, statisticians Breusch and Godfrey have developed a test of autocorrelation. Assuming a regression model where the error term  $u_t$  follows the  $\rho$  th order autoregressive, AR ( $\rho$ ) schemes as:

$$u_t = \rho_1 u_{t-1} + \rho_2 u_{t-2} + \dots + \rho_\rho u_{t-\rho} + \varepsilon_t \dots \dots \dots (6.4.15)$$

Where,  $e_t$  is a white noise error term. This is simply the extension of the AR(1) scheme. This test is an alternative to the Q-Statistic for testing serial correlation. The null hypothesis of the B-G test is that there is no serial autocorrelation up to the specified number of lags. The number of observations multiplied by R2 is the Breusch-Godfrey test statistic. **Two**, in the multiple regression models to

test the hypothesis  $\beta_i = 0$ , we use this test statistics with the corresponding partial  $r^2$  substituted in the place of the simple  $r^2$ . We have to substitute the multiple  $R^2$  in place of the simple  $r^2$  or partial  $r^2$  in the formula. The test statistics has a  $\chi^2$  distribution with *d.f. k*. The L-M test like Wald test has a  $\chi^2$ -distribution with *d. f. r*. if the test statistics is significant at the level, rejecting the hypothesis of coefficient stability (Maddala, 2001, pp. 176-177). **Three**, to give some idea about White's heteroscedasticity corrected standard errors, the variances of  $\hat{\beta}$  of k variable regression model with the variance of any partial coefficient is obtained as:

$$\text{var}(\hat{\beta}_i) = \frac{\sum \hat{w}_{ji}^2 \hat{u}_i^2}{(\sum \hat{w}_{ji}^2)^2} \dots\dots\dots (6.4.16)$$

Since  $\hat{u}_i^2$  are not directly observable, White suggests the squared residual for each *i*. White has shown that (3) is a consistent estimator of (2), that is, as the sample size increases indefinitely (3) converges to (2). Where,  $\hat{u}_i$  are the residuals obtained from the *k* variable regression (Gujarati, 2012, pp. 439-440). **Four**, as the post estimation techniques, the CUSUM and CUSUMSQ tests are to be applied to obtain whether the data set have structurally broken or not. In general, the CUSUM (cumulative sum) and CUSUMSQ (CUSUM squared) tests can be used to test the constancy of the coefficients in a model. It is shown that the conventional CUSUM test for structural change can be applied to cointegrating regression residuals leading to a consistent residual-based test for the null hypothesis of cointegration. The tests are semi-parametric and utilize fully modified residuals to correct for endogeneity and serial correlation and to scale out nuisance parameters. By applying these tests in the data series, the results will be more reliable and robust.

#### 4. Findings

##### *Result of the Chow Test*

Result of the Chow Test confirms that there exists no structural breakpoint in 1990 in the series of GDP during the study period. Since, the calculated F-statistic is 3.94 which is greater than the F-critical value and it is also confirmed by the p-value equals to 0.007 which is much lower than any significance levels ( $\alpha$ ). The p-values are very small so the null hypothesis has been statistically significant. That is, there is no structural breaking point in 1990.

##### *Result of the Coppock Instability Index*

Coppock Instability Index of GDP Growth in Bangladesh shows that the CII is 21.7 percent during the pre-liberalization regime and 12.5 percent during the post-liberalization regime. Therefore, the instability in GDP growth is higher during pre-liberalization than post-liberalization periods. The CII of pre liberalization period is also higher than that of during the overall study period (17.1 percent). That is, the data series of GDP growth is more instable in the pre-liberalization than post-liberalization periods.

**Descriptive Statistics of the GDP Growth Function**

The statistical description of the function indicates that mean-to-median ratio of each variable is approximately one. The standard deviation is also low compared to the mean, showing a small coefficient of variation. The range of variation between maximum and minimum is also reasonable except foreign direct investment. The numeric of skewness of each variable is low and is mildly negatively skewed but for GDP and trade openness is positively skewed. The figures for kurtosis of all variables in the growth model are below 3 which confirms near normality. The Jarque-Bera test statistics cannot accept the null hypothesis of normal distribution for each variable, except two (lnl and lnfdi), with varying probabilities. It is mentionable that data in the level form of some variables are seen non-normal with high probability in the Jerque-Bera test but they are completely normal in the first differenced form. Thus, the normality of the distribution is ensured.

**Correlation among the Variables of GDP Growth Function**

The correlation matrix shows that the dependent variable lngdp is positively related with all of the independent variables of the function as expected. It is also consistent with the theory of economic growth that it is the positive function of stock of labour, domestic investment, FDI and trade openness of the country. That is, economic growth in Bangladesh is always positively related by its different components (*lnl, lndi, lnfdi, and lnto*).

**Table 1: Results of the Unit Root Tests (ADF, D-F (GLS) and P-P Tests)**

Variables	Without an Intercept and a Linear Trend					With an Intercept and a Linear Trend				
	ADF Statistic	D-F (GLS)	P-P Statistics	Crit. Value (1%)	Crit. Value (5%)	ADF Statistic	D-F GLS Statistic	PP Statistic	Crit Value (1%)	Crit. Value (5%)
lngdp	2.4210	0.8565	-0.8804	-3.6156	-2.9411	-0.7696	-3.5109	-4.0449	-4.2191	-3.5331
lnl	-1.1353	0.7279	-1.1151	-3.6056	-2.9369	-5.2047	-3.6327	-4.2920	-4.2050	-3.5266
ln di	-0.5070	2.1110	-2.5623	-3.6056	-2.9369	-2.5331	-1.5090	-5.6762	-4.2050	-3.5266
lnfdi	-1.5347	-0.3853	-3.1872	-3.6268	-2.9458	-3.0957	-4.6303	-4.4276	-4.2350	-3.5403
lnto	-1.4012	-1.3221	-1.6509	-3.6010	-2.9350	-3.3283	-1.9974	-7.3837	-4.2119	-3.5298
Δlngdp	-7.4781	-5.1401	-11.0380	-3.6105	-2.9390	-7.3982	-6.3831	-10.8639	-4.2117	-3.5298
Δlnl	-7.5982	-5.0535	-10.1894	-3.6105	-2.9390	-7.4806	-6.3927	-10.0497	-4.2119	-3.5298
Δln di	-7.7713	-1.8432	-7.7713	-3.6056	-2.9369	-7.4129	-3.4013	-7.4129	-4.2050	-3.5266
Δlnfdi	-7.2476	-7.4255	-14.4624	-3.6105	-2.9390	-7.1538	-6.1607	-15.1876	-4.2119	-3.5298
Δlnto	-6.1999	-2.5362	-6.4890	-3.6056	-2.9369	-6.0794	-4.2600	-6.2760	-4.2050	-3.5266

The test is conducted with Eviews 5.1. The data are rounded at 4 digits after decimal.  
 Note: 95% critical value for the Augmented Dickey – Fuller statistic=-2.9665; \* Critical values (5%) are from Mackinnon (1991).  
 Where, lngdp = output of the country used as the proxy of economic growth; ln di= domestic investment proxy of gross capital formation; lnl= stock of labour force proxy of the active population ages 15- 64 years % of total population; lnfdi = inflows of foreign direct investment; and lnto = trade openness. Δ= First Difference, \* Critical values (5%) are from Mackinnon (1991).

Table 7.2.1 presents that the level values are non-stationarity as the calculated values are less than their critical values in absolute term. The null hypothesis could not be rejected then. Table further indicates that the non-stationarity problem vanished after the first difference of the data; because the ADF statistics are greater

than their critical values at 1% and 5% level of significance and the null hypothesis of non-stationarity is rejected and the data have been found stationary after the first difference. These suggest that the series are integrated of order one I(1). The results of D-F (GLS) test indicate that the time series data of growth function have however been non-stationary at the level form but the problems have been vanished after the first difference because the null hypotheses have been rejected then and the data have been found stationary for the integration of order one I(1). Results of the P-P test show the level values are non-stationary because the calculated values are less than their critical values in absolute term. The non-stationarity problem vanished after the first difference of the data. It can be said that the first difference of GDP growth and its various components do not have a unit root problem and the data series are stationary with integration of order one I(1). Therefore, the null hypotheses of unit root problems have been accepted at level form. But, the problems have been vanished after the first difference. That is, the time series data of GDP function have however been non-stationary at the level form because the ADF, D-F (GLS), PP as well as the correlogram statistics are less than their critical values but they all have been found stationary at the first difference.

### Table 2: Result of the Cointegration Test of the Growth Function

Since the variables lngdp, lnI, lnI<sub>d</sub>, lnfdi, and ln<sub>t</sub> are integrated of order 1 (one), it confirms the possibility of cointegration between them.

**Table 2: Results of the Cointegration Test of the Growth Function**

$H_0$	$H_A$	Eigen Value	Trace Statistic	5% Crit. Value	Probability **	Max- eigen Value	5% Crit. Value	Probability**	Hypothesis
<b>Cointegration Result between GDP and Stock of Labour</b>									
$r=0$	$r=1$	0.3153	21.8508	15.4947	0.0048	15.1516	14.2646	0.0361	None*
$r<=1$	$r=2$	0.1542	6.6992	3.84147	0.0096	6.69916	3.84147	0.0096	Atmost 1*
<b>Cointegration Result between GDP and Domestic Investment</b>									
$r=0$	$r=1$	0.746286	68.92562	15.49471	0.0000	53.49041	14.2646	0.0000	None*
$r<=1$	$r=2$	0.326842	15.43521	3.841466	0.0001	15.43521	3.841466	0.0001	Atmost 1*
<b>Cointegration Result between GDP and FDI</b>									
$r=0$	$r=1$	0.640826	68.38409	15.49471	0.0000	39.93396	14.2646	0.0000	None*
$r<=1$	$r=2$	0.517846	28.45014	3.841466	0.0000	28.45014	3.841466	0.0000	Atmost 1*
<b>Cointegration Result between GDP and Trade Openness</b>									
$r=0$	$r=1$	0.603478	60.20864	15.49471	0.0000	36.07596	14.2646	0.0000	None*
$r<=1$	$r=2$	0.461402	24.13268	3.841466	0.0000	24.13268	3.84147	0.0000	Atmost 1*

The tests are performed with the software Eviews- 5.1

The Trace and Max-eigen value tests indicate 2 cointegrating eqn(s) at the 0.05 level.

Note: \* denotes the rejection of the hypothesis at 0.05 levels. \*\*MacKinnon-Haug-Michelis (1999) p-values.

Table 7.3.1 states that the trace and max-eigen value test statistics for GDP ( $\Delta$  lngdp) and other components ( $\Delta$ lnI,  $\Delta$ lnI<sub>d</sub>,  $\Delta$ lnfdi, and  $\Delta$ ln<sub>t</sub>) of Bangladesh are greater than the critical values at 0.01 and 0.05 level of significance. Thus, the null hypothesis of no cointegration is rejected at 5 percent significance level. In the second row, both the trace and max-eigen value statistics are also greater than their critical values. Thus, there are 2 (two) cointegrating stable relations between gross domestic products and its various components in Bangladesh in the short run and they are converging each other in the long run. The result is also supported by Rahman & Shahbaz (2011) while contradicted with Hossain & Kamal (2012).

### Estimation of GDP Growth Function by OLS

The estimated GDP growth regression model is:

$$\Delta \ln gdp = -0.054859 + 8.628111 \Delta \ln l + 0.707270^{**} \Delta \ln di - 0.007299 \Delta \ln fdi - 0.064531 \Delta \ln to. \quad (7.4.1)$$

The estimation is conducted with Eviews 5.1.

Note: \* Coefficient is significant at 0.05 levels of significance \*\* Coefficient is significant at 0.01 levels.

Brackets show the standard error and the p-values of the function; t-test statistics are shown by the parenthesis.

Result shows that GDP of Bangladesh is obviously influenced by its different factors. But, the stock of labour and domestic investment positively affects it, of which domestic investment is significant. That is, an increase in domestic investment GDP will be significantly increased by 70 percent in Bangladesh. FDI and trade openness on the other hand, negatively affect GDP in Bangladesh but the effects are insignificant. This result is partially supported by Akinlo (2004). Domestic investment has a significantly positive impact on economic growth in Bangladesh. This result is supported by (Ahmed, 1985). FDI has negative and insignificant effect on GDP in Bangladesh. This result is supported by (Ghosh&Hendrik, 2006; Fabienne, 2007; Akinlo, 2004; Kim & Seo, 2003; and Matin, 1987) while the result is contradicted with (Schneider, 2005; Hossain& Kamal, 2012; Bhuvan, 2011; Ahmad & Fahian, 2010; Shujie&Kailei, 2006; Yao, 2006; Hermes & Lensink, 2003; Borensztein et al., 1998; Bengoa& Blanca, 2003; Nunnenkamp et al., 2004; Laura et al., 2004; and Quazi&Munir, 2009). Trade openness in Bangladesh has a negative and insignificant effect on economic growth. The result is also supported by Shahbaz (2012) while contradicted with (Yucel, 2009; Humayara et al., 2012). The diversification of findings may due to the difference of the sample selection, data range, model and econometric methodology used by the author. The Wald test confirms that the coefficients are jointly significant because the probabilities are less than the significance level ( $\alpha=0.05, 0.01$ ) for both F-statistic and Chi-square test.

### Result of the VECM of GDP Growth Function

Results of the VECM test indicate that the long run relationships exist between GDP growth with stock of labour, FDI inflows and trade openness in of Bangladesh. The short run relationships exist between GDP and stock of labour as well as foreign direct investment in Bangladesh. The VECM term of the Growth function on the other hand, is significant for stock of labour, domestic investment, FDI inflows and trade openness in Bangladesh that means, there is short run dynamics to the long run equilibrium between GDP and domestic investment in Bangladesh while there exists long run causality but with a divergence relations between stock of labour, FDI and trade openness to the GDP growth in Bangladesh.

**Table 3: Long and Short run Elasticity of Growth Function with VAR Model**

Elasticity	Constant	$\Delta \ln l$	$\Delta \ln di$	$\Delta \ln fdi$	$\Delta \ln to$
Long-term	0.039684*	24.91766**	0.485424**	-0.005081	-0.010850
	(0.017077)	(0.366354)	(0.089454)	(0.002699)	(0.077535)
	[2.323804]	[68.01520]	[5.426515]	[-1.882432]	[-0.139933]
Short-term	0.021721*	14.22193	0.159142	-0.294822*	-0.109112
	(0.00916)	(10.5944)	(0.29650)	(0.16462)	(0.17863)
	[2.37027]	[1.34240]	[0.53674]	[-1.79089]	[-0.61083]

The estimation is conducted with Eviews 5.1.

Note: \*\* Statistically significant at 1 percent level of significance; \* significant at 5 percent level of significance. The standard error is shown in the bracket while the t-statistics are shown by the parenthesis.

The first row of the Table 7.6.1 indicates the long run elasticity of the GDP growth ( $\Delta \ln gdp$ ) function because it contains the coefficients of the log values of the estimated function. It shows that the elasticities of the stock of labour, domestic investment and the constant term are significant. That means an increase in domestic investment may increase GDP growth by 49 percent in Bangladesh. The coefficient of FDI is negative but insignificant. The coefficients of the differenced independent lag values in the second row of the table shows that the coefficients of the constant term, stock of labour force, and FDI are statistically significant at 5 percent level of significance. The coefficients of labour force and FDI are negatively elastic; whereas, the coefficient of constant term is positively elastic with GDP growth in the short run in Bangladesh. Trade openness is insignificant both in the short and long run. This may due to the insignificant contribution to the domestic economy of Bangladesh.

### Result of the Granger Causality Test

Table 7.7.1 shows that the null hypothesis of stock of labour does not cause GDP is rejected at 0.05 percent level as the F-statistic is significant. The null hypothesis of GDP growth does not Granger cause stock of labour is also rejected as the F-statistic is significant. The null hypothesis of GDP does not cause domestic investment indicated in the second row of the table is accepted as F-statistic is insignificant at 0.05 levels. That is, domestic investment causes GDP in Bangladesh but GDP does not cause domestic investment to grow. The result is supported by (Islam et al., 2005) while contradicted with (Tang et al., 2008). The third row of the table, indicates that the null hypothesis of FDI does not Granger cause GDP is accepted as the F-statistic is insignificant at 0.05 level. On the other hand, GDP does not cause FDI in Bangladesh is rejected as the F-statistics is significant then. That is, FDI does not cause GDP but GDP causes FDI inflows in Bangladesh. This result is supported by (Zambe&Yue, 2010; Tang et al., 2008; and Paul, 2011) while contradicted with (Liu et al., 2002; Hossain& Kamal, 2012; and Shafiun et al., 2009). Trade openness in Bangladesh causes GDP as the null hypothesis is rejected while GDP also cause trade openness as F-statistic is significant. That is, both trade openness and GDP of Bangladesh cause each other to grow at the same tandem. The result is supported by (Yucel, 2009) while contradicted with

(Zambe&Yue, 2010; Shafiun et al., 2009; and Adhikary, 2012).

**Table 4: Results of Pair-wise Granger Causality Test of the GDP Growth Function**

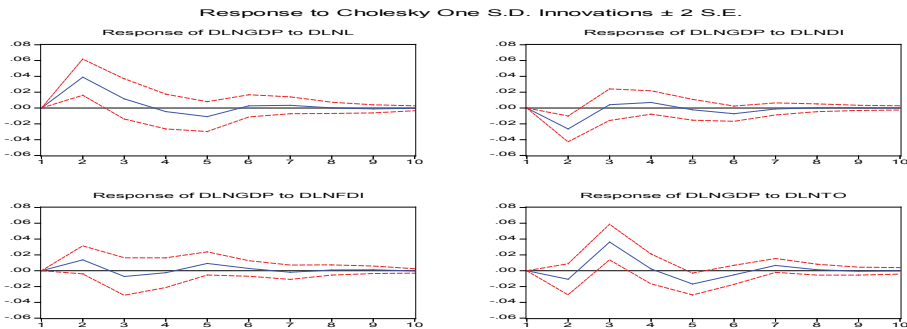
Null Hypothesis	Obs.	Lag	F-Statistic	Probability	Decisions
$\Delta lnI$ does not Granger Cause $\Delta lngdp$		1	7.11970	0.01115	Rejected**
$\Delta lngdp$ does not Granger Cause $\Delta lnI$	40		7.03931	0.01157	Rejected**
$\Delta lnDI$ does not Granger Cause $\Delta lngdp$		1	4.02478	0.05219	Rejected*
$\Delta lngdp$ does not Granger Cause $\Delta lnDI$	40		0.86134	0.35938	Accepted
$\Delta lnfdi$ does not Granger Cause $\Delta lngdp$		3	0.65828	0.58394	Accepted
$\Delta lngdp$ does not Granger Cause $\Delta lnfdi$	38		3.88784	0.01812	Rejected**
$\Delta lnTO$ does not Granger Cause $\Delta lngdp$		1	11.4045	0.00174	Rejected**
$\Delta lngdp$ does not Granger Cause $\Delta lnTO$	40		5.77413	0.02139	Rejected*

The test is performed with Eviews 5.1.

Note: \*Rejection of the null hypothesis of no causation at 0.05 significant levels. \*\* Rejection of the null hypothesis of no causation at 0.01 significant levels. \*\*\* The negligible rejection of the null hypothesis of no causation.

Thus, there are bidirectional causalities between pair wise stock of labour, trade openness and GDP growth in Bangladesh. That is, they cause each other to grow at the same direction. Otherwise, there exist unidirectional causality. That is, domestic investment causes GDP to grow but GDP does not play the same role for the domestic investment. FDI on the other hand, does not significantly cause GDP to grow but GDP causes FDI inflows in Bangladesh in the short run.

**Figure 1: Impulse Response Analysis of GDP Function in the VAR Model**



\*For researcher’s convenience only 10 subsequent periods are considered.

The test is conducted with Eviews 5.1.

Figure 7.8.1(a) presents the response of GDP to stock of labour force indicated by the figure 7.8.1(a) which reveals that it was favourable up to fourth period but negative effects are continued up to sixth period and it again goes to the steady positive position and are converging each other over the period. Likewise, domestic investment, foreign direct investment and trade openness had only the positive or negative implications in short run. But, the bad implication decreases henceforth and they are converging each other in the long run. Thus, the response of all variables is either positive or negative in the short run but in the long run they all are responded towards the economic growth in Bangladesh.



### Variance Decompositions of the GDP Growth Function

The variance decomposition output was documented that the variance of GDP growth is always caused by 100 percent by itself in the first year. In the second year, the GDP variance is decomposed into its own variance (67.36%) followed by stock of labour (17.78%), domestic investment (14.14%), foreign direct investment (0.36%) and trade openness (0.36%) in Bangladesh. However, in subsequent years, the share of labour increases to approximately 18.24% followed by the domestic investment, foreign direct investment and trade openness are increased to (15.35%, 2.24% and 1.96% respectively). The share of trade openness is very much fluctuated to the GDP growth in Bangladesh. The volatility of GDP growth is mainly caused by its own variation, as it always accounts for major portion (above 62%) of the fluctuations.

**Table 5: Results of Autocorrelation and Heteroscedasticity Tests**

Tests	Lagrange Multiplier Test			White General Heteroscedasticity Test		
	L-M Statistics	Probability	Conclusions	WH Statistics	Probability	Conclusion
F-statistic	2.886772	0.098183	No Autocorrelation	14.98310	0.000000	No Heteroscedasticity
Obs*R-squared	3.123984	0.077148	Normally Distributed	32.36074	0.000080	Normally Distributed

Source: Results are drawn from the equation (6.3.1) and the tests are performed with software Eviews 5.1.

Table 7.10.1 indicates the results of the autocorrelation of the GDP growth equation. In case of equation (7.4.1), both the probability values are greater than ( $\alpha=0.01$ ). The F-statistic of the L-M test is 2.89 and the probability is 0.10 which is greater than 0.01 ( $\alpha$ ). That is, the null hypothesis of autocorrelation is rejected. Likewise, Breusch–Godfrey serial correlation test reveals no autocorrelation among the variables (Obs\*R-squared 3.12 with associated P-value 0.08). These imply that the estimated GDP growth equation does not suffer from autocorrelation problem as well as the residuals follow the normality of the distribution. Table further indicates that the F-statistic of the White Heteroscedasticity test is 14.98 and respective probability is 0.0000 which is smaller than the critical value ( $\alpha$ ) 0.01 and 0.05. This implies that the null hypothesis of no heteroscedasticity is accepted that is, the equation (7.4.1) is free from heteroscedasticity problem. The Breusch–Pagan–Godfrey test also reveals homoscedasticity (Obs\*R-square 32.36 with associated P-value 0.00008 which is less than 0.01 and 0.05 level) of the distribution. Therefore, there is no heteroscedasticity problem as well as the estimated residuals are normally distributed. Theory also supports these results.

#### **Results of the Stability Tests of the Models**

Results show that the plots of CUSUM and CUSUMSQ statistics stay within the 95 percent confidence interval. This implies that the estimated coefficients and their variances of the model are stable over the period. That is, there is no structural change over the period. On the other hand, the statistics of CUSUMSQ test begins

from outside of the confidence interval and remains outside of the interval up to the year 2000. Then, it falls inside the 95 percent interval and remains inside to the date. These imply that estimates and the variation of the estimates of the model have the short run structural breaks but are stable over the period. Thus, a short run structural change is found in the growth model but stable in the long run. Finally, it could be concluded that the models are structurally stable and specified.

## 5. Policy Implication

The estimated coefficients of the growth function (7.4.1) indicate that GDP of Bangladesh is obviously influenced (positively and negatively) by its selected factors. The stock of labour and the domestic investment have positive impacts on GDP growth of which the impact of domestic investment is significant by 70% in Bangladesh. FDI and trade openness on the other hand, negatively affect GDP growth in Bangladesh but they are insignificant. Investment of a country is the nucleus of economic growth. But, the investment position of Bangladesh is very poor either for domestic or foreign investment. Domestic investment in Bangladesh suffers with the scarcity of capital formation. Due to the wide gap of saving and investment local entrepreneurs look for foreign capital. The foreign capital is often restricted by countries trade policies. Obviously, it may seem that FDI fosters economic growth because of many reasons. Firstly, it brings the technological improvement in the host country which gears the export and thus, development. Secondly, for the import substitution firms, it enhances competition and that increases efficiency and productivity. Thirdly, it creates the employment opportunity for the host country. Fourthly, FDI results in an increased demand for exports from the host country and helps to attract domestic investment in the export industry. Trade openness maintains a significant channel between investment and economic growth of a country. In addition with greater efficiency, as a result of trade openness many of the developing countries follow the suit with the export-led strategies. Hence, the necessity of the research work has a significant importance in the perspective of the country's need.

### *Policy Regarding the Issue in 7th FYP (2016-2020)*

Progress in transforming the economy from a rural-based agrarian economy towards a more modern urban-based manufacturing and service based economy provides a sound basis for further transformation during the Seventh Plan to meet up the vision 2021. The core targets regarding the issues in accordance with the vision 2021 and goals of the perspective plan under the 7th FYP are:

- i) Attaining average real GDP growth rate of 7.4% per year over plan period;
- ii) Creating good jobs for the large pool of under-employed to manufacture sector from 15 to 20%;

- iii) Substantial improvement of exports to \$54.1 billion by FY2020;
- iv) Achieving a trade-GDP ratio of 50% by FY2020; and
- v) FDI to be increased substantially to \$9.6 billion by FY2020.

**Table 6: Macroeconomic Scenario of the 7th Five Year Plan**

Macro Indicator	FY14(Actual)	FY15(Estimated)	FY16	FY17	FY18	FY19	FY20
Real GDP Growth (%)	6.1	6.5	7.0	7.2	7.4	7.6	8.0
Gross Domestic Investment (% of GDP)	27.2	28.9	30.1	31.0	31.8	32.7	34.4
Private Investment (% of GDP)	22.0	22.1	23.7	23.9	24.4	25.1	26.6
Public Investment (% of GDP)	6.5	6.9	6.4	7.1	7.4	7.6	7.8
National Savings (% of GDP)	29.2	29.0	29.1	29.7	30.2	30.7	32.1

Source: Bangladesh Bureau of Statistics and 7th FYP projections.

The key challenge is to increase the rate of investment from 28.9% of GDP in FY15 to 34.4% of GDP by the end of the Plan in FY20. Efficiency of domestic investment, particularly in the public sector, will be important for realizing the maximum benefits out of the public sector investment plan. The 7th Plan aims to achieve an average growth rate of 7.4% of GDP from the average level of growth at 6.3% recorded under 6th FYP. If the planned growth targets are achieved, it would mean that per capita GDP would increase by an average of about 6% per annum during the 7th Plan period, reaching a peak of 6.7% by the end of the plan. One of the major macroeconomic problems for Bangladesh under the 6th FYP was the continued stagnation of domestic private sector, failure on the part of the government to launch major investment projects under the public-private partnership (PPP) and inability to attract foreign direct investment into the country. Thus, the lesson from the 6th FYP is that, accelerated growth target of 8% by the end of the 7th FYP is to be realized; the level of domestic investment must go up by 5.5% points to 34.4% of GDP by FY20. Much of the growth of additional investment in relation to GDP is projected to come from the private sector (77.3% of gross investment) by the end of the Plan. The 7th Plan aims to reach the export target of US\$54.1 billion with export growth averaging about 12% per annum over the planned period. This projection is also broadly consistent with the RMG export target of US\$50 billion by FY21, the 50th anniversary of the independence of Bangladesh announced by the BGEMA and also endorsed by the government. The faster growth of the manufacturing sector would only be attainable under this export-led growth strategy, if exports grow at a much faster rate than the overall GDP growth.

### Policy Recommendations

On the basis of the findings of the study, the following policies should be adopted for stimulating economic growth in Bangladesh through domestic investment, FDI and trade openness:

- i) Effort should be made to keep the GDP growth rate stable and the gap

of targeted and achieved GDP growth rate in Bangladesh should be reduced. Strengthening government institutions and the rule of law will do much to improve the climate for investment, productivity and growth.

- ii) Wage rate in Bangladesh should be rationalized so that labourer can have a minimum guarantee of maintaining their livelihoods. Individual and national savings should be increased for domestic capital formation.
- iii) Trade integrated liberalization policies should be adopted for increasing the degree of trade openness that may attract foreign investors to the country; Initiatives should be taken to increase export items as well as to get back the benefit of GSP in the US market for country's RMG products; and an appropriate trade policy so that trade openness could maintain a channel between investment and economic growth.

From the findings, it has been imperative for the government of Bangladesh to formulate human development policy to increase managerial skills, technological knowhow and efficiency of labour. It should also adopt policy to create more avenues towards the capital formation through instigating national savings for domestic investment. It should also adopt policy to attract FDI inflows by abolishing the constraints regarding inward FDI.

## 6. Conclusion

The objectives of this paper are to assess the impact of labour, domestic investment, FDI and trade openness on economic growth of Bangladesh and to examine the short and long run causal relationships associated with them. The structural break point and the stability of the function have been examined first with the Chow and Copcock Instability Index that show no structural break point in 1990 as well as the instability index is higher in the pre-liberalization than the post-liberalization periods in Bangladesh. The JarqueBera and the correlation matrix show that the data series are normally distributed and the variables are positively correlated to each other. For econometric analysis the unit root test results show that all the variables in the function have been suffering with unit root problem at their levels. But, they all have been freed from the problem after their first differences which ensures that there are 2 (two) cointegrating stable long run relationships between the pair-wise variables of the GDP growth function. The OLS estimated coefficients of the growth function indicate that the labor and domestic investment positively affect economic growth of which domestic investment is significant. GDP of Bangladesh is again negatively influenced by FDI and trade openness but they are insignificant. The VECM results show that the long run relationships exist between stock of labour, FDI and trade openness to GDP growth while, the short run relationships exist between stock of labour, FDI and

GDP growth in Bangladesh. There is a short run dynamics to the long run equilibrium between domestic investment and GDP otherwise, short run dynamics but a divergence relation exist. The VAR results show that the long run positively significant elasticities exist among labour and domestic investment to economic growth in Bangladesh while the short run negative significant elasticities exist between labour force and FDI to GDP growth in Bangladesh. The Granger causality test shows that there are bidirectional causalities between pair-wise stock of labour, trade openness and GDP growth in Bangladesh. Otherwise, there is unidirectional causality between the pair-wise residual variables of GDP growth function. The response of all variables is either positive or negative in the short run but in the long run they all are responded towards the GDP growth in Bangladesh. The variance decomposition ensures that all the variables are volatile in the short run but it is very high for the case of FDI in Bangladesh. Thus, the government needs to work out all of its institutional frameworks to enhance and monitor the inflow of the FDI. So that it could significantly contribute to the economy of Bangladesh. Finally, policy alone is not sufficient to attract the handsome inflow of FDI. Overcoming the aforesaid impediments towards the inflow of FDI in Bangladesh should be met up. If it is possible, definitely Bangladesh would be able to attract a lion's share of FDI among South Asian regions and thereby achieve its target of higher economic growth and sustainable development in the long run. But, the first emphasis should be given on the enhancement of domestic investment by increasing domestic capital formation and reducing other constraints for stimulating private domestic investment in Bangladesh for sustainable economic growth.

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## Farmers' Adoption of GO-NGO Support in Selected Char Areas of Sirajganj District

Md. Monirul Islam\*  
Md. Taj Uddin\*

**Abstract:** *The study was carried out to identify the adoption of GO-NGO support on farmers' income generation and livelihood changes in selected char areas of Sirajganj district. A total of 60 farmers consisted 30 from non-supported and 30 from GO-NGO supported both in Belkuchi and Chauhali upazilas in Sirajganj district were selected. The primary data were collected from direct interview method using structured questionnaire. Collected data and information were analyzed with the combination of descriptive statistics (sum, average, percentages, etc.) and statistical analysis (Ravallion test and logit model with marginal effect). The average perceptions of the non-supported farmers about the statements on their improvement with GO-NGO support in agriculture and other services were relatively not worth mentioning situation than the GO-NGO supported one. The result of logit model showed that farm size, education level of the household heads, farm income and non-farm income had significant influence on adopting GO-NGO supports in farming practices. The estimated result of double difference (DID) method for total income in the year of 2012 and 2014 was statistically significant. The farmers in char areas mentioned lack of transportation facilities, low price of output, etc as problems; and also provided some probable suggestions to support them.*

**Key words:** Farmers' adoption, GO-NGO support and Char area

### 1. Introduction

About 5 percent populations of Bangladesh as well as about 10 million people live on the char areas narrowed as 7200 square kilometers (Kelly et al., 2002). The economy of the people of river basin areas is highly dependent on agriculture. Most of the char dwellers are involved in various kinds of farming systems and

\* The authors are respectively lecturer, and Professor, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh

their farming practices are also different from the mainland. A number of social protection interventions such as social safety net programmes, various training facilities, awareness campaign, etc. have been providing by the government and non-government organizations (GO-NGOs) to the poorest households in char areas. These provide either long-term assistance to those unable to work or a 'step' for poor households to overcome the initial barriers to productive activities. The development of organizational facilities, agricultural product has been brought by bringing additional area under cultivation and better techniques evolved through adoption of GO-NGO support on agricultural production and their livelihood. However, the chronic increase of population, evolution of new socioeconomic as well as psychological problems, limitations of the state fund in social welfare, etc. made almost impossible for any long-term solution of all these problems by the government alone. Hence, the emergence of NGOs was considered with much importance in this regard.

Despite poor living conditions, households continue to live in the chars because they simply have no alternative, since land is so scarce in Bangladesh. As population, and thus future cereals demand grows, overcoming these constraints is becoming an increasingly pressing issue. Without the intervention of GO-NGOs, the situation would be more problematic and challenging for the char people. The employment opportunities of char dwellers are even less diversified than the others. Government and non-government organizations act as windows in char areas on applied knowledge in agricultural practices and provide links to sources of information and other facilities. Different GOs and NGOs are working in the char areas to reduce poverty and contribute to community development through various support and services. The Char Livelihood Programme (CLP) is one of the important programme run by different NGOs. The government is also implementing programmes to promote farmers for producing high-value crops, fruits and vegetables, potatoes, oilseeds, pulses and spices through appropriate packages of seed-fertilizer-irrigation technologies.

The present study is linked in some extent to other studies. Mahamud (2011) examined the livelihood of the people of Boyer char in Noakhali district under the intervention of Char Development and Settlement Project (CDSP) by the government of Bangladesh. Rahman et al. (2011) carried out a research on char formation process and livelihood characteristics of char dwellers of alluvial river in Bangladesh where the authors observed that the stability of char has positive relationship to the stability of livelihoods of char dwellers. Kashem et al. (2005) identified hunger, locations of ultra-poor, causes of food insecurity and put suggestions for reducing food insecurity in rural Bangladesh in line with social and religious cultural norms, lack of alternate income sources, limitation of training supports, supporting the integration of ultra-poor women into the development programmes for enhancing purchasing power. Uddin (2000) examined that Grameen Bank

credit program has positive impact on improving standard of living of participants and the author found that after joining the GB credit program, there was noteworthy progress in the living standard of the participants in Mymensingh district of Bangladesh. The above literature review indicates that, there are very few studies which endeavour to analyse the impact of adoption of GO-NGO supports on farmers' livelihood in char areas. This study provides a scope to identify the linkage between farmers' livelihood and GO-NGO support. The study will be helpful to scrutinize the farmers' adoption of GO-NGO supports on income generation on livelihood changes in the study areas. So, it is expected that present study would be able to add new information for the assessment and improvement of development activities in future.

The overall goal of this study is to find out an overview of farmers' adoption of GO-NGO support on income generation and livelihood changes in char areas. The specific objectives of the study are:

- i. to determine and describe the important socioeconomic characteristics of the char farmers;
- ii. to identify the farmers' perception about the GO-NGO support on their improvement; and
- iii. to investigate the key determinants of the adoption of different supports and services provided by the GO-NGO.

## **2. Study Method**

Total 60 farmers in which 30 non-supported and 30 GO-NGO supported farmers were selected from Belkuchi and Chauhali upazila of Sirajganj district for primary data collection using purposive sampling technique where different GO-NGO organizations are working. All possible efforts were made to ensure the collection of reasonably accurate data from the selected farmers through direct interview method by the researcher himself. Moreover, focus group discussions (FGD) were conducted in each selected location. The primary data for one year farming operations (January to December, 2014) which covered ten different crops were collected. Secondary information sources were different books, handouts, publications, documents of Government of Bangladesh (GoB) and its different non-government organizations i.e., CLP.

### **Model specification**

The primary data collected from direct interview method were analyzed with a combination of tabular and statistical techniques. Descriptive statistics (such as, sum, mean, percentages, etc.), impact analysis i.e., PPI, DID, Ravallion test, CFI, and econometric analysis using logit model with marginal effect were derived and calculated to present the results.



### Percentage perception index

To determine the improvement of GO-NGO supports on agriculture and other services, percentage perception index was used by using the following simple percentage formula:

Percentage perception index = [No. of respondents' opinion about statements (increase, decrease or constant)  $\times$  100] / Total no. of respondent

### Determinants of adopting GO-NGO supports in different farming operations

The logit regression model was used to determine the factors that have significant influence on the adoption of GO-NGO support in the study areas. The implicit form of the model was as follows:

$$Y = \ln \left( \frac{P_i}{1-P_i} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \varepsilon_i$$

Where,

$P_i$  is the probability of adoption and non-adoption of GO-NGO support; and

$P_i = 0$  indicates non-adoption and  $P_i = 1$  indicates adoption.

Dependent variable (i.e., binary variable):

$Y$  = Probability of adoption of GO-NGO support.

Independent variables:

$X_1$  = Farm size (Ha);  $X_2$  = Age of household head (Years);  $X_3$  = Household size (Number);

$X_4$  = Educational level of household head (Years of schooling);  $X_5$  = Farm income (Tk.);

$X_6$  = Non-farm income (Tk.);  $\beta_0$  = Intercept;  $\beta_1$  to  $\beta_6$  = Regression coefficients of the independent variables; and  $\varepsilon$  = Disturbance term or error term.

### Marginal effect

Marginal effects are computed differently for discrete (i.e., categorical) and continuous variables. Marginal effects measure discrete change i.e., how predicted probabilities change as the binary independent variable changes from 0 to 1. Marginal effects can be an informative means for summarizing how change in a response is related to change in a covariate. This can be quite useful, informative, and easy to understand.

According to Gujarati (1995), the marginal probabilities of the key determinants of adopting GO-NGO support to be estimated based on expressions derived from the marginal effect of the logit model which was estimated as:

$$dp/dx = \beta_i \{ P_i (1-P_i) \}$$

Where,

$\beta_i$  = Estimated logit regression coefficient with respect to the *i*th factor; and

$P_i$  = Estimated probability of a farm household adoption status.

**Ravallion test**

The impacts of GO-NGO support on farming systems were measured by using the non-supported and GO-NGO supported farmers' income generation comparison with the help of following formula:

$$I = \frac{1}{n} \sum_{i=1}^n (O_i^T - O_i^C)$$

Where,

$I$  = Average impact;  $N$  = Sample size;  $I$  = Sample units;

$O$  = Value of the interpretable impact indicator;

$T$  = Treatment group; and  $C$  = Control group.

The paired sample t-test was applied to test the significance of relevant parameters.

**Difference-in-differences (DID) method**

A central feature of impact evaluations is the use of longitudinal data (repeat observations of the same individuals or households over time) to use difference-in-differences or double difference methods. These data were collected from the households receiving GO-NGO support and without receiving such support

The double-difference estimate is obtained by subtracting the preexisting differences between the groups,  $(I_0 - C_0)$  from the difference after the intervention has been implemented,  $(I_1 - C_1)$ . The formula of double-difference estimates is given below:

$$DID = \{ (I_1 - C_1) - (I_0 - C_0) \}$$

DID = Difference in difference;  $I_1$  = Follow- up (Intervention group);  $C_1$  = Follow- up (Control group);  $I_0$  = Baseline (Intervention group);  $C_0$  = Baseline (Control group)

**Constraint facing index**

There were so many constraints faced by the farmers in *char* areas. A constraint facing index (CFI) for each 10 selected constraints was computed by using the following formula:

$$CFI = (C_h \times 3) + (C_m \times 2) + (C_l \times 1) + (C_n \times 0)$$

Where,

$C_h$  = Number of responses indicating high constraint;

$C_m$  = Number of responses indicating medium constraint;

$C_l$  = Number of responses indicating low constraint; and

$C_o$  = Number of respondents having no constraints.

Constraint facing index (CFI) for any of the selected constraints could range from 0 to 90 for non-supported and GO-NGO supported farmers, where, 0 indicated no constraint facing index and 90 indicated highest constraint facing index.

### 3. Results and Discussion

#### Some Basic Socioeconomic Features of the Respondents

The average crop area was 0.21 ha for non-supported and for GO-NGO supported farmers, it was 0.25 ha. The average numbers of livestock and poultry birds were 3.83, 4.27 and 5.35, 7.65 for non-supported and GO-NGO supported farmers, respectively. Average number of wood tree was 5.15 and 5.48 for non-supported and GO-NGO supported farmers, respectively. Majority of the family members were in the working age group of 15.01 to 55 years and it was 51.6 and 61.9 percent, respectively for non-supported and GO-NGO supported farmers in char areas. The average family size of non-supported and GO-NGO supported farmers was 5.2 and 6.3 which is higher than the national average of 4.53 (HIES, 2010). The average literacy rate of GO-NGO supported farmers (64.3 percent) was higher than the non-supported (53.3 percent) farmers and it also exceeded the national average literacy rate (57.9 percent) (BER, 2013). On an average, 23.3 percent farmers were engaged in crop farming in case of non-supported farmers whereas it was 30.0 percent for GO-NGO supported farmers.

**Table 1: Socioeconomic features of the respondents**

Particulars	Non-supported farmers	GO-NGO supported farmers
Area and number of agricultural enterprises		
Crop area (ha)	0.21	0.25
Livestock (no.)	3.83	4.27
Poultry (no.)	5.35	7.65
Wood tree (no.)	5.15	5.48
Family size, age, education level, average literacy rate, occupational status, land type and dependency ratio of sample farmers		
Family size (no.)	5.2	6.3
Age (16-55 years) (%)	51.6	61.9
Average literacy rate (%)	53.3	64.3
Occupational status		
Farming (%)	23.3	30.0
Farming + handloom (%)	40.0	20.0
Rented/mortgaged/leased-in land (%)	55.2	60.5
Dependency ratio (no.)	2.25	2.52

Source: Authors' estimation based on field survey, 2015.

The dependency ratio expresses how many members of a family were dependent on economically working and earning person. In the study areas, economically working and earning persons were 2.25 and 2.52 for non-supported and GO-NGO supported farmers, respectively. It was noted that the socioeconomic characteristics of the sample farmers differ significantly between two groups i.e., non-supported and GO-NGO supported farmers in char areas.

### **Credit and Training Facilities Received by the Farmers**

Credit can play a significant role in increasing farm productivity and income. The GO-NGO supported farmers have spent their loaned money broadly for the agricultural and non-agricultural purposes. From Table 2 it is apparent that percentage of total loaned money utilized for agricultural purposes was about 44.5 percent. The borrower farmers also used about 55.5 percent of their credit for non-agricultural purposes among which the highest amount of credit was utilized for the marriage of daughter and it was 29.9 percent of the total credit fund. As their economic condition was so poor, they used their credit money in some non-agricultural purposes such as small business, food consumption (during flood period), etc. There are different GO-NGOs working in char areas that provide loans to the farmers for various purposes. Farmers of char areas generally borrowed money from BRDB, ASA, MMS, GKS, CLP, CARITAS, NDP, BRAC, CARE Bangladesh, etc.

Training activities can give people more effective social connections and bonds so that they can apply their knowledge and skill to get more benefit in their daily lives, thus making their lives more happier. In recent years, BRDB, DAE and MMS, CLP, GKS, Tomtom project (NGOs), etc. has been providing training and technical assistance in agricultural activities such as rice plantation, vegetable cultivation, cattle and goat rearing, poultry production, etc. for both men and women in the study areas. They are also working with the farmers to promote safe drinking water, sanitation and hygiene, and getting people involved with various income-generating activities (IGAs). BRDB offered training on 'one house one farm' project to the char farmers with a duration of three (03) days. Department of Agricultural Extension (DAE) also provided training on various issues that helped to improve their standard of living. Different NGOs also provided a number of training programmes to the char farmers on livestock rearing, flood protection activities and some social awareness related issues like early marriage, sanitation, dowry system, etc.

**Table 2: Uses, sources, training and distribution of sampled farmers of GO-NGO support and services**

Particulars	Amount (Tk.)		Percentage of credit used
<b>Uses</b>			
Agricultural activities	8835		44.5
Non-agricultural activities	11065		55.5
Grand Total	20000		100.0
<b>Sources</b>	BRDB, ASA, MMS, GKS, CLP, CARITAS, BRAC, CARE Bangladesh		
<b>Training and field visit organization</b>	Duration (days)	Year	Purpose(s)
	Training offered by Government organization(s)		
BRDB, DAE	3 and 2	2013	One House One Farm (OHOF)
	Training offered by NGO(s)		
MMS, CLP, GKS, <i>Tomtom</i> project	5, 3, 2 and 5	2014 and 2013	Crops, livestock, poultry, flood protection
	Title of field visit		
MMS Expert team, DAE	1	2013	After flood period
<b>GO-NGO support</b>			
Types of NGO intervention			No. Percentage (%)
Credit facilities			30 100.0
Training			14 46.7
Free agricultural inputs, Monitoring, Product selling and credit facilities			16 53.3

Source: Field survey, 2015.

Table 2 showed that 100 percent farmers have access to get loan from both GO and local NGOs in the study areas. 14 out of 30 farmers have training facilities on various agricultural and social related issues. A marginal number of farmers have the accessibility to get free agricultural inputs, monitoring service, product selling and all of the above within the same time.

### **Farmers Perception about their Improvement on Agricultural and Other Services**

#### **Improvement in agricultural activities**

The percentage of the farmers' improvement at GO-NGO support in agriculture has been shown in Table 3. It exhibits that most of the non-supported farmers have constant opinion about the statements while for GO-NGO supported farmers, the statements were in the favour of their increase in productivity (83.3%), production of crops (86.7%), use of fallow land (90.0%), number of crops produced in a year (93.3%), poverty situation (86.7%), better marketing facilities (83.3%) and income generation (86.7%). In case of pesticide and fertilizer application, both non-supported and GO-NGO supported farmers have constant opinion and it was 86.7 and 90.0 percent, respectively. The table also shows that the average perceptions of the farmers about the statements on their improvement due to GO-NGO support in agriculture were 38, 7 and 55 percent for increase, decrease and constant circumstances, correspondingly for non-supported farmers while for GO-NGO supported farmers, these were 77, 5 and 18 percent, respectively in char areas.

**Table 3: Farmers' perception regarding their improvement in agriculture through GO-NGO support (in %)**

Statements	Non-supported farmers			GO-NGO supported farmers		
	Increase	Decrease	Constant	Increase	Decrease	Constant
Productivity	30.0	3.3	66.7	83.3	6.7	10.0
Production of crops	40.0	3.3	56.7	86.7	3.3	10.0
Use of fallow land	46.7	6.7	46.7	90.0	6.7	3.3
No. of crops	43.3	3.3	53.3	93.3	3.3	3.3
Poverty status	40.0	6.7	53.3	86.7	6.7	10.0
Marketing facilities	46.7	10.0	43.3	83.3	3.3	13.3
Pesticide and fertilizer application	3.3	10.0	86.7	6.7	3.3	90.0
Employment creation	46.7	13.3	40.0	76.7	6.7	16.7
Income generation	43.3	6.7	50.0	86.7	6.7	6.7
Average perceptions	38.0	7.0	55.0	77.0	5.0	18.0

Source: Authors' estimation, 2015.

### 3.2 Improvement in other services

The percentage of farmers' perception on their improvement at GO-NGO support in other services has been shown in Table 4.

**Table 4: Farmers' perception on their improvement in other services (in %)**

Statements	Non-supported farmers			GO-NGO supported farmers		
	Yes	No	Indifferent	Yes	No	Indifferent
Credit facilities	3.3	83.3	13.3	79.9	13.3	6.7
Training facilities	13.3	79.9	6.7	79.9	6.7	13.3
Health care facilities	6.7	79.9	13.3	83.3	3.3	13.3
Sanitary latrine	13.3	83.3	3.3	86.6	6.7	6.7
Pure drinking water	6.7	79.9	13.3	79.9	6.7	13.3
Selection of occupation with season	6.7	10.0	83.3	83.3	3.3	13.3
Selection of time of cultivation	13.3	73.3	13.3	13.3	3.3	83.3
Crop pattern change	13.3	79.9	6.7	79.9	13.3	6.7
Market distance	79.9	13.3	6.7	20.0	6.7	73.3
Extension services	13.3	13.3	73.3	73.3	13.3	13.3
Transportation problem	13.3	20.0	66.6	20.0	59.9	20.0
Average perceptions	17.0	56.0	27.0	64.0	12.0	24.0

Source: Authors' calculation, 2015.

The table reveals that most of the non-supported farmers have adverse opinion about the statements while for GO-NGO supported farmers, the statements were in the favour of their increase in credit facilities (79.9%), training facilities (79.9%), health care facilities (83.3%), sanitary latrine (86.6%), pure drinking water facilities (79.9%), selection of occupation with season (83.3%), change in cropping pattern (79.9%) and extension services (73.3%). The table also shows that the average perception of the farmers about the statements on their improvement at GO-NGO support in other services were 17, 56 and 27 percent for yes, no and indifferent situations, correspondingly for non-supported farmers while for GO-NGO supported farmers these were 64, 12 and 24 percent, respectively.

## Determinants of Adopting GO-NGO Support

### Empirical results of factors influencing the adoption of GO-NGO support

The result of logit regression was presented in Table 5. The results showed that the model was accurate in explaining the determinants of adopting GO-NGO support in different farming practices. Four out of six variables included in the model were significant in explaining the variation in adopting GO-NGO support in farming practices; which were: farm size, education level of the household heads, farm income and non-farm income of the sample farm households in char areas.

#### Farm size

The empirical result shows that the farm size of the farmers has negative coefficient and it was 3.08, which was significant at 10% level. One unit increase in the farm size will decrease the probability of adopting GO-NGO support in farming practices by 3.08 unit, keeping other factors held constant.

#### Household size

Household size has also positive coefficient and it was 0.31, which was also statistically significant at 10% level. One unit increase in the household size will increase the probability of adopting GO-NGO support in farming practices by 0.31 unit, keeping other factors remaining constant.

#### Education level of household head

The parameter estimates of education level carry a positive result which is 1.174 and is statistically significant at 5% level. One unit increase in the level of education of the household head will increase the probability of adopting GO-NGO support in farming practices by 1.174 unit, keeping other factors remaining constant.

**Table 5: Estimates of the logistic regression of determinants of adopting GO-NGO supports in farming practices**

Variables	Coefficient (Y)	Std. Err.	z	P>z	[95% Confidence Interval]
Constant	-3.642	1.781	-2.05	0.041	-7.131
Farm size (X <sub>1</sub> )	-3.084*	1.651	-1.87	0.062	-6.321
Age of household head (X <sub>2</sub> )	0.046	0.041	1.11	0.266	-0.035
Household size (X <sub>3</sub> )	0.313*	0.188	1.67	0.095	-0.054
Education level of household head (X <sub>4</sub> )	1.175**	0.620	1.90	0.048	-0.040
Farm income (X <sub>5</sub> )	1.141*	0.746	1.53	0.101	-0.321
Non-farm income (X <sub>6</sub> )	0.046	0.490	0.10	0.926	-0.915

Source: Authors' estimation based on field survey, 2015.

Note: \*\* Significant at 5 percent level; and \* Significant at 10 percent level.

**Farm income**

This result implies that households' annual average farm income was positive which was 1.14 and significant at 10% level. If other things being equal, one unit increase in the level of farm income will increase the probability of household to be adopted GO-NGO support in farming systems by 1.14 unit.

Marginal effect subsequent to logit model

The results of marginal effects subsequent to logit model are shown below:

$$Y = \text{Pr (type of farmers) (predict)}$$

$$= 0.492$$

The result of marginal effect shows that the farm size of the farmers has a negative value of dy/dx and it was 0.771 unit, which was significant at 10% level.

**Table 6: Estimates of the marginal effect for adopting GO-NGO support in farming practices**

Variables	dy/dx	Std. Err.	z	P>z	[95% Confidence Interval]	X
Farm size (X <sub>1</sub> )	-0.771*	0.412	-1.87	0.061	-1.579	0.037
Age of household head (X <sub>2</sub> )	0.012	0.010	1.11	0.265	-0.009	0.032
Household size (X <sub>3</sub> )	0.078*	0.047	1.67	0.095	-0.014	0.170
Education level of household head (X <sub>4</sub> )	0.285**	0.141	2.02	0.044	0.008	0.562
Farm income (X <sub>5</sub> )	0.285*	0.186	1.53	0.101	-0.080	0.650
Non-farm income (X <sub>6</sub> )	0.012	0.123	0.09	0.925	-0.023	0.252

Source: Authors' calculation based on field survey, 2015.

Note: \*\* Significant at 5 percent level and; \* Significant at 10 percent level.

It indicated that the predicted probability of adoption is 0.771 unit lower for the individual in higher farm size than for one who is smaller one all other variables equal their means. The marginal effect on the probability of adopting GO-NGO supports in different farming practices is 0.078 unit greater for large household size than the smaller one, keeping all other factors constant. The results of marginal effect showed that the predicted probability of adoption is 0.285 unit higher for the individual in better education level than for one who is less educated held all other factors remain equal. The results of marginal effect confirmed that, the predicted probability of adoption is 0.285 unit higher for the individual in higher farm income than for one who is smaller farm income earner, other things being equal.

**Impact on Income Generation**

An analysis of income sources adds further insight into the income generation process. There are two sources of income for both non-supported and GO-NGO supported farmers. These sources are farm and non-farm income. After the intervention, the income of the GO-NGO supported farmers was increased because of



credit facilities, extension services, supervision and monitoring of the field worker. Table 7 depicts that average annual income of non-supported and GO-NGO supported farmers in the year 2014 were Tk. 102672.1 and Tk. 128076.1, respectively. Table 7 also illustrates that average yearly income of non-supported and GO-NGO supported farmers in the year 2012 were Tk. 89200.0 and Tk. 103700.0, respectively.

**Table 7: Average annual income of the farmers**

Sources of income	Non-supported farmers		GO-NGO supported farmers	
	Amount (Tk.)	Percentage (%)	Amount (Tk.)	Percentage (%)
In the year 2014				
A. Total farm income	71605.4	69.74	89326.1	69.74
B. Total non-farm income	31066.7	30.26	38750.0	30.26
C. Total income (A+B)	102672.1	100.00	128076.1	100.00
In the year 2012				
A. Total farm income	60800.0	68.16	68100.0	65.67
B. Total non-farm income	28400.0	31.84	35600.0	34.33
C. Total income (A+B)	89200.0	100.00	103700.0	100.00

Source: Authors' calculation based on field survey, 2015.

**Table 8: Double difference estimates for income generation**

Outcome variables	Non-supported farmers	GO-NGO supported farmers	Difference	t-statistic	p-value
Total farm income in 2012	60800.0	68100.0	7300.0	15.12	0.0000
Total farm income in 2014	71605.4	89326.1	17720.7	11.93	0.0532
Difference in total farm income (2014-2012)	10805.4	21226.1	10420.7	11.30	0.1945
Total non-farm income in 2012	28400.0	35600.0	7200.0	11.50	0.1341
Total non-farm income in 2014	31066.7	38750.0	7683.3	16.36	0.0000
Difference in total non-farm income (2014-2012)	2666.7	3150.0	483.3	14.78	0.0000
Total income in 2012	89200.0	103700.0	14500.0	17.93	0.0000
Total income in 2014	102672.1	128076.1	25404.0	53.22	0.0000
Difference in total income (2014-2012)	13472.1	24376.1	10904.0	58.94	0.0000

Source: Authors' calculation based on field survey, 2015.

Note: Total farm incomes in 2012 and in 2014 are considered as before-after situation.

In addition to assessing the impact of GO-NGO support and services on income generation in the study areas, authors' estimate the change in total farm income, total non-farm income as well as total income behavior of the GO-NGO supported and non-supported farmers over the 2012 to 2014 period. The results of impact estimates presented in Table 8 suggest that for non-supported farmers, total income difference was Tk. 13472.1 and for GO-NGO supported farmers, it was Tk. 24376.1. The estimated result of double-difference (DID) method was Tk. 10904 in the year 2012 and 2014 which is statistically significant.

**Table 9: Ravallion test result (in Tk./farm)**

Sources of income	Non-supported farmers	GO-NGO supported farmers
Total farm income	71605.4	89326.1
Total non-farm income	31066.7	38750
Total income	102672.1	128076.1
Change in total income		25404.0 (2.02*)

Source: Authors' estimation, 2015.

Note: \*Significant at 10 percent level.

Table 9 shows that, because of the GO-NGO support, the annual average income per farm increases from Tk. 102672.1 to Tk. 128076.1. The Ravallion test results shows that the income was increased by the amount of Tk. 25404.0 due to the support obtained from different GO and NGO organizations working in the study areas which is statistically significant at 10% level and it was verified by the value of t-statistic.

**Computation of constraint facing index (CFI)**

The computed CFI of 10 constraints ranged from 74 to 55 for non-supported and 73 to 53 (against a possible range from 0 to 90) for GO-NGO supported farmers which are arranged in rank order according to their CFI as shown in Table 10. Majority of the farmers point out that lack of transportation problem was the main problem in the study areas. A good number of the farmers point out that low price of output was an important problem due to lack of transportation facilities. High prices of different inputs are also problem in both for non-supported and GO-NGO supported farmers. Lack of education and training facilities was also a foremost difficulty for GO-NGO supported farmers compared to the non-supported farmers. Due to lack of knowledge about the best production practices, farmers do not know about the scientific methods of cultivation that ultimately results in lower output. Non-farm employment opportunity has been created to a large extent and laborers in the study areas migrated from farm activities to non-farm activities especially as a handloom worker for better income.

**Table 10: Ten selected constraints along with constraint facing index and rank order**

Name of the constraints	Non-supported farmers		GO-NGO supported farmers	
	CFI (A)	Rank order	CFI (B)	Rank order
Lack of transportation problem	74	1	73	1
Low price of outputs	72	2	69	2
High price of different inputs	71	4	70	3
Lack of education and training facilities	68	5	65	4
Scarcity of concentrate feed and fodder	63	3	61	7
Lack of adequate extension services	61	6	60	8
Outbreak of diseases	60	9	58	9
Lack of knowledge about best production practices	58	10	57	10
Scarcity of labor	56	11	55	11
High price of irrigation	55	12	53	12

Source: Authors' estimation, 2015.

Therefore, the scarcity of human labour along with their higher wage rate is found in different cropping seasons that ultimately hamper the whole process of cultivation.

**Conclusions and Policy Implications**

Different crop farming was much more profitable under GO-NGO supported farmers than the non-supported farmers. Income generation was increased due to the

intervention of GO-NGO support for GO-NGO supported farmers than the non-supported farmers. Increase in farm size, household size, level of education and farm income enable farmers to renovate their production system through GO-NGO supports that would be more helpful to increase the production level of char farmers. Farmers in char areas expressed their opinion about lack of transportation facilities, low price of output, high price of different inputs, etc. which was identified as major problems in the study areas. For policy implications, the sample farmers suggested that government and non-government organizations should allocate more soft loan for agricultural activities. As, education has positive influence on adopting GO-NGO support, compulsory primary education programme for both male and female should be implemented with the cooperation of proper authority.

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## **Production Practices and Profitability Analysis of Household Goat Rearing in a Selected Area of Mymensingh District**

**SC Sarker\***  
**AKFH Bhuiyan\***  
**M. Akteruzzaman\***

**Abstract:** *This study was undertaken to examine the production practices and profitability analysis of household goat farming in Mymensingh district. It covered 80 households from three villages of Baluka upazila of which 40 from project under management of UNEP-GEF-ILRI FAnGR Asia Project of Bangladesh Agricultural University (BAU) and 40 from non-project. Evidence showed that the numbers of goat per project and non-project households were 3.65 and 2.95 respectively. Semi intensive goat rearing was practiced by the 75.0% of project and 77.5% of non-project households. Forty percent project and 60% non project households fed their goat homestead resources and 60% of project and 40% of non project households fed purchased feed to their goat. All the project households practiced goat vaccination mainly PPR whereas it was 55.0% in case of non-project household. Hundred percent project households maintain records, but non-project households maintained no records. Net return from goat rearing were found Tk. 8531.46 and Tk. 6737.00 for having and no having shed, Tk. 7893.98 and Tk. 7244.73 for having and no having feeding cost, Tk. 8798.86 and Tk. 6935.53 for having and no having treatment cost, respectively for the project households. The average net return per project household was calculated Tk. 7634.28 on the other hand Tk. 3805.36 for the non-project household. In case of non project household the net return were calculated Tk. 4310.84 and Tk. 3631.41 for having and no having shed, Tk. 3824.78 and Tk. 3802.34 for having and no having feeding cost, Tk. 3879.99 and Tk. 3503.31 for having and no having treatment cost, respectively. As a whole, the average net return per project household was higher Tk. 3828.00 compare to non-project household. It indicates that the intervention had a positive impact on the profitability of the project household. Thus, the study recommended for extension of the project interventions in other rural areas of Bangladesh.*

\* Professor, Department of Animal Breeding and Genetics, BAU, Mymensingh.  
Professor, Department of Agricultural Economics, BAU, Mymensingh.

**Key words:** Production practice, Goat farming, Feeding systems, Intensive and Net return.

## 1. Introduction

Livestock plays an important role in the national economy of Bangladesh with a direct contribution of around 3% to the agricultural GDP and providing 15% of total employment in the economy (BER, 2011). The present estimated growth rate of this sector is 3.39 during FY 2011-12. About 75% people rely on livestock to some extent for their livelihood, which clearly indicates that the poverty reduction potential of the livestock sub-sector is high (Tareque and Chowdhury, 2010). Although the contribution of livestock to household income is clearly recognized but its unplanned and inefficient production systems, still exist in many developing countries of the world including Bangladesh (Moholl, 2002). Among the livestock herds, the goat has proved to be of utmost importance in many developing countries, because they are widely kept by the rural farmers. Other people have called goat 'the poor person's bank or the poor family's insurance policy (Peacock, 1996). The many different modern goat breeds are found across all agro-ecological environments (Husain, 1993). There are about 300 breeds and types of goats, the majority of which are found in the tropics and subtropics (Devendra and Burns, 1983). Due to the increasing human population pressure on land goats are increasing simultaneously which makes the goat enterprise more important in smallholder production systems in the high potential areas (Peters, 1989).

The average number of goats per household was 2.31 and they are mostly reared by landless, small and medium farmers (Faruque, 2010). Goats have been reared in Bangladesh from the time of human settlement in this part of the earth. They are also considered a potential genetic resource for poverty alleviation as they are the source of many small and landless farmers. Goats are used primarily for meat and milk production, but their skin is a valuable by product. Goat meat is the most popular and expensive in the Bangladesh and is acceptable to people of all castes, creeds and religions. The higher demand of meat and skin in the local as well as foreign markets focused the goat enterprise extremely prominent to the vulnerable group of people in the existing socio economic condition of the country (Husain, 1993). Small-scale farmers have limited access to land and capital and so the rearing of goats using common property resources at least gives them an opportunity to improve their income position (Riethmuller, 2003). The goat population in Bangladesh is increasing by year to year. According to the estimate of the Department of Livestock Services (DLS) the population of goat raised to 25.20 million in year 2012-13 against of number 19.10 million in the year 2004-05. Meat production was reached 36.2 lakh ton in the year 2012-2013 in against of 11.3 lakh ton in the year 2005-2006.

Indigenous goat is the important livestock species in Bangladesh, for which

require less money, space and technological knowledge to rear. It is saying that about 85% people of Bangladesh live in rural area. Maximum of them have no capacity to rear high costing cross breed livestock species. Indigenous goats are highly adapted to the harsh conditions, poor nutrition and disease and/or parasite challenges. Over all the indigenous breeds are habituated with the environment of Bangladesh. The taste and preference of Bangladeshi people trend to indigenous livestock species and the price of indigenous species near about double in the market. So the rural people can easily rear some goats at household level to meet the animal protein requirement. This study highlights the current indigenous goat production circumstances in Bangladesh with a view to identifying the major challenges which need to be addressed in order to improve the indigenous goat productivity and thereby improve the livelihood of the rural households who are the custodian of these valuable genetic resources. By reviewing various research papers it is expected that there is some scope to study on the mentioned topics on the basis of some research questions that may be helpful for conservation as well as improvement of household goat production. The research questions are:

- Goat keepers are practicing different production systems but there is no in-depth information about what are the various production systems are practicing the goat keepers in the study area?
- What is the profitability variation of goat rearing under different production systems?
- What interventions/policy options can be promoted that would increase Black Bengal owner's income and increase contribution to their livelihood?

The overall objective of the present research is to increase the household income of the rural farmers in Bangladesh through household goat (Black Bengal) farming. The specific objectives of the study are as follows: (i) to assess the household goat production practices (ii) to examine the profitability of household goat rearing under different production practices.

## **2. Methodology**

The study was conducted with the support of UNEP-GEF-ILRI FAnGR Asia Project which was implemented its activities on Goat rearing at Bhaluka upazila under Mymensingh district. Three villages from Bhaluka upazila under Mymensingh district were selected purposively for the study covering 80 households where 40 from project and 40 non-project households. The survey was conducted during November–December 2014 by using a structured interview schedule. Data of secondary sources was collected from various research publications, BBS and other authentic sources as per requirement of the study. The collected data for the study were processed and analyzed using different software (Excel, SPSS, etc). The following techniques were used in analyzing the collected



data as per objectives of the study:

To assess the household goat production practices in the study areas, the following factors were considered;

i. **Types of goat as per coat colour:** Collected data was presented in tabular form.

ii. **Housing system:** Patterns of housing system was described in tabular form with resource full information.

iii. **Feeding system:**

- a. Types of feed that was used by the goat keeping household
- b. Sources of feed-Purchase or home supply;

iv. **Breeding system:**

- a. Selection process of Doe;
- b. Selection process of Buck;
- c. Age of first kidding;
- d. Breeding type: Control/natural;

v. **Healthcare:**

- a. Training/awareness;
- b. Preventive measure: Vaccination, de-worming;
- c. Treatment-Type of treatment, Type of service providers;

vii. **Record Keeping:**

All the production and reproduction record, input cost; and income related record was analyzed in tabular form.

To examine the profitability of household goat rearing under different production practices, the profit function was estimated.

The following profit ( $\Pi$ ) equation was used to determine the profitability of household goat rearing under different management practices:

$$\Pi = I_c + P_g \cdot G_s + P_g \cdot G_c - \text{Cost}$$

Where,

$\Pi$  = Profit per household;

$I_c$  = Value of change in inventory;

$P_g$  = Per unit price of goat;

$G_s$  = Total number of goat sold in a year; and

Gc = Total number of goat consumed in a year.

### 3. Results and Discussions

#### 3.1 Production Practices of Goat Rearing

Production of an enterprise greatly depends on its production procedures. Live-stock production is not out of this theme. The productivity of goat also depends on proper housing, nutrition, health management and selection of appropriate animal (Moholl, 2002). An attempt has been taken in this section to illustrate the present production practices of household goat farming of the study area.

##### 3.1.1 Goat population and available types

Goats in the study area were 54.79% fully black, 13.70% was brown, 28.08% was boiragi, 2.06% was white and 1.37% was mixed in project households (Table 1). Overall 3.65 goats were found per project household. In the non project households 77.97% was black Bengal, 4.24% was brown and 17.79% was boiragi. Overall 2.95 goats were found per non project household. Nandy et al., (2011) reported that in West Bengal in majority causes the flock size ranges from 1-4. The present study supported Nandy's findings.

**Table 1: Available goat type in the study area**

Type s of goat	% of total of Project HHs	% of total of non-Project HHs
Black Bengal	54.79	77.97
Brown Bengal	13.70	4.24
Boiragi	28.08	17.79
White Bengal	2.06	0.0
Mixed	1.37	0.0
Total	100.0	100.0
Average (No./HH)	3.65	2.95

Source: Field survey, 2014.

##### 3.1.2 Goat rearing system

75.0 percent of project household were used to practice semi intensive goat rearing system that was 77.5% in non goat household (Table 2). Twenty percent of project household used to rear intensive system in goat rearing while it is 17.5% in non-project household. Free or scavenging rearing system was practiced 5% household in both project and non-project household.

**Table 2 Goat rearing system of the surveyed households**

Rearing types	Project HHs		Non- Project HHs
	No.	Percent (%)	Percent (%)
Abadha (Intensive)	8	20.0	17.5
Semi intensive	30	75.0	77.5
Free/Scavenging	2	5.0	5.0
Total	40	100.0	100.0

Source: Field survey, 2014.

### 3.1.3 Goat housing pattern

Table 3 represented the housing information of goat rearing project and non-project households. 50% of goat rearing project household have special housing for goat keeping and 50% had no special housing for goat keeping. About 75% of non-project surveyed households had no special housing for goat rearing. They had only 25% special housing system for their goats. Among the special housing of project households had kept their goat with tin shed and tin fence house representing 85% and in non-project household Tin shed with mudd wall 50% was the highest special housing system for goat husbandry in the study area. In the project household had no special housing used to keep their goat in veranda 45% and in non-project household highest 30% kept their goats in the cattle shed with cattle.

**Table 3 Goat housing pattern of the surveyed households**

Description of information	Project HHs		Non-project HHs	
	No.	Percent (%)	No.	Percent (%)
No special housing	20	50.0	30	75.0
Special housing	20	50.0	10	25.0
Total	40	100.0	40	100.0
<b>Special housing type</b>				
Tin shed with Tin fence	17	85.0	3	30.0
Tin shed with mudd wall	3	15.0	5	50.0
Tin with bamboo fence	0	0.0	0	0.0
Straw shed with tree leaf fence	0	0.0	1	10.0
Others	0	0.0	1	10.0
Total	20	100.0	10	100.0
<b>No special housing</b>				
In the cattle shed with cattle	8	40.0	9	30.0
Kitchen room	0	0.0	6	20.0
Living room	2	10.0	5	16.67
Veranda	9	45.0	8	26.66
Others	1	5.0	2	6.67
Total	20	100.0	30	100.0

Source: Field survey, 2014.

### 3.1.4 House cleaning information

Same percent of goat rearing project households were practiced to clean regularly (Table 4). But in case of non-project goat keeping households 95% were habituated to clean regularly, remaining 5% households cleaned their goat house in every two days interval.

**Table 4 House cleaning by the goat keepers**

Description of items	Project HHs		Non-project HHs	
	No.	Percent (%)	No.	Percent (%)
Cleaning daily	40	100.0	38	95.0
Cleaning two days interval	0	0.0	2	5.0
Total	40	100.0	40	100.0

Source: Field survey, 2014.

### 3.1.5 Goat feed sources

Only home supplied feed was provided by 40% of project and 60% of non-project households. Project households 60% and non-project households 40% fed goats by purchasing feeds (Table 5).

**Table 5 Goat feed sources in studied area**

Source of feed	Project hhs		Non -project hhs	
	No.	Percent (%)	No.	Percent (%)
Home supplied	16	40.0	24	60.0
Purchased	24	60.0	16	40.0
Total	40	100.0	40	100.0

Source: Field survey, 2014.

### 3.1.6 General feeding management of goat

Free grazing was common type of feeding both project and non-project households (Table 6). Nandy et al., (2011) reported that all most all the farmers used to graze their goats. Dey et al., (2007) conducted a study on goat production scenario in Bihar, India and found that goats are raised on grazing. Saadullah and Hossain (2000) stated that management system of indigenous goat in Bangladesh was a combination of both tethering and scavenging. All the studies are supported by the present study. In addition cocked rice, tree leaf and rice gruel was fed 50% of project households and 25% of non-project households to their goats, tree leaf and rice gruel was fed 47.5% of project households and 65% of non-project households.

**Table 6 General feeding management of goat**

Indicators	Project HHHs		Non -project HHHs	
	No.	Percent (%)	No.	Percent (%)
<b>Type of feeding</b>				
Free grazing and in addition cocked rice and tree leaf	1	2.5	4	10.0
Free grazing and in addition cocked rice, tree leaf and rice gruel	20	50.0	10	25.0
Free grazing and in addition tree leaf and rice gruel	19	47.5.0	26	65.0
Total	40	100.0	40	100.0
<b>Daily install/when feeding</b>				
One times	1	2.5	10	25.0
Two times	31	77.5	23	57.5
Three times	8	20.0	7	17.7
Total	40	100.0	40	100.0

Source: Field survey, 2014.

### 3.1.7 Feeding management of purchased feed for goats

Wheat bran was the major item of purchased goat feeds in both project and non-project households (Table 7). Wheat bran was purchased 79.17% by project and

100.0% by non-project households. Farmers practiced different feeding practices of purchased feeds. Purchased feed with water was practiced by 87.50% of project households and 100.0% of non-project households. Daily 62.50% of project households and 56.25% of non-project households fed purchased feed one time and 37.50% of project households and 43.75% of non-project households fed two times.

### 3.1.8 Breeding practiced by the goat keepers

Ninety percent of project households and hundred percent of non-project households used hire buck for breeding purpose (Table 8). Present study revealed that 90.0% of project households and 100.0% of non-project households used hire bucks for breeding their does as they had no breeding facility to breed their does with own bucks. 90.0% of project households and 85.0% of non-project households provided service charges when they served their does from the buck of buck parks as related to study of Gokhale et al., (2002).

**Table 7 Feeding management of purchased feed for goats**

Indicators	HHs		Non-project HHs	
	No.	Percent (%)	No.	Percent (%)
<b>Feed type</b>				
Wheat bran	19	79.17	16	100.0
Wheat bran and gram	2	8.33	0	0.0
Wheat bran, gram and pulse bran	1	4.17	0	0.0
Wheat bran and rice/broken rice	2	8.33	0	0.0
Total	24	100.0	16	100.0
<b>Type of feeding</b>				
Purchased feed with water	21	87.50	16	100.0
Mixed purchased all feed with water	2	8.33	0	0.0
Mixed purchased feed, cocked rice with water	1	4.17	0	0.0
Total	24	100.0	16	100.0
<b>Daily install/when feeding</b>				
One time	15	62.5	9	56.25
Two times	9	37.5	7	43.75
Total	24	100.0	16	100.0

Source: Field survey, 2014.

**Table 8 Breeding practiced by the goat keepers**

Description of items	Project HHs		Non-project HHs	
	No.	Percent (%)	No.	Percent (%)
<b>Buck use</b>				
Sources of breeding bucks				
Own	4	10.0	0	0.0
Others	36	90.0	40	100.0
Total	40	100.0	40	100.0

<b>Breeding Method</b>					
	Controlled	40	100.0	34	85.0
	Un controlled	0	0.0	6	15.0
Total		40	100.0	40	100.0
<b>Consideration about the breeding buck</b>					
	Consider	40	100.0	9	22.5
	No consideration	0	0.0	31	77.5
Total		40	100.0	40	100.0
<b>Considering factors about breeding buck</b>					
	Colour	36	90.0	5	55.56
	Pedigree	32	80.0	3	33.33
	Age	30	75.0	2	22.22
	Size	39	97.5	8	88.89
	Weight	29	72.5	0	0.0
	Physical appearance	35	87.5	0	0.0
	Testicle size	28	70.0	0	0.0
<b>Provide service charge</b>					
	Yes	36	90.0	34	85.0
	No	4	10.0	6	15.0
Total		40	100.0	40	100.0

Source: Field survey, 2014.

### 3.1.9 Buck rotation

Buck rotation is a process through which goat keepers serve their does with one buck only 6 to 12 months to prevent inbreeding problem. By this process bucks are rotted within 6-12 months from one buck park to another buck park. Hundred percent of project households maintained buck rotation regularly (Table 9). But in goat keeping non-project households only 10% was following buck rotation.

**Table 9 Buck rotation practiced by goat keepers**

Variables	Project HHs		Non -project HHs		
	No.	Percent (%)	No.	Percent (%)	
Not following buck rotation	0	0.0	36	90.0	
Following buck rotation	40	100.0	4	10.0	
Total	40	100.0	40	100.0	
<b>Days for buck rotation</b>					
	6 Months	31	77.5	0	0.0
	12 months	9	22.5	4	100.0
Total		40	100.0	4	100.0
<b>Causes for buck rotation</b>					
	Healthy kids and less diseases	1	2.5	0	0.0
	Healthy kids	26	65.0	1	25.0
	Less diseases	8	20.0	0	0.0
	Prevent mating with close relatives	5	12.5	0	0.0
	Don't get the same buck after one year	0	0.0	3	75.0
Total		40	100.0	4	100.0

Source: Field survey, 2014.

### 3.1.10 Considering the factors of purchasing does

Both project and non-project households were practiced to consider some factors during purchasing a doe (Table 10). Size was the main considering factor as expressed by both project and non-project goat rearing households representing 100% in project and 97.5% in non-project households.

**Table 10 Considering factors of purchasing does**

Variables	Project HHs		Non -project HHs	
	No.	Percent (%)	No.	Percent (%)
Not following consideration	0	0.0	0	0.0
Following consideration	40	100.0	40	100.0
Total	40	100.0	40	100.0
<b>Considering factors</b>				
Colour	36	90.0	27	67.5
Pedigree	30	75.0	0	0.0
Age	43	85.0	28	70.0
Size	40	100.0	39	97.5
Weight	36	90.0	1	2.5
Physical Appearance	35	87.5	14	35.0
Udder	30	75.0	1	2.5

Source: Field survey, 2014.

### 3.1.11 Vaccination practiced by the goat keepers

Hundred percent of project households practiced goat vaccination whereas it was 55.0% in case of non-project goat keeping household against PPR (Table 11). Gokhale et al., (2002) reported that only 39.9% studied goat rearers vaccinated their goats for various diseases in Moharashtra, India. The vaccination percentage in the present study was higher than study of Gokhale et al. Training was the only one source of knowing about vaccination for project households in the year 2010 and 2011.

**Table 11 Vaccination practiced by the goat keepers**

Indicators	Project HHs		Non -project HHs	
	No.	Percent (%)	No.	Percent (%)
Not Practicing vaccination	0	0.0	18	45.0
Practicing vaccination	40	100.0	22	55.0
Total	40	100.0	40	100.0
<b>Vaccination information sources</b>				
Training	40	100.0	0	0.0
GEF community worker	0	0.0	7	31.82
Neighbour and other goat keepers	0	0.0	12	54.54
World Vision volunteers	0	0.0	3	13.64
Total	40	100.0	22	100.0
<b>Vaccine information receiving year</b>				
2010	9	22.5	1	4.55
2011	29	72.5	1	4.55
2012	2	5.0	5	22.72
2013	0	0.0	8	36.36
2014	0	0.0	7	31.82
Total	40	100.0	22	100.0

<b>Name of vaccines</b>					
	Cannot say	0	0.0	9	40.91
	Can say PPR	40	100.0	13	59.09
Total		40	100.0	22	100.0
<b>Interval</b>					
	6 months	40	100.0	13	59.09
	Cannot say	0	0.0	9	40.91
Total		40	100.0	22	100.0
<b>Vaccination program arranged by</b>					
	DLS	4	10.0	0	0.0
	NGO	5	12.5	7	31.82
	Own initiative	19	47.5	11	50.0
	Other	12	30.0	0	0.0
	Cannot say	0	0.0	4	18.18
Total		40	100.0	22	100.0

Source: Field survey, 2014.

### 3.1.12 Disease management practiced by the goat keepers

Thirty five percent of project housed hold was attack with different diseases as reported by respondents (Table 12). On other hand 80.0% of non-project households were attack with different diseases as reported by the non-project respondents. Pet fola/fapa and cold 35.29% were the main diseases in the project households each. Patla paikhana (34.92%) was the main disease as reported by respondents of non-project household. Village doctors were the main treatment sources for both project and non- project household 82.35% and 58.73%, respectively.

**Table 12 Disease management practiced by the goat keepers**

Indicators	Project HHs		Non -project HHs	
	No.	Percent (%)	No.	Percent (%)
No problems	26	65.0	8	20.0
Problems	14	35.0	32	80.0
Total	40	100.0	40	100.0
<b>Type of problem</b>				
Pet fola/fapa	6	35.29	13	20.63
Patla paikhana	1	5.88	22	34.92
Fever	2	11.77	5	7.94
Khora	0	0.0	3	4.76
Worm	0	0.0	13	20.63
Skin	0	0.0	2	3.18
Cold	6	35.29	4	6.35
Golafula	0	0.0	1	1.59
Other	2	11.77	0	0.0
Total	17	100.0	63	100.0
<b>Sources of service</b>				
Medicine shop	0	0.0	15	23.81
Other goat keeper	0	0.0	1	1.58
Veterinary surgeon/DLS	3	17.65	5	7.94
Village doctor	14	82.35	37	58.73
Other	0	0.0	5	7.94
Total	17	100.0	63	100.0

Source: Field survey, 2014.



### 3.1.13 Bio security management

Hundred percent project household and 75.0% of non-project household put death goat underground as a bio security measure (Table 13). Ninety five percent of project household presented causes of put underground the death goats not to disseminate diseases and five percent reported to prevent diseases and bad smell. Not to spread bad smell was one of the causes as reported 57.5% by the non-project households. Thirty five percent of non project households took bio security measure as cause not disseminate disease reported 35% of the non-project household

**Table 13 Bio security measures taken by goat keepers**

Type of activity/causes	Project HHs		Non -project HHs	
	No.	Percent (%)	No.	Percent (%)
<b>Type of activity</b>				
Thrown into jungle	0	0.0	10	25.0
Under ground	40	100.0	30	75.0
<b>Total</b>	<b>40</b>	<b>100.0</b>	<b>40</b>	<b>100.0</b>
<b>Causes</b>				
Not to disseminate disease	38	95.0	14	35.0
Not to spread bad smell	0	0.0	23	57.5
For cleaning	0	0.0	2	5.0
To prevent disease and bad smell	2	5.0	1	2.5
<b>Total</b>	<b>40</b>	<b>100.0</b>	<b>40</b>	<b>100.0</b>

Source: Field survey, 2014.

### 3.1.14 Record keeping

Record keeping was maintained by project household 100% and in non project household 0% (Table 14). Manzi et al., (2013) reported that records were rare (4%) and 50% of these kept breeding records. The record keeping practice was higher in the project households but was lower in the non-project households compared to the study of Manzi et al.,.

**Table 14 Record keeping practiced by goat keepers**

Description of entry	Project HHs		Non -project HHs	
	No.	Percent (%)	No.	Percent (%)
Not keeping record	0	0.0	40	100.0
Record keeping	40	100.0	0	0.0
<b>Total</b>	<b>40</b>	<b>100.0</b>	<b>40</b>	<b>100.0</b>
<b>Type of record keeping</b>				
Date of birth	40	100.0	0	0.0
Birth weight	40	100.0	0	0.0
Tagging	40	100.0	0	0.0
Pedigree	30	75.0	0	0.0
Weaning time and weight	35	87.5	0	0.0
Breeding record	36	90.0	0	0.0
Rearing cost	28	70.0	0	0.0
Health and treatment	30	75.0	0	0.0
Selling age	34	85.0	0	0.0
Buyer's information	29	72.5	0	0.0

Place of sale	30	75.0	0	0.0
Value	38	95.0	0	0.0
<b>Form of record keeping</b>				
Special card & khata	40	100.0	0	0.0

Source: Field survey, 2014.

### **3.2 Profitability of Goat Rearing**

The purpose of this section is to calculate the costs and returns of household goat rearing. In this study cost items consisted of housing, feeding, vaccination, treatment and unpaid labour cost. On the return side total return and net returns per households invested were determined and analyzed. Costs and return were calculated on different management practices; such as those having housing cost and no housing cost, having feed cost and no feed cost, having treatment cost and no treatment costs.

#### **3.2.1 Cost items of household goat rearing**

##### **Feed cost**

In project household, the feed cost per household were calculated on the basis of different management practices; Tk. 475.50 for having shed cost, Tk. 575.42 for having feeding cost and Tk. 383.33 for having treatment cost of the households for their goats (Table 15). The average feed cost of the households were calculated on basis for no cost in different management practices was calculated Tk. 215.00 for having no housing cost, Tk. 0.0 for having no feeding cost and Tk. 322.4 for having no treatment cost for their goats. Overall average feeding cost was calculated Tk. 345.25 that was 22.59% of total cost.

Feeding cost per non-project household was calculated Tk. 227.50 for having shed cost, Tk. 439.06 for having feeding cost and Tk. 213.28 for having treatment cost of the households. The average feeding cost of the households were calculated on basis for no cost in the different management practices was calculated Tk. 163.79 for having no housing cost, Tk. 0.0 for having no feeding cost and Tk. 213.28 for having no treatment cost for their goats. Overall average feeding cost was calculated Tk. 175.62 that was 19.52% of total cost.

##### **Housing cost**

The housing cost per project household was calculated Tk. 776.29 for having shed, Tk. 510.10 for having feeding cost and Tk. 367.27 for having treatment cost respectively (Table 15). The average housing cost of the households were calculated on basis for no cost for housing was Tk. 0.0 for having no housing cost, Tk. 205.21 for having no feeding cost and Tk. 400.67 for having no treatment cost for their goats. Overall average housing cost was calculated Tk. 388.14 which was 25.40% of total cost.

Housing cost per non-project household was calculated Tk. 386.66 for having shed cost, Tk. 204.16 for having feeding cost and Tk. 108.33 for having treatment cost of the households. The average housing cost of the households were calculated on basis for no cost for housing was Tk. 0.0 for having no housing cost, Tk. 28.57 for having no feeding cost and Tk. 50.00 for having no treatment cost for their goats. Overall average housing cost was calculated Tk. 96.67 that was 10.75% of total cost.

### **Treatment cost**

In project household treatment cost per household was calculated on the basis of different management practices; Tk. 59.75 for having shed, Tk. 57.17 for having feeding cost and Tk. 157.20 for having treatment cost of the households for their goats (Table 15). The average treatment cost of the households were calculated on basis for no cost in the different management practices Tk. 58.15 for having no housing cost, Tk. 61.62 for having no feeding cost and Tk. 0.00 for having no treatment cost for their goats. Overall average treatment cost was calculated Tk. 58.95 that was 3.86% of total cost.

Treatment cost per non-project household was calculated Tk. 92.50 for having shed cost, Tk. 98.56 for having feeding cost and Tk. 100.75 for having treatment cost of the households. The average treatment cost of the households were calculated on basis for no cost in the different management practices Tk. 76.63 for having no housing cost, Tk. 71.71 for having no feeding cost and Tk. 0.00 for having no treatment cost for their goats. Overall average treatment cost was calculated Tk. 80.6 that was 8.96% of total cost.

### **Vaccination cost**

In project household vaccination cost per household was calculated on the basis of different management practices Tk. 18.5 for having shed, Tk. 16.87 for having feeding cost and Tk. 16.67 for having treatment cost of the households for their goats (Table 15). The average vaccination cost of the households were calculated on basis for no cost in the different management practices Tk. 16.50 for having no housing cost, Tk. 18.44 for having no feeding cost and Tk. 18.00 for having no treatment cost for their goats. Overall average vaccination cost was calculated Tk. 17.5 that was 1.15% of total cost.

Vaccination cost per non-project household was calculated Tk. 5.50 for having shed cost, Tk. 8.44 for having feeding cost and Tk. 7.03 for having treatment cost of the households. The average vaccination cost of the households were calculated on basis for no cost in the different management practices Tk. 7.83 for having no housing cost, Tk. 6.43 for having no feeding cost and Tk. 8.12 for having no treatment cost for their goats. Overall average vaccination cost was calculated Tk. 7.25 that was 0.81% of total cost.

### Unpaid labour cost

In project household unpaid labour cost per household was calculated on the basis of different management practices; Tk. 768.5 for having shed, Tk. 754.79 for having feeding cost and Tk. 723.33 for having treatment cost of the households for their goats (Table 15). The average unpaid labour cost of the households were calculated on basis for no cost in the different management practices Tk. 668.25 for having no housing cost, Tk. 663.75 for having no feeding cost and Tk. 715.40 for having no treatment cost for their goats. Overall average unpaid labour cost was calculated Tk. 718.37 that was 47% of total cost.

Unpaid labour cost per non-project household was calculated Tk. 527.00 for having shed cost, Tk. 562.50 for having feeding cost and Tk. 540.62 for having treatment cost of the households. The average unpaid labour cost of the households were calculated on the basis of no cost in the different management practices Tk. 543.67 for having no housing cost, Tk. 507.62 for having no feeding cost and Tk. 535.00 for having no treatment cost for their goats. Overall average unpaid labour cost was calculated Tk. 539.50 that was 59.97% of total cost.

### Total cost

In project households total cost per household having shed was calculated Tk. 2098.54, Tk. 1914.35 for having fed cost and Tk. 1647.81 for having treatment cost. Total cost per household was calculated Tk. 958.00 for having no shed, Tk. 949.02 for having no feeding cost and Tk. 1456.47 for having no treatment cost. In the non-project household total cost per household having shed was calculated Tk. 1239.16, Tk. 1312.72 for having fed cost and Tk. 970.01 for having treatment cost. On the other hand total cost per household was calculated Tk. 791.92 for having no shed, Tk. 614.33 for having no feeding cost and Tk. 621.69 for having no treatment cost.

**Table 15 Cost and return from household goat production under different management practices**

	Cost/ return items	Management practices						Overall	% of total cost
		Having shed		Feeding practice		Treatment			
		Yes	No	Yes	No	Yes	No		
Project HHs	No. of HH	20	20	24	16	15	25	40	-
	No. of goat	3.8	3.5	3.71	3.56	3.07	4	3.65	-
	Feed cost	475.5	215	575.42	0	383.33	322.4	345.25	22.59
	Housing cost	776.29	0	510.10	205.21	367.27	400.67	388.14	25.4
	Treatment cost	59.75	58.15	57.17	61.62	157.2	0	58.95	3.86
	Vaccination cost	18.5	16.50	16.87	18.44	16.67	18.00	17.50	1.15
	Unpaid labor	768.50	668.25	754.79	663.75	723.33	715.4	718.37	47.00
	Total cost	2098.54	958.00	1914.35	949.02	1647.81	1456.47	1528.22	100.0
	Total return	10630.00	7695.00	9808.33	8193.75	10446.67	8392.00	9162.50	-
	Net return	8531.46	6737.00	7893.98	7244.73	8798.86	6935.53	7634.28	-

Non Project HHs		Yes	No	Yes	No	Yes	No		
	No. of HH	10	30	16	24	32	8	40	
	No. of goat	3.10	2.90	4.00	2.92	2.91	3.12	2.95	
	Feed cost	227.50	163.79	439.06	0	213.28	28.57	175.62	19.52
	Housing cost	386.66	0	204.16	28.57	108.33	50.00	96.67	10.75
	Treatment cost	92.50	76.63	98.56	71.71	100.75	0	80.6	8.96
	Vaccination cost	5.50	7.83	8.44	6.43	7.03	8.12	7.25	0.81
	Unpaid labor	527.00	543.67	562.50	507.62	540.62	535.00	539.50	59.97
	Total cost	1239.16	791.92	1312.72	614.33	970.01	621.69	899.64	100.0
	Total return	5550.00	4423.33	5137.50	4416.67	4850.00	4125.00	4705.00	-
Net return	4310.84	3631.41	3824.78	3802.34	3879.99	3503.31	3805.36	-	
Difference	Net return	4220.62	3105.59	4069.2	3442.39	4918.87	3442.22	3828.00	

Source: Authors' estimation based on field survey, 2014.

### 3.2.2 Net return/profit from goat rearing

Net return in project household was calculated on the basis of different management practices; Tk. 8531.46 for having shed, Tk. 7893.98 for having feeding cost and Tk. 8798.86 for having treatment cost of the households for goat (Table 15). The net return of the households were calculated on basis for no cost in the different management practices; Tk. 6737.00 for having no housing cost, Tk. 7214.73 for having no feeding cost and Tk. 6935.53 for having no treatment cost of goat. Overall net return per project household was calculated Tk. 7634.28.

Net return of non-project household was calculated Tk. 4310.84 for having shed cost, Tk. 3824.78 for having feeding cost and Tk. 3879.99 for having treatment cost of the households. The average net return of the households were calculated on the basis of no cost in the different management practices Tk. 3631.41 for having no housing cost, Tk. 3802.34 for having no feeding cost and Tk. 3503.31 for having no treatment cost for their goat. Overall net return per non-project household was calculated Tk. 3805.36.

Net return per project household was higher than non-project household on the basis of different management practices; such as Tk. 4220.62 for having shed and Tk. 3105.59 for having no shed, Tk. 4069.20 for having feed cost and Tk. 3442.39 for having no feed cost, Tk. 4918.87 for having treatment cost and Tk. 3442.22 for having no treatment cost, respectively. Overall net return of project household was higher Tk. 3828.00 than non-project household.

## 4. Conclusions and Policy Implications

The production practices of goat differ between project and non-project households. As a result of variation in production practices, net return per goat rearing household were also varied. Net return were higher in the household who had goat shed, spent purchased feed and spent cost in treatment purpose compare to the households who had no goat shed, spent no cost in feed and spent no cost in treat-

ment in both project and non-project households.

The following policy implications ensure from the findings of the study.

- Project intervention of the farmers focusing on diseases control, improved housing, feeding, breeding, proper data recording system should be arranged
- Government and non-government organizations should take initiative to supply goat feed at lower cost and provide financial support to goat keepers for construction of goat shed.
- Line ministry especially DLS should strengthened treatment facilities for prevention of diseases for improving indigenous goat in order to enhance the traditional goat production practices in the rural areas of the country.

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## দিনাজপুরের আর্থ-সামাজিক অবস্থা: উন্নয়ন সম্ভাবনা

ড. মো: আব্দুর রাজ্জাক \*

সারকথা: ১৭৮৬ খ্রিস্টাব্দে গঠিত হয় ঐতিহ্যবাহী দিনাজপুর জেলা। ১৯৮৪ সালে বর্তমান দিনাজপুর জেলার আধুনিক রূপান্তর ঘটে। বেদানা লিচু আর কাটারিভোগ চালের জন্য খ্যাত দিনাজপুরের অর্থনীতি মূলত কৃষিভিত্তিক। অতীতে, অবস্থাসম্পন্ন গৃহস্থ বা জোতদার শ্রেণির মানুষের গোলাভরা ধান এবং পুকুর ভরা মাছ ছিলো ঠিকই। ফসলের দাম হ্রাস-বৃদ্ধির সাথে রায়ত শ্রেণির আর্থিক অবস্থার পরিবর্তন হতো। কিন্তু, অধিকাংশ জনগণ, যারা দরিদ্র ও ভূমিহীন সাধারণ মানুষের অন্তর্ভুক্ত ছিলেন, তাদের অর্থনৈতিক অবস্থা ভালো ছিলো না। দেশ বিভাগের পর ১৯৫০ সালে পূর্ব বাংলা জমিদারী উচ্ছেদ ও প্রজাস্বত্ব আইন পাশ এবং তা কার্যকর হলে ১৯৫৬ সাল থেকে জমিদারী স্বত্বের বিলুপ্তি ঘটে। এ সময়কাল থেকে কৃষি উৎপাদনে ও ভূমি মালিকানায় যে পরিবর্তন তার সূচনা ঘটে। ঐতিহাসিকভাবে কৃষি সমৃদ্ধ একটি জেলা হিসাবে দিনাজপুর উত্তরাঞ্চলের শস্যভাণ্ডার বলে খ্যাতি লাভ করে। স্বাধীনতার পর থেকে কৃষিক্ষেত্রে উন্নত বীজ, সার, সেচ, কীটনাশকের ব্যবহার বৃদ্ধির কারণে কৃষিক্ষেত্রে শস্য বহুমুখীকরণ ও বৈচিত্র্যের ব্যাপকতা বৃদ্ধি পায়। জীবন নির্বাহী চাষাবাদের স্থলে ক্রমান্বয়ে বাণিজ্যিক চাষাবাদের প্রসার ঘটে। ফলে, কৃষকের আয় ও জীবনযাত্রার মান বাড়তে থাকে। দেশের অন্যান্য অঞ্চলের তুলনায় দিনাজপুর অঞ্চলে শিল্পখাতের বিকাশ তেমন হয়নি। ধানের সহজলভ্যতা ও সস্তা শ্রমের পর্যাপ্ত যোগানের কারণে এখানে চালকলের সংখ্যা বেশি। গ্রামাঞ্চলের হাটবাজারগুলোতে কৃষিভিত্তিক ব্যবসা বাণিজ্যের প্রাধান্য রয়ে গেছে। শহরাঞ্চলে শিল্প বলতে অন্য যা কিছু হয়েছে সেগুলোকে ক্ষুদ্র ও মাঝারি শিল্প বলা যায়। মানুষের ক্রমবর্ধমান চাহিদার প্রেক্ষিতে শহরাঞ্চলে বিভিন্ন শিল্পপণ্যের বেশ কিছু ব্যবসা প্রতিষ্ঠান গড়ে উঠেছে। বর্তমানে দিনাজপুর থেকে ধান, চাল, আম, লিচু, কাঠাল, ভুট্টা, টমেটো ইত্যাদি দেশের অন্যান্য অঞ্চলে রপ্তানি হচ্ছে। আপেক্ষিকভাবে পূর্বের তুলনায় ক্রমান্বয়ে অপ্রাতিষ্ঠানিক ঋণের পরিমাণ কমে গিয়ে তার স্থলে প্রাতিষ্ঠানিক ঋণের পরিমাণ বৃদ্ধি পেয়েছে। ব্যাংক ব্যবস্থার প্রসার, জনগণের সচেতনতা এবং বিশেষ ক্ষেত্রে ক্ষুদ্র ঋণের প্রাপ্যতা বেড়েছে। কালক্রমে আর্থ-সামাজিক অবস্থার পরিবর্তনের ফলে কৃষিনির্ভর মানুষের সংখ্যা তুলনামূলকভাবে হ্রাস পেয়েছে। কিছু মানুষ শিল্প ও সেবাখাতে কর্মসংস্থানের সুযোগ পেয়েছে। তবে গ্রামাঞ্চলে শিল্প ও সেবাখাতে নিয়োজিত জনসংখ্যার পরিমাণ তুলনামূলকভাবে অনেক কম। এ জেলার ক্ষুদ্র নৃ-গোষ্ঠীর অন্তর্ভুক্ত পরিবারের নিজস্ব অর্থনৈতিক সংস্কৃতি পূর্বে বিদ্যমান ছিলো। সময়ের পরিবর্তনের সাথে বিভিন্ন কারণে তারা সেগুলো হারিয়ে ফেলেছে। ক্ষেত্র ভেদে নারী ও পুরুষ শ্রমিকের মজুরির বৈষম্য রয়েছে। বর্তমানে তথ্য ও যোগাযোগ ক্ষেত্রে উল্লেখযোগ্য অগ্রগতি সাধিত হয়েছে। ক্রমান্বয়ে সামাজিক অবকাঠামোর পরিবর্তন ও উন্নয়ন ঘটেছে। স্কুল, কলেজ, মাদ্রাসা, মসজিদ, হাসপাতাল, ক্লিনিক ইত্যাদির সংখ্যা বৃদ্ধি পেয়ে সামাজিক অবকাঠামোর ভিত্তি গড়ে উঠেছে। উন্নত চিকিৎসাসেবা, স্যানিটেশন সুবিধা, পাকা ঘরবাড়ির সংখ্যা

\* সহযোগী অধ্যাপক অর্থনীতি, উপ সচিব (প্রেষণে) মাধ্যমিক ও উচ্চ মাধ্যমিক শিক্ষা বোর্ড, দিনাজপুর



বৃদ্ধি পেয়েছে। সমাজজীবনে উন্নয়নের মিশ্র প্রভাব লক্ষণীয়। আয় বৃদ্ধি, অর্থনৈতিক অবকাঠামো উন্নয়ন, ব্যবসা বাণিজ্যের অগ্রগতি ইত্যাদি ক্ষেত্রে কতগুলো সূচকে ধনাত্মক পরিবর্তন সাধিত হলেও কোন কোন সামাজিক সূচকের ক্ষেত্রে অবনতি লক্ষ করা যায়। দিনাজপুর অঞ্চলে কৃষিভিত্তিক শিল্প উন্নয়নের প্রচুর সম্ভাবনা রয়েছে। এখানে পর্যটন শিল্প বিকাশের এবং উন্নয়নের আছে যথেষ্ট সুযোগ ও সম্ভাবনা। ব্যবসা-বাণিজ্যের প্রসারের জন্য এ জেলার রাস্তাঘাট, যাতায়াত ও যোগাযোগ ব্যবস্থা উন্নত করে গড়ে তোলার বিকল্প নেই। শিল্পের উন্নয়নে এ অঞ্চলের ব্যবসায়ী উদ্যোক্তা শ্রেণিকে এগিয়ে আসতে হবে। সর্বোপরি শিক্ষা ও সচেতনতা বৃদ্ধির মাধ্যমে এ অঞ্চলের মানুষের উন্নত ভবিষ্যৎ বিনির্মাণ করা সম্ভব।

## ১. ভূমিকা

কোন অঞ্চলের অর্থনৈতিক অবস্থার স্বরূপ নির্ধারণের জন্য সেই অঞ্চলের মানুষের আয়, উৎপাদন ব্যবস্থা, উৎপাদিত পণ্যসামগ্রীর প্রকৃতি ও পরিমাণ, সম্পদের প্রাচুর্য ও মালিকানা, কর্মসংস্থানের সুযোগ, পেশা, আবাসন, বহির্গমনের হার, জীবনযাত্রার মান ইত্যাদি সম্পর্কে জানা প্রয়োজন। সময়ের পরিবর্তনের সাথে সাথে কোন গতিশীল সমাজের উৎপাদন ব্যবস্থা, পেশা, সম্পদের মালিকানা ও তার ব্যবহার, উপজীবিকা ও আয়ের উৎসসমূহের পরিবর্তন ঘটে, যার কারণে মানুষের জীবনযাপনে বৈচিত্র্যের সৃষ্টি হয়। এই বৈচিত্র্য ও ধনাত্মক পরিবর্তন মানুষের জীবনযাত্রার মানের উন্নতি ঘটিয়ে আর্থ-সামাজিক অবস্থার পরিবর্তন সাধন করে। ফলে, তা মানুষের অর্থনৈতিক কল্যাণ বৃদ্ধিতে সহায়ক হয়ে উন্নয়নের সূচনা ঘটায়।

অর্থনৈতিক প্রবৃদ্ধি ও পরিবর্তনের সমষ্টি হচ্ছে উন্নয়ন। এটি একটি দীর্ঘকালীন গতিশীল প্রক্রিয়া যার মাধ্যমে সমাজের উৎপাদন বা আয় বৃদ্ধি পায় এবং মানুষের জীবনযাত্রার মানের গুণগত পরিবর্তন ঘটে। আয় বৃদ্ধির ফলে আর্থ-সামাজিক অবকাঠামোর উন্নয়ন, সমাজে বসবাসকারী মানুষের দৃষ্টিভঙ্গির ধনাত্মক পরিবর্তন, বিজ্ঞান মনস্কতা এবং সৃজনশীলতা বৃদ্ধি পেলে সমাজের উন্নয়ন ত্বরান্বিত হয়। উন্নয়নের একটি গুণগত অর্থাৎ মানবিক ও সাংস্কৃতিক দিক রয়েছে। উন্নয়ন সর্ব মানুষের কল্যাণ বৃদ্ধি করে। ফলে আয় বৈষম্য হ্রাস পায়, দারিদ্র্য ও বেকারত্বের নিপীড়ন থেকে সমাজ ক্রমান্বয়ে মুক্ত হতে থাকে। উন্নয়নের ছোঁয়া মানুষের মর্যাদাবোধ ও পছন্দের স্বাধীনতাকে বাড়িয়ে দেয়। মানবসম্পদের উন্নয়ন, রাজনৈতিক অংশগ্রহণ এবং পরিবেশ সুরক্ষাকেও উন্নয়নের সূচকরূপে বিবেচনা করা হয়। উন্নয়নের এসকল বৈশিষ্ট্য, সূচক ও পরিমাপককে সামনে রেখে উন্নয়ন প্রক্রিয়ায় দিনাজপুর জেলার অর্থনৈতিক অবস্থার বিচার-বিশ্লেষণ করা যেতে পারে।

দিনাজপুর জেলা ১৭৮৬ খ্রিস্টাব্দে গঠিত হয়। ১৮০৭-১৮০৮ খ্রিস্টাব্দে হ্যামিলটন বুকাননের বিবরণ থেকে এ জেলার আয়তন ৫৩৭৪ বর্গমাইল বলে জানা যায়। ১৮৭২ সালের লোকগণনা অনুযায়ী দিনাজপুরের লোকসংখ্যা ছিল ১৫০১৯২৪ জন। ১৯৮৪ সালে বর্তমান দিনাজপুর জেলার আধুনিক রূপান্তর ঘটে। দিনাজপুর জেলার বর্তমান মোট আয়তন ৩৪৪৪.৩০ বর্গ কিলোমিটার (১৩২৯.৮৫ বর্গমাইল), যার মধ্যে ৭৮.৮৭ বর্গ কিলোমিটার (৩০.৪৫ বর্গমাইল) বনভূমির আওতাধীন। উপজেলার সংখ্যা ১৩ টি, ইউনিয়ন ১০১ টি, মৌজা ১৯২৬ টি, গ্রাম ২১৩১ টি, পৌরসভা ০৮ টি, ওয়ার্ড ৭৫ টি এবং মহল্লার সংখ্যা ২৪৬টি। ২০০১ সালে এ জেলার জনসংখ্যা ছিল ২৭,৬৬,০০০ জন এবং ২০১১ সালে তা বৃদ্ধি পেয়ে ২৯৯০১২৮ জন হয়। বার্ষিক জনসংখ্যা বৃদ্ধির হার ১.২২।<sup>১</sup>

আবহমানকাল ধরে দিনাজপুর একটি কৃষি নির্ভর জেলা। এখানকার অর্থনীতি মূলত কৃষিভিত্তিক।

<sup>১</sup> গণপ্রজাতন্ত্রী বাংলাদেশ সরকার, আদমশুমারি ও গৃহগণনা ২০১১, বাংলাদেশ পরিসংখ্যান ব্যুরো (বিবিএস), পরিকল্পনা মন্ত্রণালয়, জুন ২০১২, পৃ. ১০-১৮।

কৃষিখাতকে এই জেলার অর্থনৈতিক কর্মকাণ্ডের প্রাণ বলা যায়। এর প্রায় পুরোটাই সমতল ভূমির অন্তর্ভুক্ত। অতীতে নদী সমৃদ্ধ দিনাজপুরের বহুবিধ ফল ও ফসলের মধ্যে ধানই ছিল প্রধান কৃষি পণ্য। মৌসুমি ফল গোপালভোগ আম ও বেদানা লিচু উৎপাদনের জন্য বিখ্যাত দিনাজপুর। যার জন্য দিনাজপুরকে রাজশাহী বিভাগের রত্নখনি বলা হত। এতদসত্ত্বেও, দিনাজপুরের সাধারণ মানুষের কৃষিনির্ভর অতীত অর্থনৈতিক, সামাজিক ও রাজনৈতিক সংগ্রামী জীবনের চিত্র কঠিন বাস্তবতায় পরিপূর্ণ। প্রাপ্ত বিভিন্ন তথ্য থেকে দিনাজপুরের ভূমি মালিকানার প্রকৃতি, চাষীদের আর্থ সামাজিক অবস্থা, চাষ ব্যবস্থা বা ভূমি বন্দোবস্তের স্বরূপ, খাজনা, কৃষকের ঋণগ্রস্ততা, দারিদ্র্য, বন্যা, খরা, দুর্ভিক্ষ, নিপীড়ন এবং তা থেকে মুক্তির জন্য দরিদ্র মানুষের আন্দোলন ও দীর্ঘ সংগ্রামের যে বিবরণ পাওয়া যায়— অর্থনৈতিক সমৃদ্ধির নিরিখে তা এককথায় হতাশাব্যঞ্জক ছিলো।

সম্রাট আকবরের রাজত্বকালে<sup>২</sup> দিনাজপুরে জমিদারের সংখ্যা বাড়ে। কারণ, যে রাজস্ব আদায়কারীরা নিজস্ব প্রভাব খাটিয়ে বিশেষ বিশেষ অঞ্চলের রাজস্ব আদায়ের দায়িত্ব নিয়েছিলেন, তারাই কালক্রমে সংশ্লিষ্ট অঞ্চলের ভূস্বামী বা প্রকৃত মালিকে পরিণত হন। বিশ শতকের প্রথম দিকে কেবল দিনাজপুরে জমিদারের সংখ্যা ছিল ৪৯ জন।<sup>৩</sup> জমিদার ও তালুকদার ছাড়া অন্যান্যরা ছিলেন মধ্যস্বত্বভোগী জোতদার, রায়ত, অধীনস্ত রায়ত, গাতিদার, পওনিদার, মণ্ডল, ইত্যাদি শ্রেণির অন্তর্ভুক্ত।

এদের মধ্যে বেশিরভাগই ছিলেন ডাক্তার, উকিল, শিক্ষক প্রভৃতি শ্রেণির মানুষ। নির্দিষ্ট আয়, নিরাপদ বিনিয়োগ এবং সামাজিক মর্যাদার জন্য তারা মূলত জমিদারি ক্রয় করতেন এবং তা দিয়ে নিজেদের ভাগ্য ফেরানোর চেষ্টা করতেন। এই শ্রেণির মানুষের সংখ্যা ছিলো নিতান্তই কম এবং তাদের অর্থনৈতিক অবস্থা ভালো ছিলো। তাদের অনেকেই উন্নত জীবনযাত্রায় অভ্যস্ত ছিলেন। অবস্থাসম্পন্ন গৃহস্থ বা জোতদার শ্রেণির মানুষের গোলাভরা ধান এবং পুকুরে মাছ ছিলো ঠিকই। তাঁদের জীবন ছিলো সুখের। ফসলের দামহ্রাস-বৃদ্ধির সাথে রায়ত শ্রেণির আর্থিক অবস্থার পরিবর্তন হতো। কিন্তু, অধিকাংশ জনগণ, যারা দরিদ্র ও সাধারণ মানুষের অন্তর্ভুক্ত ছিলেন তাদের অর্থনৈতিক অবস্থা ভালো ছিলো না। তাদের ভাগ্যের পরিবর্তনও ছিলো সুদূরপর্যায়ত।

কৃষিব্যবস্থার অন্যতম বৈশিষ্ট্য ছিলো বর্গাচাষ বা ভাগচাষ ব্যবস্থা। ভাগচাষ পদ্ধতিতে উৎপাদনের অর্ধেকই জোতদারকে পরিশোধের কারণে কৃষকেরা আর্থিকভাবে তেমন লাভবান হতেন না। কৃষির স্থায়ী উন্নয়নের জন্য ভূমির মালিক বা উপস্বত্বভোগীদের কেউই উৎসাহিত ছিলেন না। খাইখালাসী প্রথার মাধ্যমে নির্ধারিত সময়ের জন্য কৃষকেরা নিজের জমি ঋণদাতার কাছে বন্ধক রাখত। ঐ মেয়াদে ঋণদাতা জমির উপস্বত্ব ভোগ করার পর ঋণ পরিশোধ হলে কৃষক তার জমি ফেরত পেত। চাষীদের উপর জমিদার, মহাজনদের অত্যাচার ছিল দুর্বিসহ। জমিদাররা এক টাকা খাজনার সাথে আরও দুই টাকা অন্যান্য অর্থোজিক আদায় বুঝে নিতেন। সরকারি ভাষায় যা ‘আবওয়াব’ বলে পরিচিত ছিল। দিনাজপুরে কৃষকদের ভাষায় যাকে বলা হত ‘বাজনা’। তহরি, হিসাবানা, পার্বনী, পুন্যাহ খরচ, পস্তা, মারুচা (বিবাহকর), হাড়পুড়ালি, তলবাণি, দর্শনী বা নজরানা ইত্যাদি বিচিত্র নামে অতিরিক্ত অর্থ আদায় করা হত।<sup>৪</sup> যে কারণে খাজনার চেয়ে ‘বাজনা’ বেশি কথাটার প্রচলন দেখা যায় সর্বত্র। কোম্পানি আমলের রাজা দেবী সিং (কোম্পানি কর্তৃক নিযুক্ত) ইতিহাসের একজন অত্যাচারী, জঘন্য চরিত্রের শাসক ছিলেন।<sup>৫</sup> কৃষকের উপর যত সমস্ত অনাচার-অত্যাচার করা হত সেসবের বিরুদ্ধে কৃষক কোন আইনের আশ্রয় নিতে পারত না। অথচ,

<sup>২</sup> ১৫৫৬-১৬০৫ খ্রি। ১৫৭৬ থেকে ১৫৮০ সালের মধ্যে বাংলা সম্রাট আকবরের অধিকারে আসে।

<sup>৩</sup> ধনঞ্জয় রায়, বিশ শতকের দিনাজপুর মনস্তর ও কৃষক আন্দোলন (কলকাতা: পুনশ্চ, ডিসেম্বর ১৯৯৭), পৃ. ৯।

<sup>৪</sup> তদেব, পৃ. ১১।

<sup>৫</sup> মেহরাব আলী, দিনাজপুরের রাজনৈতিক আন্দোলনের ইতিহাস (দিনাজপুর, মে ১৯৬৫), পৃ. ১১-১২।

জমিদারের সকল কাজই ছিল আইনসঙ্গত। জমিদারদের অত্যাচারে নিঃশ্ব হয়ে প্রজাসাধারণ সুদিন মহাজনের স্মরণাপন্ন হতেন এবং মহাজনের ঋণের ফাঁদে পড়ে নিঃসম্বল হয়ে পড়তেন।

অতীতে জমিদার, সুদখোর মহাজনদের বিরুদ্ধে প্রজাদের যে কয়েকটি গণমুখী আন্দোলনের বর্ণনা পাওয়া যায়, সেগুলো হচ্ছে ছত্রিশ জাতি বা ছত্রিশ গ্রামের আন্দোলন (১৯২১-২৭), রাজবংশী কৃষকদের গাছক-টা আন্দোলন (১৯২৪-২৫), কর বন্ধ আন্দোলন (১৯২৭-২৮), চৌকিদারি ট্যাক্স বন্ধ আন্দোলন (১৯২৪-৩২) ইত্যাদি। এসব আন্দোলন, সংগ্রাম করতে গিয়ে কৃষকদেরকে জেল, জুলুম ও নির্যাতনের মুখোমুখি হতে হয়েছে, হারাতে হয়েছে অনেক কিছু। তবে, অত্যাচারীদের বিরুদ্ধে সহায় সম্বলহীন বিভিন্ন শ্রেণির মানুষের মধ্যে যে ঐক্য গড়ে উঠেছিল তাই তাঁদেরকে মুক্তির পথ দেখিয়েছে। দুর্ভিক্ষের ভয়াবহতা থেকে যে অভিজ্ঞতা অর্জিত হয়, তার ফলে কৃষকদের মধ্যে গণজাগরণের উন্মেষ ঘটে। অষ্টাদশ শতকের সন্ন্যাসী ফকির বিদ্রোহ, উনিশ শতকের সাঁওতাল বিদ্রোহ, নীল বিদ্রোহ, বিশ শতকের রায়ত বিদ্রোহ, তেভাগা আন্দোলন<sup>৬</sup> সুস্পষ্টরূপে অভাব, ক্ষুধা ও দারিদ্র্যের বিরুদ্ধে এ অঞ্চলের কৃষকদের সংগ্রামী চেতনার বহিঃপ্রকাশ ঘটায়।

মুঘলদের আমলে আকস্মিক মহামারী এবং পলাশীর পরে ছিয়াত্তরের ( বাংলা ১১৭৬ সালে, ১৭৬৯-১৭৭০ খ্রি.) মন্বন্তর এ অঞ্চলেও ভীষণ দুর্ভিক্ষ এবং গুরুতর অর্থনৈতিক বিপর্যয় ডেকে আনে। এ অঞ্চলের মানুষকে বিপদ থেকে উদ্ধার করার জন্য শাষকগোষ্ঠীর তেমন কোন কর্মসূচি গ্রহণ করতে দেখা যায় না। উপরন্তু, বাংলার রাজধানী মুর্শিদাবাদকে রক্ষা করার জন্য নবাব<sup>৭</sup> আদেশ জারি করেছিলেন যে, দিনাজপুরে যেটুকু চাল রয়েছে তা ক্রয় করে মুর্শিদাবাদে পাঠাতে হবে। মানুষের তৈরি সংকটের সাথে যোগ হতে দেখা যায় প্রাকৃতিক বিপর্যয়ের। দিনাজপুর জেলায় খরা, বন্যা ও ফসল নাশের মত ঘটনা এবং এর ফলে সৃষ্ট দূরবস্থার উদাহরণ বিরল নয়। ১৮৬৫ থেকে ১৯৪০ সাল পর্যন্ত দিনাজপুর অঞ্চলের মানুষকে অন্তত ০৭ বার খরা, ০৭ বার বন্যা ও ছোট বড় ০৪ টি দুর্ভিক্ষের মুখোমুখি হতে হয়।<sup>৮</sup> ১৯৪৩ (১৩৫০ বঙ্গাব্দ) খ্রিস্টাব্দের দুর্ভিক্ষ ছিলো সর্বাধিক ভয়াবহ। অমর্ত্য সেন, বি.এম. ভাটিয়া, পল.আর. গ্রিনো প্রমুখ মনে করেন যে, ১৯৪৩ সালের দুর্ভিক্ষের মূল কারণ ছিলো বাংলার কৃষক, কারিগর ও শ্রমজীবী মানুষের দীর্ঘকালের দারিদ্র্য এবং ক্রয়ক্ষমতার অভাব বা তার ক্রমাবলুপ্তি। জীবনধারণের জন্য যে ন্যূনতম আর্থিক সঙ্গতি থাকা দরকার, সাধারণ দরিদ্র মানুষের হাতে তা ছিল না। ১৯৭১ সালে স্বাধীনতার পর ১৯৭৪ সালে দেশব্যাপী যে দুর্ভিক্ষ এবং ১৯৮৮ সালে যে বন্যা হয়, দেশের অন্যান্য অঞ্চলের ন্যায় দিনাজপুরের মানুষের অর্থনৈতিক জীবনেও তার বিরূপ প্রভাব পড়ে।

## ২. অর্থনৈতিক উন্নয়ন ভাবনায় পরিবর্তন, অগ্রগতি ও অর্জন

তৎকালীন কৃষক সমাজের মুক্তির জন্য শের এ বাংলা এ কে ফজলুল হকের মন্ত্রিসভা বাংলার কৃষি অর্থনীতির সমস্যাগুলির স্থায়ী সমাধানের উদ্দেশ্যে কিছু গুরুত্বপূর্ণ পদক্ষেপ গ্রহণ করেন। ১৯৩৮ সালে ফ্রান্সিস ফ্লাউডের নেতৃত্বে একটি ল্যান্ড রেভেন্যু কমিশন গঠন করা হয়। ১৯৪০ সালে ২১ শে মার্চ কমিশন তাদের প্রতিবেদন পেশ করে। প্রতিবেদনে আটটি উল্লেখযোগ্য সুপারিশ ছিল। কৃষির উন্নতির জন্য এই প্রয়াস গুরুত্বপূর্ণ ছিল বটে, কিন্তু দীর্ঘদিনের সমস্যা জর্জরিত প্রজাসাধারণের ভাগ্য ফেরাতে তা যথেষ্ট ছিল না। দেশ বিভাগের পর ১৯৫০ সালে পূর্ব বাংলা জমিদারী উচ্ছেদ ও প্রজাস্বত্ব আইন পাশ এবং তা কার্যকর হলে ১৯৫৬ সাল থেকে জমিদারী স্বত্বের বিলুপ্তি ঘটে। এ সময়কাল থেকেই কৃষি উৎপাদনে ও ভূমি মালিকানায়ে যে পরিবর্তন তার সূচনা ঘটে বলা যায়। ঐতিহ্যগতভাবে কৃষি সমৃদ্ধ একটি জেলা

<sup>৬</sup> ড. মুহম্মদ মনিরুজ্জামান, দিনাজপুরের ইতিহাস (ঢাকা: গতিধারা, এপ্রিল ২০১০), পৃ. ৮৯।

<sup>৭</sup> নজম উদ্দৌলা, মীরজাফর পুত্র।

<sup>৮</sup> ধনঞ্জয় রায়, বিশ শতকের দিনাজপুর মন্বন্তর ও কৃষক আন্দোলন, পৃ. ১৭।

হিসাবে দিনাজপুর জেলা উত্তরাঞ্চলের শস্যভাণ্ডার বলে খ্যাতি লাভ করে। ১৯৬০ সালের কৃষি শুমারি প্রতিবেদনে দিনাজপুরকে একটি খাদ্য ঘাটতি মুক্ত এলাকা হিসেবে বর্ণনা করা হয়। ১৯৭১ খ্রিস্টাব্দে স্বাধীনতার পর থেকে কৃষিক্ষেত্রে উন্নত বীজ, সার, সেচ, কীটনাশকের ব্যবহার বৃদ্ধির কারণে কৃষিক্ষেত্রে শস্য বহুমুখীকরণ ও ব্যাপকতা বৃদ্ধি পাওয়ায় কৃষকের আয় বাড়তে থাকে। তাদের জীবনযাত্রার মান উন্নত হওয়ার ক্ষেত্রে কৃষির গুরুত্বপূর্ণ অবদান লক্ষণীয় হয়ে উঠে। বর্তমানে দিনাজপুর জেলা দেশের একটি অন্যতম খাদ্য উদ্বৃত্ত অঞ্চল। দিনাজপুর জেলার কৃষি বিষয়ক কিছু তথ্য টেবিল ১ এ উল্লেখ করা হলো।

টেবিল-১ : দিনাজপুর জেলার কৃষি বিষয়ক তথ্য (২০১৩-১৪)

ক্র: নং	বিষয়	পরিমাণ	শতকরা হার
১.	জেলার আয়তন	৩৪৩৭৯৮ হেক্টর	
২.	মোট আবাদি জমির পরিমাণ	২৮৫১০০ হেক্টর	৮২.৯২%
	(ক) এক ফসলি জমি	৬৯২০ হেক্টর	২.০৪%
	(খ) দুই ফসলি জমি	১৮৫২০০ হেক্টর	৬৫%
	(গ) তিন ফসলি জমি	৯১০৭০ হেক্টর	৩২%
৩.	(ঘ) তিনের অধিক ফসলি জমি	১৯১০ হেক্টর	০.৬০%
৪.	শস্য নিবিড়তার হার		২৩০%
	(ক) মোট পরিবারের সংখ্যা	৬৬২৬৭৭ টি	
	(খ) কৃষক পরিবারের সংখ্যা	৪৯৫৬৫০ টি	৭৫%
	(i) ভূমিহীন কৃষক পরিবারের সংখ্যা	১৩৪৬৭০ টি	২০.৪%
	(ii) প্রান্তিক কৃষক পরিবারের সংখ্যা	১২৫৩০০ টি	১৯%
	(iii) ক্ষুদ্র কৃষক পরিবারের সংখ্যা	১২২৬০০ টি	১৮.৫%
	(v) মাঝারি কৃষক পরিবারের সংখ্যা	৬৫৬২০ টি	১০%
	(vi) বড় কৃষক পরিবারের সংখ্যা	১৫৯৪৫ টি	২.৪%
	(vii) বর্গাচাষি কৃষক পরিবারের সংখ্যা	৩১৫১৫ টি	৪.৭%
	(গ) কৃষি বহির্ভূত পরিবারের সংখ্যা	১৬৭০২৭ টি	২৫%
৫.	মোট খাদ্যশস্য উৎপাদন	১৪৮৬৬৬৭ মে: টন	
৬.	বীজ ও অন্যান্য ব্যবহার বাদে প্রাপ্ত খাদ্যশস্য	১৩২৩১৩৪ মে: টন	
৭.	খাদ্য চাহিদা	৫১৪৮৪২ মে: টন	
৮.	উদ্বৃত্ত খাদ্যশস্য	৮০৮২৯২ মে: টন	

উৎসঃ শস্য উৎপাদন বিশেষজ্ঞ ও অতিরিক্ত উপ-পরিচালক (শস্য), কৃষি সম্প্রসারণ অধিদপ্তর, “দিনাজপুর জেলার কৃষি বিষয়ক তথ্যাদি”, খামারবাড়ি, দিনাজপুর, তারিখঃ ১৫ মে ২০১৪।

২০১৩-১৪ অর্থবছরে মোট খাদ্যশস্য উৎপাদিত হয়েছে ১৪৮৬৬৬৭ মেঃ টন, খাদ্য উদ্বৃত্তের পরিমাণ ৮০৮২৯২ মেঃ টন। ভূমিহীন, ক্ষুদ্র ও প্রান্তিক কৃষক পরিবারের সংখ্যা যথাক্রমে ২০.৪%, ১৮.৫% ও ১৯%। সময়ের পরিবর্তনের সাথে এ অঞ্চলের কৃষিখাতেও পরিবর্তন ঘটেছে। তিন ফসলি জমির পরিমাণ বেড়েছে যা প্রায় এক তৃতীয়াংশ। কৃষিক্ষেত্রে শস্য নিবিড়তার হার ক্রমান্বয়ে বৃদ্ধি পেয়েছে। ২০১৩-১৪ সময়কালে দিনাজপুরে শস্য নিবিড়তার হার ২৩০% উন্নীত হয়েছে। শস্যের বহুমুখীকরণ সম্ভব হয়েছে। আদিম চাষপদ্ধতির পরিবর্তে আধুনিক প্রযুক্তির ব্যবহার বেড়েছে। ফলে শস্য উৎপাদন বৃদ্ধি পেয়েছে। জীবন নির্বাহী চাষাবাদের স্থলে ক্রমান্বয়ে বাণিজ্যিক চাষাবাদের প্রসার ঘটছে।

সাধারণভাবে ধান, গম, আখ, পাট, আলু, শাকসবজি, রসুন, পিঁয়াজ, তৈলবীজ দিনাজপুরে উৎপাদিত ফসলের মধ্যে প্রধান ফসলাদি হলেও দিনাজপুরের কৃষি বর্তমানে ধান, আখ, ফলমূল ও গম চাষের মধ্যে সীমাবদ্ধ নেই। ভূট্টা, কলা, ডাল, কুল, ফুলকপি, বাঁধাকপি, টমেটো ইত্যাদির বাণিজ্যিক উৎপাদন লক্ষণীয়ভাবে বেড়েছে। ফলমূলের মধ্যে সুমিষ্ট বেদানা লিচু প্রধান। বোম্বাই, মাদ্রাজি, চায়না থ্রি জাতের

সুমিষ্ট লিচুও দিনাজপুরে প্রচুর পরিমাণে উৎপাদিত হয়। আমের মধ্যে মিসরিভোগ, গোপালভোগ ও সূর্যাপুরির নাম উল্লেখযোগ্য। ফলমূলের আধুনিক চাষাবাদের প্রসার ঘটছে, বাণিজ্যিকভাবে তৈরি হচ্ছে আম, লিচু, কুল ও কলার বাগান। সুগন্ধি কাটারীভোগ চাল ও কাটারীভোগ চিড়া দেশের বাহিরে বিদেশেও দিনাজপুরের সুনাম বৃদ্ধি করেছে। স্বর্ণালি রঙের বিখ্যাত কাটারীভোগ ধানসহ এ অঞ্চলে নানান জাতের ধান উৎপাদিত হয়। যেমন- জিরা কাটারী (চিনি গুড়া), ফিলিপিন কাটারী, বাদশা ভোগ, কালোজিরা, চিনি কাটারী ইত্যাদি।

১৯৭১ এর পর কৃষি উন্নয়নে বিভিন্ন সময়ে গৃহীত সরকারের নানামুখী উদ্যোগ ও কার্যক্রম বাস্তবায়নের ফলে কৃষির ব্যাপক পরিবর্তন ও উন্নয়ন সাধিত হয়েছে। দিনাজপুরের কোন কোন উপজেলায় আন্তঃশস্য উৎপাদন এবং সমন্বিত খামার ব্যবস্থাপনার মাধ্যমে উৎপাদন শুরু হওয়ায় কৃষিতে বৈচিত্র্য লক্ষ করা যাচ্ছে। বর্তমানে হাঁস-মুরগি এবং গবাদিপশু পালন, এমনকি দুগ্ধ উৎপাদনে বেশ কিছু বাণিজ্যিক খামারও গড়ে উঠেছে। গ্রামীণ অর্থনীতিতে কাঠামোগত পরিবর্তন সাধিত হচ্ছে। কৃষি কাজ ছাড়াও অকৃষি খাতে মানুষের কর্মসংস্থানের সুযোগ সৃষ্টি হয়েছে। গ্রামের মানুষের আয় বৈষম্য কমেছে। কৃষি মজুরি বৃদ্ধি পেয়েছে। প্রত্যেক মানুষের হাতে কিছু না কিছু ক্রয়ক্ষমতা বিদ্যমান। ফলে বিশেষ কঠিন কোন দৈব দুর্বিপাকে আক্রান্ত হওয়া ব্যতীত না খেয়ে মানুষের মৃত্যবরণ করার মত পরিস্থিতি আর নেই।

### শিল্প ও খনিজ সম্পদের উন্নয়ন

দিনাজপুর জেলার জনমানুষের জীবিকার উৎস প্রধানত কৃষি। স্বাধীনতার পূর্বে সেতাবগঞ্জ চিনিকল ছাড়া দিনাজপুর অঞ্চলে তেমন কোন বড় শিল্প কারখানা গড়ে উঠতে দেখা যায় না। দিনাজপুরের হাজী আব্দুর রউফ ১৯৪২ সালে কলকাতা থেকে ফিরে দিনাজপুরে বেঙ্গল টেকনোকেমিক্যাল ওয়ার্কস নামে একটি ঔষধ কারখানা স্থাপন করেন।<sup>১০</sup> স্বাধীনতার পর সরকারি উদ্যোগে দিনাজপুর টেক্সটাইল মিল স্থাপিত হয়। ২০০৮ সাল থেকে মিলটির উৎপাদন বন্ধ হয়ে যায়। দেশের অন্যান্য অঞ্চলের তুলনায় দিনাজপুর অঞ্চলে শিল্পখাতের বিকাশ তেমন হয়নি। ধানের সহজলভ্যতা ও সস্তা শ্রমের পর্যাণ্ড যোগানের কারণে এখানে চালকলের সংখ্যা বেড়েছে। গ্রামাঞ্চলের হাটবাজারগুলোতে কৃষিভিত্তিক ব্যবসা বাণিজ্যের প্রাধান্য রয়ে গেছে। শহরাঞ্চলে শিল্প বলতে অন্য যা কিছু হয়েছে সেগুলোকে ক্ষুদ্র ও মাঝারি শিল্প বলা যায়। বর্তমানে কৃষিভিত্তিক কিছু শিল্প কারখানা চালু হতে দেখা যাচ্ছে। আলু সংরক্ষণের জন্য কয়েকটি হিমাগার স্থাপিত হলেও তা প্রয়োজনের তুলনায় অপ্রতুল। অনেকসময় এ অঞ্চলে কৃষিভিত্তিক শিল্প বলতে অটো রাইস মিল, ফ্লাওয়ার মিল ইত্যাদিকে বুঝান হয়। নিম্নে দিনাজপুরের শিল্প কারখানার একটি তালিকা প্রদান করা হলো।

টেবিল ২ : দিনাজপুর জেলার শিল্প ও কারখানার তালিকা

বড় শিল্প ও কারখানা	
তাপ বিদ্যুৎ কেন্দ্র	১টি
লোকমোটর কারখানা	১টি (পার্বতীপুর)
চিনিকল	১টি (সেতাবগঞ্জ সুগার মিলস লিঃ)
টেক্সটাইল মিল	১টি
মাঝারি ও ক্ষুদ্র শিল্প কারখানা	
অটোমেটিক চাউল কল	৬১টি
সেমি অটোমেটিক চাউল কল	৩৫টি
চাতাল চাউল কল	১৮৬১টি

<sup>১০</sup> মেহরাব আলী, *দিনাজপুরের ইতিহাস সমগ্র-৫* (দিনাজপুরের ইতিহাস প্রকাশনা প্রকল্প-দিনাজপুর, বাংলাদেশ, ২০০২), পৃ. ১৫৮-১৫৯।

মেজর চাউল কল	১২টি
অটোমেটিক ফ্লাওয়ার মিল	৬টি
হিমাগার	১৩টি
জুট মিল	১টি
গার্মেন্টস	১টি
মিশ্র সার ফ্যাক্টরি	১টি
পোলট্রি হ্যাচারী	৪টি

উৎস: dcdinajpur.gov.bd, Government Website (accessed on 21.06.2014).

উপরের ২ নম্বর টেবিলে দেখা যাচ্ছে যে, দিনাজপুরে ০১ টি তাপবিদ্যুৎ কেন্দ্র, ০১ টি লোকমোটর কারখানা, ০১ টি টেক্সটাইল মিল, ০১ টি গার্মেন্টস এবং ০১ টি মিশ্র সার ফ্যাক্টরি ছাড়া বাকি সব শিল্প কারখানা কৃষি নির্ভর। দিনাজপুরের কৃষি নির্ভরতা থেকে ম্যানুফেকচারিং শিল্প ও সেবা শিল্প নির্ভর অর্থনীতিতে উত্তরণ অপরিহার্য। এজন্য প্রয়োজন পর্যাপ্ত বিদ্যুৎ ও বাণিজ্যিক জ্বালানী সরবরাহের নিশ্চয়তা। যৌক্তিক মূল্যে নির্ভরযোগ্য বাণিজ্যিক জ্বালানী পেতে হলে দিনাজপুরে কয়লার সর্বোচ্চ উত্তোলন ও ব্যবহার নিশ্চিত করার মাধ্যমে তা করা সম্ভব। নিচের ৩ নম্বর টেবিলে দিনাজপুরের প্রাকৃতিক সম্পদের বিবরণ লক্ষণীয়।

টেবিল ৩ : প্রাকৃতিক সম্পদ

শিরোনাম	অবস্থান	খনি আবিষ্কার	খনি এলাকার আয়তন	বাণিজ্যিক উৎপাদন শুরু	উত্তোলনযোগ্য মজুদ	উৎপাদন লক্ষ্যমাত্রা প্রতিদিন
বড়পুকুরিয়া কোল মাইনিং কোম্পানী লিমিটেড (বিসিএমসিএল)	পার্বতীপুর উপজেলা	১৯৮৫ খ্রি.	০৩ বর্গ কি: মি:	২০০৫ খ্রি.	৬৪ মিলিয়ন মে:টন	৩৩০০ মে:টন
মধ্যপাড়া গ্রানাইট মাইনিং কোম্পানী লিমিটেড (এমজিএমসিএল)	পার্বতীপুর উপজেলা	১৯৭৪ খ্রি.	১.২০ বর্গ কি: মি:	২০০৭ খ্রি.	১৭৪ মিলিয়ন মে:টন	৫৫০০ মে:টন

উৎস: dcdinajpur.gov.bd, Government Website (accessed on 21.06.2014).

### ব্যবসা-বাণিজ্য ও সেবাখাতের উন্নয়ন

দিনাজপুরবাসীর কৃষিনির্ভর মনোভাবের পরিচয় প্রায় সর্বজনবিদিত এবং তা এই অঞ্চলের ইতিহাসেও নানাভাবে বিধৃত রয়েছে। কৃষিকেন্দ্রিক উৎপাদন ভাবনার কারণে পূর্বে এ অঞ্চলে স্থানীয়ভাবে একটি বণিক গোষ্ঠী ও শিল্প উদ্যোক্তা শ্রেণি গড়ে উঠেনি। ব্যবসা-বাণিজ্য ক্ষেত্রে স্থানীয় জনসাধারণের উৎসাহ বৃদ্ধির বিষয়টি খুব বেশি দিন আগের কথা নয়। দেশবিভাগের পরিবর্তী সময়ে স্থানীয় অধিবাসীদের ব্যবসা-বাণিজ্যে উৎসাহ ও অংশগ্রহণ ক্রমশ: বৃদ্ধি পেতে থাকে।

১৮৫৭ এর সিপাহী বিদ্রোহের পর থেকে এ অঞ্চলে মাড়োয়ারী বণিকদের আগমন ঘটতে থাকে। বলা যায় যে, প্রায় দেশ বিভাগকাল পর্যন্ত ব্যবসা-বাণিজ্য ক্ষেত্রে মাড়োয়ারীদেরই আধিপত্য ছিল। কিন্তু তাদের ব্যবসা-বাণিজ্য ছিল মুনাফা কেন্দ্রিক যা তাদেরকে কেবল একটি উদ্বৃত্তভোগী শ্রেণিতে পরিণত করেছিল। সে সময়ে ব্যবসা-বাণিজ্যের মাধ্যমে তারা যে অর্থ উপার্জন করেছিল তা স্থানীয় উন্নয়নে বিনিয়োগ করা হয়নি। তাদের ব্যবসায়িক শোষণ ও সম্পদ আহরণ এতদঞ্চলের আপামর জনসাধারণের জীবনমানের উন্নতির উপর প্রভাব ফেলেনি।<sup>১০</sup> দেশবিভাগ পরবর্তীকালে কয়েকটি হিন্দু ব্যবসায়ী পরিবার

<sup>১০</sup> তদেব, পৃ. ১৪৮-৪৯।

এবং মুসলমান ব্যবসায়ীদের উদ্যোগে ক্রমশ: হোটেল ব্যবসা, ঔষধের দোকান, মুদিখানা, প্রেক্ষাগৃহ, ছাপাখানা, ঠিকাদারি ব্যবসাসহ নানা ক্ষেত্রে স্থানীয় অধিবাসীদের উৎসাহ ও অংশগ্রহণ বাড়তে থাকে। কালক্রমে এ প্রক্রিয়া প্রসার লাভ করায় দিনাজপুরবাসীর কৃষিকেন্দ্রিক মানসিকতা থেকে বেরিয়ে আসার ক্ষেত্র তৈরি হয় এবং ধীরে ধীরে তা পেশাগত পরিবর্তনের গतिकে সচল করে দেয়।

বাংলাদেশের স্বাধীনতার পর দিনাজপুর অঞ্চলে ব্যবসা-বাণিজ্যে গতিশীলতা সৃষ্টির লক্ষ্যে ১৯৭৫ সালে দিনাজপুর চেম্বার অব কমার্স এন্ড ইন্ডাস্ট্রিজের আনুষ্ঠানিক যাত্রা শুরু হয়। বর্তমানে এই অঞ্চলের বিভিন্ন ব্যবসায়ী, শিল্প উদ্যোক্তা, শিল্পপতি, আমাদানি ও রপ্তানিকারকদেরকে বিভিন্নভাবে প্রতিষ্ঠানটি সাহায্যসহযোগিতা করে আসছে। প্রথমে দিনাজপুর চেম্বার অব কমার্স এন্ড ইন্ডাস্ট্রিজের কর্মকাণ্ড দিনাজপুর ইনস্টিটিউটের একটি ভাড়া করা ঘরে পরিচালিত হতো। পরবর্তীতে এই অঞ্চলের ব্যবসায়ী, শিল্পো উদ্যোক্তা, শিল্পপতি, আমাদানি ও রপ্তানিকারক প্রমুখের সহযোগিতায় মালদহপট্টি (গরুহাট্টি) এলাকায় ৭.৬২ শতক জমি ক্রয় করে ৪র্থ তলা বিশিষ্ট আধুনিক মানের চেম্বার ভবন নির্মিত হয়েছে। স্বাধীনতা পূর্ব সময়ে এই অঞ্চলে ব্যবসা-বাণিজ্যের উল্লেখযোগ্য তেমন কোন উন্নয়ন সাধিত হয়নি। তবে স্বাধীনতাত্তোরকালে এই জনপদে কৃষিভিত্তিক ব্যবসা-বাণিজ্যের প্রসার ঘটে। মানুষের ক্রমবর্ধমান চাহিদার প্রেক্ষিতে শহরাঞ্চলে বিভিন্ন শিল্পপণ্যের বেশ কিছু ব্যবসা প্রতিষ্ঠান গড়ে উঠেছে। বর্তমানে দিনাজপুরের রপ্তানি দ্রব্যের মধ্যে ধান, চাল, গম, আখ, আম, লিচু, কাঠাল, ভুট্টা, টমেটো ইত্যাদির নাম উল্লেখযোগ্য।

দিনাজপুর জেলায় হাটবাজার, ব্যাংক, বীমা, আর্থিক প্রতিষ্ঠান, এনজিওসহ বিভিন্ন সেবামুখী প্রতিষ্ঠানের বিস্তার লক্ষ্য করার মত। বর্তমানে দিনাজপুরে হাটবাজারের সংখ্যা ২৭৩ টি, শাখাসহ বিভিন্ন ব্যাংকিং প্রতিষ্ঠানের সংখ্যা ১৬৮ টি, তালিকাভুক্ত এনজিওর সংখ্যা ৭৬ টি এবং স্থলবন্দরের সংখ্যা ০২ টি (হিলি-হাকিমপুর ও বিরল)। বেচা-কেনা ও লেনদেনের ক্ষেত্রে সুযোগ-সুবিধা সৃষ্টির মাধ্যমে এসকল প্রতিষ্ঠান জনগণের আর্থ-সামাজিক উন্নয়নে গুরুত্বপূর্ণ ভূমিকা রাখছে।

### কৃষি, এসএমই, দরিদ্র্য বিমোচন খাতে বিতরণকৃত ঋণ

দেশের অন্যান্য অঞ্চলের ন্যায় দিনাজপুর জেলার কৃষি ঋণের প্রতিষ্ঠানিক উৎসের মধ্যে রয়েছে স্থানীয় সরকারি, বেসরকারি ব্যাংকসমূহ। বিশেষায়িত ব্যাংক হিসাবে রাজশাহী কৃষি উন্নয়ন ব্যাংকের (রাকাবের) বিভিন্ন শাখা কৃষকদের মাঝে বিভিন্ন মেয়াদি ঋণ বিতরণ করে থাকে। অপ্রাতিষ্ঠানিক উৎস থেকেও কৃষকেরা ঋণ গ্রহণ করেন। আত্মীয়-স্বজন, বন্ধু-বান্ধব, স্থানীয় ধনী কৃষক, ব্যবসায়ী এবং গ্রাম্য মহাজন অপ্রাতিষ্ঠানিক ঋণের প্রধান উৎস। এই ধরনের ঋণের সুদ বেশি। অভাবে পড়ে বাধ্য হয়ে কৃষকেরা অনেক সময় মাঠের ফসলের উপর আগাম ঋণ নিয়ে অত্যন্ত চড়া সুদে তা পরিশোধ করেন। তবে আপেক্ষিকভাবে পূর্বের তুলনায় ক্রমান্বয়ে অপ্রাতিষ্ঠানিক ঋণের পরিমাণ কমে গিয়ে তার স্থলে প্রাতিষ্ঠানিক ঋণের পরিমাণ বৃদ্ধি পেয়েছে। ব্যাংক ব্যবস্থার প্রসার, জনগণের সচেতনতা এবং বিশেষ ক্ষেত্রে ক্ষুদ্র ঋণের প্রাপ্যতা বৃদ্ধি এর অন্যতম কারণ।

কৃষি বহুমুখীকরণের ফলে নতুন নতুন শস্যের উৎপাদনে কৃষিঋণের প্রবাহ বেড়েছে। কৃষির বিভিন্ন উপখাতে যেমন-মৎস্য চাষ, পশুপালন প্রভৃতি ক্ষেত্রে প্রাতিষ্ঠানিক ঋণ বিতরণের ফলে ঋণের বাণিজ্যিক ব্যবহার বৃদ্ধি পেয়েছে। দিনাজপুর জেলায় শস্য, কৃষিভিত্তিক শিল্প, ক্ষুদ্র ও মাঝারি শিল্প (এসএমই), দারিদ্র্য বিমোচন খাতে বিতরণকৃত ব্যাংকঋণের বিবরণ টেবিল ৪ এ প্রদান করা হলো।

টেবিল ৪ : দিনাজপুর জেলায় সরকারি, বেসরকারি বাণিজ্যিক ব্যাংক, বিশেষায়িত ব্যাংকের গত ০৫ (পাঁচ) বছরে বিতরণকৃত কৃষি ঋণের তথ্য

(লক্ষ টাকায়)

ক্র. নং	বিতরণের খাত	২০১০	২০১১	২০১২	২০১৩	২০১৪	মন্তব্য
১.	শস্য ঋণ	১১৫৩১.৫৩	১৮৫৭৩.২৪	২১৮০১.৬৩	২২০৭৮.৪৯	২১৭৩২.২৮	সকল ব্যাংকের
২.	মৎস্য	১২৭.১৫	১৫৫.২০	৩৬৩.৮৪	৪৪৬.৪৪	৫৫১.৯৮	সকল ব্যাংকের
৩.	পশুসম্পদ	৪২০.১২	৪৬৭.১২	৮৮০.৮০	১৪৫২.২৬	১২৮৫.৮২	সকল ব্যাংকের
৪.	কৃষি ও সেচ যন্ত্রপাতি	১৫৭.১৬	১৭৪.৭১	৫১.২১	৮৭.২৭	৩৪.৯৭	শুধু রাকাবের।
৫.	কৃষিভিত্তিক শিল্প	১৬৯৪.৫০	১৮৭০.০০	২০৭৫.৮৮	২৫১০.৩৬	১৬৮০.০০	সোনালী ও রাকাবের
৬.	এসএমই	৩৫৬৩.৯০	১৪৪২.৮৭	১৭৬৫.৩১	২২০৬.০৯	১১২৮.৩৪	সোনালী ও রাকাবের
৭.	চলতি/নগদ পুঁজি	৪৮৫১.১৫	৩৭০৩.৭৬	৪১৩৩.৭৭	৪৭৫৪.৩৫	৭২৯২.৫৭	সোনালী ও রাকাবের
৮.	দারিদ্র্য বিমোচন	-	১২১.১২	৩২৫.১৬	৪৫৪.৮০	১০৫.৪৮	সকল ব্যাংকের
৯.	অন্যান্য	১৬২৮.৫৬	১৫৯৬.০৫	১৬৩১.০৯	১৮১৯.৪৩	২২৬২.০৩	সোনালী ও রাকাবের
	মোট	২৩৯৭৪.০৭	২৮১০৪.০৭	৩৩০২৮.৬৯	৩৫৮০৯.৪৯	৩৬০৭৩.৪৭	

উৎসঃ ১. সোনালী ব্যাংক লিমিটেড, প্রধান কার্যালয়, দিনাজপুর, তারিখঃ ৩১.০৭.২০১৪।

২. রাজশাহী কৃষি উন্নয়ন ব্যাংক (রাকাব), জোনাল কার্যালয়, (উত্তর ও দক্ষিণ জোন), দিনাজপুর. ০৭.০৭.২০১৪।

উপরের টেবিলে দেখা যায় যে, দিনাজপুর জেলায় সকল ব্যাংকের বিতরণকৃত শস্য ঋণের পরিমাণ ২০১০ সালে ১১৫৩১.৫৩ লক্ষ টাকা ছিল। ২০১৩ সালে তা বৃদ্ধি পেয়ে ২২০৭৮.৪৯ লক্ষ টাকা হয়েছে। মৎস্য খাতে বিতরণকৃত ঋণের পরিমাণ ২০১০ সালে ১২৭.১৫ লক্ষ টাকা থেকে ২০১৪ সালে ৫৫১.৯৮ লক্ষ টাকায় বৃদ্ধি পেয়েছে। পশুসম্পদ খাতে বিতরণকৃত ঋণের পরিমাণও বৃদ্ধি পেয়েছে। ২০১৩ সালে এই খাতে বিতরণকৃত ঋণের পরিমাণ ১৪৫২.২৬ লক্ষ টাকা, ২০১০ সালে যার পরিমাণ ৪২০.১২ লক্ষ টাকা ছিল। কৃষি ও সেচ যন্ত্রপাতি খাতে ২০১০ সালে শুধু রাকাবের বিতরণকৃত ঋণের পরিমাণ ছিল ১৫৭.১৬ লক্ষ টাকা। ২০১৩ সালে কৃষিভিত্তিক শিল্পে বিতরণকৃত ঋণের পরিমাণ দাঁড়ায় ২৫১০.৩৬ লক্ষ টাকা। ২০১৩ সালে এসএমই খাতে সোনালী ব্যাংক লিঃ এবং রাকাবের বিতরণকৃত ঋণের পরিমাণ ছিল ২২০৬.০৯ লক্ষ টাকা। চলতি পুঁজি খাতে ২০১৩ সালে সোনালী ব্যাংক লিঃ এবং রাকাব ৪৭৫৪.৩৫ লক্ষ টাকা ঋণ বিতরণ করে। দারিদ্র্য বিমোচন খাতে সকল ব্যাংকের বিতরণকৃত ঋণের পরিমাণ ২০১১ সালে ১২১.১২ লক্ষ টাকা ছিল। এই খাতে ঋণের পরিমাণ বৃদ্ধি পেয়ে ২০১৩ সালে ৪৫৪.৮০ লক্ষ টাকা হয়েছে। দিনাজপুর জেলার অর্থনৈতিক উন্নয়নে বর্ণিত খাতসমূহে বিতরণকৃত ঋণ বিনিয়োগযোগ্য তহবিলের অভাব অনেকটাই পূরণ করেছে। ফলে কৃষি, ক্ষুদ্র ও মাঝারি শিল্পের উন্নয়ন ও দারিদ্র্য বিমোচনের ক্ষেত্রে দিনাজপুর জেলার অগ্রগতি সাধিত হয়েছে।

### কৃষি, শিল্প, সেবাখাতে নিয়োজিত জনসম্পদ

অতীতে দিনাজপুরের অর্থনীতি ছিলো মূলত কৃষিনির্ভর। শিল্প ও সেবাখাতে নিয়োজিত মানুষের সংখ্যা ছিলো নগণ্য। কালক্রমে আর্থ-সামাজিক অবস্থার পরিবর্তনের ফলে কৃষিনির্ভর মানুষের সংখ্যা



তুলনামূলকভাবে হ্রাস পেয়েছে। কিছু মানুষ শিল্প ও সেবাখাতে কর্মসংস্থানের সুযোগ পেয়েছে। নিম্নে দিনাজপুর জেলা ও এর অন্তর্ভুক্ত উপজেলাসমূহে কর্মে নিয়োজিত সাত বছর ও তদূর্ধ্ব বয়সের জনসংখ্যার খাতভিত্তিক পরিসংখ্যান তুলে ধরা হলো।

দিনাজপুর জেলা ও জেলার অন্তর্ভুক্ত উপজেলাসমূহে কর্মে নিয়োজিত সাত বছর ও তদূর্ধ্ব বয়সের (যারা স্কুলে যায় না) জনসংখ্যার

টেবিল ৫ : খাতভিত্তিক বিভাজন

জেলা ও উপজেলার বিবরণ	কর্মে নিয়োজিত সাত বছর ও তদূর্ধ্ব বয়সের জনসংখ্যা (যারা স্কুলে যায় না)			কর্মক্ষেত্র									
	মোট	পুরুষ	মহিলা	কৃষি			শিল্প			সেবা			
				মোট	পুরুষ	মহিলা	মোট	পুরুষ	মহিলা	মোট	পুরুষ	মহিলা	
১	২	৩	৪	৫	৬	৭	৮	৯	১০	১১	১২	১৩	
দিনাজপুর জেলা													
মোট	৩৩১৬৩৬	৩০২৫১১	২৯১২৫	২৪৬৮৭০	২৩২৭৬০	১৪১১০	১২৩৩৩	১০৫১৩	১৮২০	৭২৪৩৩	৫৯২৩৮	১৩১৯৫	
%	১০০%	৯১.২২	৮.৭৮	৭৪.৪৪	৭০.১৯	৪.২৫	৩.৭২	৩.১৭	০.৫৫	২১.৮৪	১৭.৮৬	৩.৯৮	
বিরামপুর উপজেলা													
মোট	১৯৭৭২	১৮৪২৭	১৩৪৫	১৫০৬১	১৪৫০৪	৫৫৭	৪৯১	৪১২	৭৯	৪২২০	৩৫১১	৭০৯	
%	১০০%	৯৩.২০	৬.৮০	৭৬.১৭	৭৩.৩৬	২.৮২	২.৪৮	২.০৮	০.৪০	২১.৩৪	১৭.৭৬	৩.৫৯	
বিরগঞ্জ উপজেলা													
মোট	৩৮০৭২	৩৫০৭৯	২৯৯৩	৩০৫২৭	২৮৮২৩	১৭০৪	৮৯৯	৮০৪	৯৫	৬৬৪৬	৫৪৫২	১১৯৪	
%	১০০%	৯২.১৪	৭.৮৬	৮০.১৮	৭৫.৭১	৪.৪৮	২.৩৬	২.১১	০.২৫	১৭.৪৬	১৪.৩২	৩.১৪	
বিরল উপজেলা													
মোট	৩০৫৪৬	২৮৩৫৫	২১৯১	২৪০১৭	২২৪৩৬	১৫৮১	৯০০	৮৪০	৬০	৫৬২৯	৫০৭৯	৫৫০	
%	১০০%	৯২.৮৩	৭.১৭	৭৮.৬৩	৭৩.৪৫	৫.১৮	২.৯৫	২.৭৫	০.২০	১৮.৪৩	১৬.৬৩	১.৮০	
বোচাগঞ্জ উপজেলা													
মোট	১৭৭৩৭	১৫০০০	২৭৩৭	১৪১৪৫	১২২৬৪	১৮৮১	৯৫২	৭২৮	২২৪	২৬৪০	২০০৮	৬৩২	
%	১০০%	৮৪.৫৭	১৫.৪৩	৭৯.৭৫	৬৯.১৪	১০.৬০	৫.৩৭	৪.১০	১.২৬	১৪.৮৮	১১.৩২	৩.৫৬	
চিরিবন্দর উপজেলা													
মোট	৩১৩৮৮	২৯১১০	২২৭৮	২৪৩৯৫	২৩১২১	১২৭৪	৯২৪	৭৬৬	১৫৮	৬০৬৯	৫২২৩	৮৪৬	
%	১০০%	৯২.৭৪	৭.২৬	৭৭.৭২	৭৩.৬৬	৪.০৬	২.৯৪	২.৪৪	০.৫০	১৯.৩৪	১৬.৬৪	২.৭০	
ফুলবাড়ি উপজেলা													
মোট	১৯৬৫২	১৭৯৬৯	১৬৮৩	১৪২৩৫	১৩৫৩৫	৭০০	৮৪৪	৬৯৬	১৪৮	৪৫৭৩	৩৭৩৮	৮৩৫	
%	১০০%	৯১.৪৪	৮.৫৬	৭২.৪৪	৬৮.৮৭	৩.৫৬	৪.২৯	৩.৫৪	০.৭৫	২৩.২৭	১৯.০২	৪.২৫	
ঘোড়াঘাট উপজেলা													
মোট	১৬০৪৯	১৪৬৩১	১৪১৮	১৩০০৯	১২১৩৭	৮৭২	৪৯৫	৪৫৪	৪১	২৫৫৫	২০৪০	৫০৫	
%	১০০%	৯১.১৬	৮.৮৪	৮১.০৬	৭৫.৬২	৫.৪৩	৩.০৮	২.৮৩	০.২৬	১৫.৮৬	১২.৭১	৩.১৫	
হাকিমপুর উপজেলা													
মোট	৮৬১৪	৭৭৫০	৮৬৪	৬২০৯	৫৮৫৮	৩৫১	২৪৫	২২৩	২২	২১৬০	১৬৬৯	৪৯১	
%	১০০%	৮৯.৯৭	১০.০৩	৭২.০৮	৬৮.০১	৪.০৭	২.৮৪	২.৫৯	০.২৬	২৫.০৮	১৯.৩৮	৫.৭০	
কাহারোল উপজেলা													
মোট	১৭৮৪১	১৬১৫০	১৬৯১	১৪০৭৫	১২৯৬৭	১১০৮	৭৩০	৬২৮	১০২	৩০৩৬	২৫৫৫	৪৮১	
%	১০০%	৯০.৫২	৯.৪৮	৭৮.৮৯	৭২.৬৮	৬.২১	৪.০৯	৩.৫২	০.৫৭	১৭.০২	১৪.৩২	২.৭০	
খানসামা উপজেলা													
মোট	২০৫৩১	১৯২৭০	১২৬১	১৭২৩২	১৬৪০৭	৮২৫	৬১৮	৫৬৬	৫২	২৬৮১	২২৯৭	৩৮৪	
%	১০০%	৯৩.৮৬	৬.১৪	৮৩.৯৩	৭৯.৯১	৪.০২	৩.০১	২.৭৬	০.২৫	১৩.০৬	১১.১৯	১.৮৭	

দিনাজপুর সদর উপজেলা মোট	৪০২৩২	৩৪০১৯	৬২১৩	১৬৮৭৭	১৫৮০০	১০৭৭	২৭৯৬	২২৬০	৫৩৬	২০৫৫৯	১৫৯৫৯	৪৬০০
%	১০০%	৮৪.৫৬	১৫.৪৪	৪১.৯৫	৩৯.২৭	২.৬৮	৬.৯৫	৫.৬২	১.৩৩	৫১.১০	৩৯.৬৭	১১.৪৩
নবাবগঞ্জ উপজেলা মোট	৩০৭৭৪	২৯০০৩	১৭৭১	২৬২৯৪	২৫১৫৬	১১৩৮	১১৯২	১০৭৬	১১৬	৩২৮৮	২৭৭১	৫১৭
%	১০০%	৯৪.২৫	৫.৭৫	৮৫.৪৪	৮১.৭৪	৩.৭০	৩.৮৭	৩.৫০	০.৩৮	১০.৬৮	৯.০০	১.৬৮
পাবতীপুর উপজেলা মোট	৪০৪২৮	৩৭৭৪৮	২৬৮০	৩০৭৯৪	২৯৭৫২	১০৪২	১২৪৭	১০৬০	১৮৭	৮৩৮৭	৬৯৩৬	১৪৫১
%	১০০%	৯৩.৩৭	৬.৬৩	৭৬.১৭	৭৩.৫৯	২.৫৮	৩.০৮	২.৬২	০.৪৬	২০.৭৫	১৭.১৬	৩.৫৯

উৎস : গণপ্রজাতন্ত্রী বাংলাদেশ সরকার, আদমশুমারি ও গৃহগণনা ২০১১, বাংলাদেশ পরিসংখ্যান ব্যুরো (বিবিএস), পরিকল্পনা মন্ত্রণালয়, জুন ২০১২, টেবিল সি-১১: পৃ. ১-৯৮।

দিনাজপুর জেলার কৃষি, শিল্প ও সেবাখাতের বিভিন্ন কর্মে নিয়োজিত সাত বছর ও তদূর্ধ্ব বয়সের মোট জনসংখ্যা ৩৩১৬৩৬ জন। এর মধ্যে পুরুষ ৩০২৫১১ জন এবং মহিলা ২৯১২২৫ জন। কৃষিতে নিয়োজিত জনসংখ্যার মোট পরিমাণ ২৪৬৮৭০ জন, শিল্পে ১২৩৩৩ জন এবং সেবাখাতে ৭২৪৩৩ জন। কৃষিখাতে উল্লিখিত মোট জনসংখ্যার ৭৪.৪৪%, শিল্পে ৩.৭২% এবং সেবাখাতে ২১.৮৪% লোক কাজ করে। শহরাঞ্চলে কৃষিতে নিয়োজিত জনসংখ্যা কর্মে নিয়োজিত মোট জনসংখ্যার ২৪.৯৬%, শিল্পে অন্যান্য এলাকার তুলনায় সবচেয়ে বেশি ৮.৬১% এবং সেবায় ৬৬.৪৩% লোক নিয়োজিত রয়েছে। এই ৬৬.৪৩% এর মধ্যে পুরুষ ৫০.১৯% এবং নারী ১৬.২৪%। গ্রামাঞ্চলে শিল্প ও সেবাখাতে নিয়োজিত জনসংখ্যার পরিমাণ তুলনামূলকভাবে কম। দিনাজপুর সদর উপজেলায় কৃষিতে সবচেয়ে কম ৪১.৯৫%, শিল্পে ৬.৯৫% এবং সেবাখাতে তুলনামূলকভাবে সবচেয়ে বেশি, ৫১.১০% মানুষ কাজ করে। এই ৫১.১০% এর মধ্যে ৩৯.৬৭% পুরুষ এবং ১১.৪৩% মহিলা। উল্লেখ্য যে, শহর অঞ্চলে সেবাখাতে মহিলাদের অংশগ্রহণের হার বেশি, ১৬.২৪%। নবাবগঞ্জ উপজেলায় কৃষিতে সবচেয়ে বেশি সংখ্যক, ৮৫.৪৪% লোক কাজ করে। শিল্প ও সেবাখাতে নিয়োজিত জনসংখ্যার বিচারে দিনাজপুর শহরের পরের অবস্থানে রয়েছে ফুলবাড়ী উপজেলা। এই উপজেলায় শিল্পে ৪.২৯% এবং সেবাখাতে ২৩.২৭% লোক কাজ করে।

### ৯. আবাসন: গৃহ ও স্যানিটেশন ব্যবস্থা

২০১১ সালের আদমশুমারি ও গৃহগণনা প্রতিবেদন অনুযায়ী দিনাজপুর জেলার মোট জনসংখ্যার ২৯৯০১২৮ জনের মধ্যে ২৯৮৭৬২৪ জন পারিবারিক জীবন যাপন করে। ভাসমান মানুষের সংখ্যা ২৫০৪ জন। প্রতিবন্ধী মানুষের সংখ্যা মোট জনসংখ্যার ১.৫ শতাংশ। ক্ষুদ্র নৃ-গোষ্ঠীর অন্তর্ভুক্ত পরিবারের সংখ্যা ১৬০৪৯ টি, মোট জনসংখ্যা ৬৬৮৬১ জন। তন্মধ্যে ৩৩০৩০ জন পুরুষ এবং ৩৩৮৩১ জন নারী। ক্ষুদ্র নৃ-গোষ্ঠীর মধ্যে ৪৯৮৬১ জন সাঁওতাল, ৪৫৬৬ জন ওঁরাও এবং ১২৪৩৪ জন অন্যান্য ক্ষুদ্র নৃ-জাতিগোষ্ঠীর মানুষ। পূর্বে এ সকল নৃ-গোষ্ঠীর মানুষের নিজস্ব অর্থনৈতিক সংস্কৃতি বিদ্যমান ছিলো। সময়ের পরিবর্তনের সাথে বিভিন্ন কারণে তারা সেগুলো হারিয়ে ফেলছে।

দিনাজপুর জেলার মোট গৃহের সংখ্যা ৭১৩২৫৫ টি। এর মধ্যে পাকা বাড়ি ৫.৫%, সেমি-পাকা বাড়ি ২৩.৪%, কাঁচা ঘরবাড়ি ৬৬.০%, এবং ঝুপড়ি ৫.১%। সদর উপজেলায় পাকা বাড়ি ১৪.৯%, সেমিপাকা বাড়ি ৩২.০%, কাঁচা ঘরবাড়ি ৪৫.৩% এবং ঝুপড়ি ৭.৯%। অন্যান্য, উপজেলার মধ্যে ফুলবাড়ী উপজেলার ঘরবাড়ির অবস্থা তুলনামূলকভাবে উন্নত। ঘোড়াঘাট উপজেলায় ঝুপড়ির সংখ্যা

বেশি। নিচে টেবিল ৬ এ দিনাজপুর জেলা ও জেলার অন্তর্ভুক্ত উপজেলাসমূহে বাড়িঘরের কাঠামোগত অবস্থা ও টয়লেট সুবিধার পরিসংখ্যান উল্লেখ করা হলো।

টেবিল ৬ : দিনাজপুর জেলা ও জেলার অন্তর্ভুক্ত উপজেলাসমূহে বাড়িঘরের কাঠামোগত অবস্থা ও টয়লেট সুবিধা

দিনাজপুর জেলা ও অন্তর্ভুক্ত উপজেলাসমূহ	পরিবারের সংখ্যা	বাড়িঘরের ধরন/ কাঠামো (%)				টয়লেট সুবিধা (%)			
		পাকা	সেমি পাকা	কাঁচা ঘরবাড়ি	ঝুপড়ি	পরিচ্ছন্ন টয়লেট (পানিরুদ্ধ)	পরিচ্ছন্ন টয়লেট (পানিরুদ্ধ নয়)	অপরিচ্ছন্ন টয়লেট	টয়লেট বিহীন
১	২	৩	৪	৫	৬	৭	৮	৯	১০
দিনাজপুর জেলা মোট	৭১৩২৫৫	৫.৫	২৩.৪	৬৬.০	৫.১	৩২.৪	১৫.৬	২৮.৭	২৩.৩
বিরামপুর উপজেলা মোট	৪১৯৮৮	৩.১	২৮.২	৬২.৭	৬.১	৩৬.৫	২২.৩	২৮.৭	১২.৪
বিরগঞ্জ উপজেলা মোট	৭৩৭২৩	২.৯	১৬.৪	৭৫.৬	৫.২	৩০.৩	১৬.৬	৩২.০	২১.১
বিরল উপজেলা মোট	৬১৩৩৭	৩.৫	২৩.৭	৬৭.৫	৫.৩	২৮.৩	৮.২	২১.৮	৪১.৭
বোচাগঞ্জ উপজেলা মোট	৩৯১৫৯	২.৯	২৪.৪	৭০.৬	২.০	৪৬.৩	১২.৪	১৬.৯	২৪.৩
চিরিরবন্দর উপজেলা মোট	৬৮৩১৬	৫.১	২১.৮	৬৯.১	৪.০	১৯.০	১৫.৬	৪১.৬	২৩.৮
ফুলবাড়ী উপজেলা মোট	৪৩০০২	৫.০	২৯.০	৬০.৯	৫.১	৪০.৩	১৩.৩	২৬.৮	১৯.৬
ঘোড়াঘাট উপজেলা মোট	৩০০২০	১.৬	১৮.২	৭২.০	৮.২	৪০.৩	১৮.৭	৩০.০	১১.১
হাকিমপুর উপজেলা মোট	২২৮৪৪	৩.৫	২২.৬	৭০.৩	৩.৬	৩৭.১	২৩.৬	২৭.৯	১১.৪
কাহারোল উপজেলা মোট	৩৬৭২০	৪.১	১৮.৮	৭২.৩	৪.৮	৩২.৫	১২.৪	৩১.৯	২৩.২
খানসামা উপজেলা মোট	৩৯৩৯২	২.৭	১৩.৪	৭৯.৩	৪.৫	৩২.৫	১৫.৪	৩৬.৩	১৫.৭
দিনাজপুর সদর উপজেলা মোট	১১০৪৮৩	১৪.৯	৩২.০	৪৫.৩	৭.৯	৩৮.১	১৬.১	২৩.০	২২.৮
নবাবগঞ্জ উপজেলা মোট	৫৭৭৫৩	২.১	২২.৫	৭০.৭	৪.৭	৩৩.৫	১৮.৯	২৭.২	২০.৪
পার্বতীপুর উপজেলা মোট	৮৮৫১৮	৬.৩	২২.৯	৬৭.৩	৩.৫	২৩.৩	১৪.৫	৩০.২	৩২.০

উৎস : গণপ্রজাতন্ত্রী বাংলাদেশ সরকার, আদমশুমারি ও গৃহগণনা - ২০১১, বাংলাদেশ পরিসংখ্যান ব্যুরো (বিবিএস), পরিকল্পনা মন্ত্রণালয়, জুন ২০১২, টেবিল সি-১৪, পৃ. ১-৯৮।

উন্নত টয়লেট সুবিধা রয়েছে এরূপ গৃহের সংখ্যা ৩২.৪%, তেমন উন্নত নয় তবে স্বাস্থ্যসম্মত টয়লেট আছে ১৫.৬% গৃহে এবং নিশ্চয়তার টয়লেটের সংখ্যা ২৮.৭%। কোন টয়লেট সুবিধা নাই এরূপ গৃহের সংখ্যা ২৩.৩%। বিরল উপজেলায় টয়লেট সুবিধাহীন গৃহের সংখ্যা বেশি (৪১.৭%)। উন্নত টয়লেট সুবিধার দিক থেকে এগিয়ে আছে বোচাগঞ্জ উপজেলা (৪৬.৩%)। দিনাজপুর জেলায় খাবার পানি সরবরাহের ব্যবস্থা সম্পর্কে প্রাপ্ত তথ্যে দেখা যায় যে, ১.৪% পরিবার ট্যাপের পানি ব্যবহার করে। ৯৬.৫% পরিবার টিউবওয়েলের পানি ব্যবহার করে এবং ২.১% পরিবার অন্যান্য উৎস থেকে পানি সংগ্রহ ও ব্যবহার করে। ৩৯.৪% পরিবারে বিদ্যুৎ সংযোগ রয়েছে।

### ১০. দিনমজুরসহ বিভিন্ন কর্মে নিয়োজিত শ্রমিকের মজুরি

কৃষির ভরা মৌসুমে একজন ক্ষেতমজুর দৈনিক ৫০০.০০ টাকা পর্যন্ত মজুরি পায়। একজন নারী শ্রমিক ৩০০.০০ টাকা মজুরি পায়। মৌসুম ব্যতীত অন্য সময়ে শ্রমের চাহিদা কম হওয়ায় মজুরি কমে যায়। তখন একজন নারী শ্রমিককে মাত্র ১৫০.০০ টাকা থেকে ২০০.০০ টাকা এবং পুরুষ শ্রমিককে ২৫০.০০ টাকা থেকে ৩০০.০০ টাকা মজুরিতে কাজ করতে হয়। দিনাজপুর জেলায় বিশেষ করে সদর উপজেলায় চালকলের আধিক্য রয়েছে। এসব চালকলের শ্রমিকেরা মাসে ৩৫০০.০০ টাকা থেকে ৪০০০.০০ টাকা মজুরি পেয়ে থাকেন। নারী শ্রমিকের আয় সে তুলনায় অনেক কম হয়। তাদের গড় আয় মাসে ১৫০০.০০ টাকা থেকে ২০০০.০০ টাকা মাত্র (টেবিল ৭ দেখুন)।

টেবিল ৭ : দিনাজপুর সদর উপজেলায় বিভিন্ন শ্রেণির শ্রমিকের দৈনিক/ মাসিক মজুরি।

শ্রমিকের ধরন	নারী/পুরুষ	দৈনিক মজুরি/আয়	মাসিক মজুরি/আয়	সর্বনিম্ন	সর্বোচ্চ	গড়	মন্তব্য
খेत মজুর	পুরুষ	৫০০.০০		২৫০.০০	৫০০.০০	৩৭৫.০০	
	নারী	৩০০.০০		১৫০.০০	৩০০.০০	২২৫.০০	
চালকল শ্রমিক	পুরুষ		৪০০০.০০	৩৫০০.০০	৪০০০.০০	৩৭৫০.০০	
	নারী		২০০০.০০	১৫০০.০০	২০০০.০০	১৭৫০.০০	
হোটেল (আবাসিক)	-----		৩০০০.০০	২৫০০.০০	৩০০০.০০	২৭৫০.০০	
হোটেল (খাবার)	-----		৪০০০.০০	৩৫০০.০০	৪০০০.০০	৩৭৫০.০০	
নির্মাণ শ্রমিক	দক্ষ (পুরুষ)	৪০০.০০		৩৫০.০০	৪০০.০০	৩৭৫.০০	
	আধাদক্ষ (পুরুষ)	২৫০.০০		২০০.০০	২৫০.০০	২২৫.০০	
	নারী	৪০০.০০		৩০০.০০	৪০০.০০	৩৫০.০০	
কাঠমিস্ত্রি	দক্ষ		১২০০০.০০	১০০০০.০০	১২০০০.০০	১১০০০.০০	
	আধাদক্ষ		৮০০০.০০	৬০০০.০০	৮০০০.০০	৭০০০.০০	
কারখানা শ্রমিক (ক্ষুদ্র)	-----		৩০০০.০০	২৮০০.০০	৩০০০.০০	২৯০০.০০	
কারখানা শ্রমিক (মাঝারি)	-----		৪৫০০.০০	৪০০০.০০	৪৫০০.০০	৪২৫০.০০	
দোকানের বিক্রয়কর্মী	পুরুষ		৫৫০০.০০	৫০০০.০০	৫৫০০.০০	৫২৫০.০০	
	নারী		৩৫০০.০০	৩০০০.০০	৩৫০০.০০	৩২৫০.০০	
ক্লিনিক	পুরুষ		৫০০০.০০	৪০০০.০০	৫০০০.০০	৪৫০০.০০	
	নারী		৫৫০০.০০	৫০০০.০০	৫৫০০.০০	৫২৫০.০০	
পাহারাদার	-----		৫০০০.০০	৪০০০.০০	৫০০০.০০	৪৫০০.০০	
রিকসা চালক	-----	৩০০.০০		২০০.০০	৩০০.০০	২৫০.০০	
অটো চালক	-----	৫০০.০০		৪০০.০০	৫০০.০০	৪৫০.০০	
গৃহকর্মী	-----		১৫০০.০০	১০০০.০০	১৫০০.০০	১২৫০.০০	
মটর শ্রমিক	হেলপার		৮০০০.০০	৭০০০.০০	৮০০০.০০	৭৫০০.০০	
	ড্রাইভার		১২০০০.০	১০০০০.০০	১২০০০.০০	১১০০০.০০	

উৎসঃ ২৭-৩০ জুন ২০১৪ তারিখে মাঠ পর্যায়ে নিয়োগকৃত তথ্য সংগ্রহকারী দ্বারা সংগৃহীত।

আবাসিক হোটেল শ্রমিকেরা মাসে ৩০০০.০০ টাকা মজুরি পেয়ে থাকে। এ ধরনের শ্রমিকেরা দৈনিক ৩ (তিন) শিফটে কাজ করেন। এক শিফটে কাজ করে (০৮ ঘন্টায়) তারা উক্ত মজুরি পান। খাবার হোটেলে সারাদিন কাজ করে খেয়েদেয়ে একজন শ্রমিক মাসে ৩৫০০.০০ টাকা থেকে ৪০০০.০০ টাকা পারিশ্রমিক পেয়ে থাকেন। নির্মাণ শ্রমিকদের মধ্যে দক্ষ পুরুষ শ্রমিক দৈনিক ৪০০.০০ টাকা, আধাদক্ষ শ্রমিক ২৫০.০০ টাকা এবং নারী শ্রমিক (সাধারণত ঢালাইয়ের কাজে) ৪০০.০০ টাকা দৈনিক মজুরি লাভ করেন। একই বাসায় থাকা- খাওয়ার বিনিময়ে গৃহকর্মীর কাজ করে একজন নারী মাসে ১০০০.০০ টাকা থেকে ১৫০০.০০ টাকা মজুরি পান। তবে একাধিক বাসায় বা মেসে কাজ করে একজন গৃহকর্মী ২৫০০.০০ টাকা থেকে ৩৫০০.০০ টাকা উপার্জন করেন। ক্ষেত্র ভেদে নারী ও পুরুষ শ্রমিকের মজুরি এক নয়। একই কাজের ক্ষেত্রে তাদের মজুরির পার্থক্য রয়েছে। শ্রমের পারিশ্রমিক প্রাপ্তির ক্ষেত্রে নারী শ্রমিক বৈষম্যের স্বীকার হচ্ছেন।

### ১১. দিনাজপুর জেলার উল্লেখযোগ্য কিছু পণ্যদ্রব্যের দাম

কর্মসংস্থান, উৎপাদন, আয় এবং ক্রয়ক্ষমতা মানুষের জীবন নির্বাহের জন্য কয়েকটি জরুরি শর্ত।

ভোগের জন্য পর্যাপ্ত দ্রব্য এবং সেবার সংস্থান করতে না পারলে জীবনযাত্রার মান কমে যায়। তাই দ্রব্যমূল্য অর্থনৈতিক অবস্থার অন্যতম প্রধান নিয়ামক।

আবার উৎপাদকের জন্য দ্রব্যমূল্যের স্থিতিশীলতা এবং তার যৌক্তিক ক্রমবৃদ্ধি উৎসাহদায়ক বটে। বাস্তবে জিনিসপত্রের দাম উর্ধ্বমুখী। নিচের ৮ নম্বর টেবিলে ১৯৯০-২০১৪ সাল পর্যন্ত দিনাজপুর জেলার উৎপাদিত কয়েকটি ফসলের গড় দাম উল্লেখ করা হলো।

টেবিল ৮ : দিনাজপুর জেলার বিভিন্ন ফসলের বার্ষিক গড় মূল্য পরিস্থিতি (১৯৯০-২০১৪)

ক্রঃ নং	ফসলের নাম	বছর (প্রতি কুইন্টাল/টাকায়)					
		১৯৯০	১৯৯৫	২০০০	২০০৫	২০১০	২০১৪
১.	ধান-আমন-মোটা	৬১০.০০	৭৯০.০০	৭২০.০০	৯৭৫.০০	১৮২০.০০	১৯৭৫.০০
২.	ধান-আমন-মাঝারি	৬৪০.০০	৮৫৫.০০	৭৫০.০০	১০২০.০০	১৯৮৫.০০	২২০৫.০০
৩.	ধান-আমন-সরু	৭৫৫.০০	৯৭৫.০০	৮৩০.০০	১১৭০.০০	২১৪৫.০০	২৫৮০.০০
৪.	ধান-বোরো-মোটা	৪১৫.০০	৬১০.০০	৫৯৪.০০	৮৭০.০০	১৭৬৫.০০	১৬৩৬.০০
৫.	ধান-বোরো-মাঝারি	৪৪০.০০	৫৮০.০০	৬৭০.০০	৯০৫.০০	১৭৯৫.০০	১৮৬০.০০
৬.	গম	৭০৫.০০	৮৫০.০০	৮৬০.০০	১২৬০.০০	১৯২৫.০০	২২৪৫.০০
৭.	সরিষা	১৬০০.০০	১৯১৫.০০	১৬৩০.০০	২১১৫.০০	৩৮৯০.০০	৩৬৮৫.০০
৮.	পিঁয়াজ	৯২৫.০০	১০৩০.০০	১১০০.০০	১৫৮৫.০০	২২৪০.০০	২২৪০.০০
৯.	রসুন	১৮৬৫.০০	২৯৭৫.০০	২৮৯৫.০০	৩৫৪০.০০	১১৭৮৫.০০	৫৬৬০.০০
১০.	শুকনা মরিচ	৪৩৮০.০০	৭৭৩৫.০০	৪৭৭৮.০০	৪৪৬৫.০০	১০৬৬০.০০	১৫৪০০.০০
১১.	দেশি মুরগি	৪৫৮০.০০	৬০১৫.০০	৭৬৩০.০০	১০১৩৫.০০	১৮০৬৫.০০	২৫৩০০.০০
১২.	গরুর মাংস	৪১৫০.০০	৪৭০০.০০	৬৫০০.০০	১০০০০.০০	২৩৫০০.০০	২৫০০০.০০
১৩.	কলাই-মসুর	১৬১৫.০০	২৩৯৫.০০	২১৬৫.০০	-	-	-
১৪.	কলাই-ছোলা	১৬৭০.০০	২০৯৫.০০	১৮১৫.০০	-	-	-
১৫.	আলু-কার্ডিনাল	৪৭৫.০০	৫২০.০০	৫৮৫.০০	৫৬০.০০	১১৪৫.০০	৯৪২.০০
১৬.	আলু-দেশি গুটি	৫১০.০০	৫৮০.০০	৬৩০.০০	৫৭৫.০০	১৩৮৫.০০	১২৮৫.০০
১৭.	বেগুন	৪২৫.০০	৬৪৫.০০	৭১০.০০	৮৮৫.০০	১৩৭০.০০	১৬১৭.০০
১৮.	পটল	৬৯৮.০০	৬১৫.০০	৬৫০.০০	১১৫৫.০০	১৫২০.০০	২২৯৯.০০
১৯.	করল্যা	৫৭৪.০০	১১৩০.০০	১১৩৫.০০	১০৪০.০০	১৯৪০.০০	২২৫৫.০০
২০.	টমেটো	৬৮৮.০০	৭৩০.০০	৬৮০.০০	৭৮০.০০	৮৬৫.০০	১৪৯০.০০
২১.	ফুলকপি	৩৮৪.০০	৮২৫.০০	৭৪০.০০	৩৭৫.০০	৬০০.০০	১৩১০.০০
২২.	বাঁধাকপি	১৬৬.০০	৩৯০.০০	৪০৫.০০	১০৫.০০	২৯৫.০০	৬৩৫.০০
২৩.	ভুট্টা	-	-	-	৮৬৭.০০	১৫৫০.০০	১৫৭০.০০
২৪.	চিনিগুড়া ধান	৮৪০.০০	১১৭৫.০০	১৬৪২.০০	১৭১০.০০	৩২৭০.০০	৩৬৪০.০০
২৫.	কাটারী ধান	৮২৫.০০	১০৬৫.০০	১৩০০.০০	১৪৩৫.০০	২৮৩০.০০	২৯৯০.০০

উৎস: জেলা বাজার কর্মকর্তা, দিনাজপুর, তারিখ: ২০. ০৬. ২০১৪ খ্রি.

১৯৯০ থেকে ২০০০ সাল পর্যন্ত যে হারে মূল্যবৃদ্ধি ঘটেছে, ২০০০ থেকে ২০১০ সাল পর্যন্ত মূল্যবৃদ্ধি ঘটেছে তার চেয়ে ঢের বেশি। ১৯৯০ থেকে ২০১০ সালে ধানের দাম বেড়েছে তিন গুন। ২০১৪ সাল পর্যন্ত গমের দামও তিনগুন বেড়েছে। ১৯৯০ সালে প্রতি কুইন্টাল (১০০ কেজি) সরিষার দাম ১৬০০.০০ টাকা ছিল। ২০১০ সালে তা বৃদ্ধি পেয়ে ৩৮৯০.০০ টাকা হয়েছে। ১৯৯০ সালে প্রতি কুইন্টাল পিঁয়াজের দাম ৯২৫.০০ টাকা থেকে বৃদ্ধি পেয়ে ২০১০ সালে ২২৪০.০০ টাকা হয়েছে। সবচেয়ে বেশি বৃদ্ধি পেয়েছে দেশি মুরগি ও গরুর মাংসের দাম, ১৯৯০ সালের তুলনায় ২০১৪ সালে দাম বেড়েছে ৫ গুণ।

## ১২. আর্থ-সামাজিক অবকাঠামোর পরিবর্তন

অতীতে দিনাজপুরের রাস্তাঘাট তেমন উন্নত ছিলো না। স্বাধীনতার পর দেশের অন্যান্য অঞ্চলের ন্যায় এ অঞ্চলেও ক্রমাগত রাস্তা-ঘাট, অফিস-আদালত, ব্যাংক-বীমা, বাণিজ্যিক প্রতিষ্ঠান গড়ে উঠতে থাকে

এবং ধীরে ধীরে পরিবর্তিত হয় এ অঞ্চলের অর্থনৈতিক অবকাঠামো। দেশের উত্তরাঞ্চলের সাথে অন্যান্য এলাকার যোগাযোগ প্রতিষ্ঠায় যমুনা সেতুর গুরুত্বপূর্ণ ভূমিকা লক্ষ্য করা যায়। বর্তমানে ঢাকাসহ দেশের বিভিন্ন জেলার সাথে দিনাজপুর জেলার যোগাযোগ ব্যবস্থা উন্নত হয়েছে। স্বাধীনতার পর থেকে বিভিন্ন সময়ে দিনাজপুরের বিভিন্ন উপজেলা এবং উত্তরাঞ্চলের জেলাগুলোর সাথে এ জেলার পরিবহন ব্যবস্থার উল্লেখযোগ্য অগ্রগতি সাধিত হয়েছে। নিম্নে দিনাজপুর জেলার সড়ক ও রেলপথের বিবরণ টেবিল ৯ এর মাধ্যমে তুলে ধরা হলো।

টেবিল ৯ : যোগাযোগ ব্যবস্থা: সড়ক ও রেলপথ

বিবরণ	কিলোমিটার	মন্তব্য
মোট পাকা রাস্তা	৬৯১ কি: মি:	জুন ২০১৪ পর্যন্ত
আধাপাকা রাস্তা	২৯৫ কি: মি:	
কাঁচা রাস্তা	৪৭২০ কি: মি:	
রেলপথ	১৪২.০২ কি: মি:	
রেলস্টেশন	১৮টি	
<b>সওজ, দিনাজপুরের অধীন সড়ক ও সেতু</b>		
মোট পাকা সড়কের পরিমাণ	৪৪১.৭৯১ কি:মি:	
মহাসড়কের উপর মোট সেতু	৬৫টি	
সবচেয়ে বড় সড়ক সেতু (দৈর্ঘ্য)	১৫৪.২০ মিটার	

উৎস: [dcdinajpur.gov.bd](http://dcdinajpur.gov.bd), Government Website (accessed on 21.06.2014).

বর্তমানে তথ্য ও যোগাযোগ ক্ষেত্রে উল্লেখযোগ্য অগ্রগতি সাধিত হয়েছে। মোবাইল ফোন, কম্পিউটার ও ইন্টারনেটের ব্যবহার তথ্য ও যোগাযোগের ক্ষেত্রে নতুন মাত্রা এনে দিয়েছে। ক্রমাগতই সামাজিক অবকাঠামোর পরিবর্তন ঘটেছে। স্কুল, কলেজ, মাদ্রাসা, মসজিদ, হাসপাতাল, ক্লিনিক ইত্যাদির সংখ্যা বৃদ্ধি পেয়ে সামাজিক অবকাঠামোর ভিত্তিও গড়ে উঠেছে। ব্যানবেইজ এর ২০১২ সালের পরিসংখ্যান অনুযায়ী দিনাজপুর জেলায় প্রাথমিক শিক্ষা প্রতিষ্ঠানের সংখ্যা ২৭৪১টি, নিম্নমাধ্যমিক বিদ্যালয়ের সংখ্যা ১০৯টি, মাধ্যমিক বিদ্যালয়ের সংখ্যা ৫৩২টি এবং স্কুল ও কলেজ (স্কুল শাখা) এর সংখ্যা ২০টি, সর্বমোট ৬৬১টি। বিভিন্ন পর্যায়ে অর্থাৎ স্কুল এন্ড কলেজ পর্যায় থেকে স্নাতকোত্তর পর্যায় পর্যন্ত কলেজের সংখ্যা ১১০টি। দাখিল থেকে কামিল পর্যন্ত মাদরাসার সংখ্যা ৩০৮টি।<sup>১১</sup> বর্তমানে দিনাজপুরে ১টি চিকিৎসা মহাবিদ্যালয়, ১টি বিজ্ঞান ও প্রযুক্তি বিশ্ববিদ্যালয়, ১টি পলিটেকনিক ইনস্টিটিউট, ১টি টেক্সটাইল ইনস্টিটিউট, ১টি আইন মহাবিদ্যালয় রয়েছে। এছাড়াও ১টি যুব প্রশিক্ষণ কেন্দ্র এবং ১টি ভোকেশনাল ট্রেনিং ইনস্টিটিউটসহ অন্যান্য প্রতিষ্ঠান স্থাপিত হয়েছে। এসকল প্রতিষ্ঠানের অবদানের ফলে শিক্ষার হার ও গুণগতমান বৃদ্ধি পেয়েছে। স্বাস্থ্য সুবিধা প্রদানের ক্ষেত্রে ১৩টি উপজেলা হেলথ কমপ্লেক্সে ১০৫টি ইউনিয়ন স্বাস্থ্য উপকেন্দ্রসহ ২৮টি বেসরকারি ক্লিনিক কাজ করে যাচ্ছে। স্বাস্থ্য সেবা বৃদ্ধি পাওয়ায় মানুষের গড় আয়ু বৃদ্ধি এবং মাতৃ ও শিশুমৃত্যুর হার হ্রাস পেয়েছে। ২০০১ সালে দিনাজপুর জেলায় শিক্ষার হার ৪৫.৭% ছিলো। ২০১১ সালে তা বৃদ্ধি পেয়ে ৫২.৪% হয়েছে। নিচে টেবিল ১৪ তে শিক্ষা, নগরায়নের হার উল্লেখ করা হলো। ২০০১ সাল থেকে ২০১১ সাল পর্যন্ত নারী শিক্ষার হার ৪০.০% থেকে বৃদ্ধি পেয়ে ৪৯.১% হয়েছে। নগরায়নের হার ২০০১ সালে ১৪.০৩% থেকে বৃদ্ধি পেয়ে ২০১১ সালে ১৫.১৭% হয়েছে (টেবিল ১০ দেখুন)।

<sup>১১</sup> পরিশিষ্ট ১, ২, ৩, ও ৪ এ দিনাজপুর জেলার শিক্ষা প্রতিষ্ঠান সম্পর্কে বিস্তারিত তথ্য টেবিলের মাধ্যমে উপস্থাপন করা হয়েছে।

টেবিল ১০ : জনসংখ্যা, শিক্ষা ও নগরায়নের হার

বিষয়	বাংলাদেশ	রংপুর বিভাগ	দিনাজপুর জেলা	
			২০১১	২০০১
মোট জনসংখ্যা	১৪৪০৪৩৬৯৭	১৫৭৮৭৭৫৮	২৯৯০১২৮	২৬৪২৮৫০
শহর	২৭৪৬৮৭৮৯	১৬০৩২২২	৩৯৩৯২০	২৯৭৫৮২
শহরতলী	৬০৯৪৩৯৪	৫০৫৮৪৯	৫৯৭৭৯	৭৩২৯২
গ্রাম	১১০৪৮০৫১৪	১৩৬৭৮৬৮৭	২৫৩৬৪২৯	২২৭১৯৮৬
বৃদ্ধির হার	১.৪৭	১.৩	১.২২	১.৫৮
জনসংখ্যার ঘনত্ব	৯৭৬	৯৭৫	৮৬৮	৭৬৯
নগরায়নের হার	২৩.৩০	১৩.৩৬	১৫.১৭	১৪.০৩
শিক্ষার হার	৫১.৮	৪৭.২	৫২.৪	৪৫.৭
নারী	৪৯.৪	৪৩.৮	৪৯.১	৪০.০
পুরুষ	৫৪.১	৫০.৬	৫৫.৭	৫১.০
স্কুলে যাওয়ার হার (৫ থেকে ২৪ বছর বয়সের)	৫২.৭	৫৫.০	৫৬.৭	৪৮.৮
নারী	৫০.৮	৫২.৫	৫৪.৩	৪৫.৬
পুরুষ	৫৪.৬	৫৭.৬	৫৯.১	৫১.৮
জনসংখ্যা (সমন্বয়কৃত)	১৪৯৭৭২৩৬৪	১৬৪১২২৮৭	৩১০৯৬২৮	২৭৬৬০০০

উৎসঃ গণপ্রজাতন্ত্রী বাংলাদেশ সরকার, আদমশুমারি ও গৃহগণনা - ২০১১, বাংলাদেশ পরিসংখ্যান ব্যুরো (বিবিএস), পরিকল্পনা মন্ত্রণালয়, জুন ২০১২, পৃ. ১০।

সরকারি ও বেসরকারি পর্যায়ে বিভিন্ন কর্মসূচি বাস্তবায়ন ও সচেতনতা বৃদ্ধির ফলে বসন্ত, ম্যালেরিয়া, কলেরার মত রোগের প্রকোপ ও ভয়াবহতা কমে গেছে এবং বর্তমানে এসকল আপদ থেকে মানুষের অনেকটা মুক্তি ঘটেছে বলা যায়। সাম্প্রতিককালে নিপা ভাইরাস, বার্ড ফ্লু, এ্যানথ্রাক্সে প্রাদুর্ভাব এবং এইডস ভাইরাসের উদ্ভবের কারণে নতুন করে স্বাস্থ্য রক্ষার ঝুঁকি বেড়েছে। তবে এগুলোর বিপদ থেকে বাঁচার জন্য প্রতিরোধমূলক ব্যবস্থা সম্পর্কে মানুষকে সচেতন করা হচ্ছে। এগুলোর আক্রমণের বিরুদ্ধে প্রতিরোধমূলক ব্যবস্থা ও জনসচেতনতা আরো বৃদ্ধি করা প্রয়োজন।

### ১৩. কৃষি, পরিবেশ, শিক্ষা ও সামাজিক ক্ষেত্রে বিদ্যমান সমস্যাসমূহ

কৃষি উৎপাদন বৃদ্ধি দারিদ্র্য হ্রাসে সহায়ক হলেও কৃষিক্ষেত্রের এই পরিবর্তন পল্লি-উন্নয়নে আশানুরূপ ভূমিকা রাখতে পারছে না। একদিকে কৃষি উপকরণের দাম বৃদ্ধি, অন্যদিকে কৃষিপণ্যের দামের অস্বাভাবিক উঠানামার কারণে বিশেষ করে প্রান্তিক ও ভূমিহীন কৃষকের বিপদ দেখা দিয়েছে। কৃষিপণ্যের দামের অস্থিতিশীলতা (যেমন পাট, রসূনের দাম) উৎপাদন কর্মকাণ্ডকে নিরুৎসাহিত করে। পণ্য সংরক্ষণের ব্যবস্থা না থাকায় উৎপাদনের কিছু অংশ নষ্ট হয়ে যায় (বিশেষ করে শবজি, ফলমূল ও মাছ)। এছাড়া, মধ্যসত্ত্বভোগীদের দৌরাাত্র্য কৃষকদের পণ্যমূল্যের উপর বিরূপ প্রভাব ফেলে। উপরন্তু, প্রাকৃতিক দুর্যোগে ফসলহানি ঘটলে কৃষকের ঋণগ্রস্ততা বাড়ে এবং নিঃস্ব অসহায় অবস্থার কারণে তারা আবার পুনরুৎপাদনে যেতে পারে না।

বিগত সময়ে উফশি চাষাবাদের মাধ্যমে ফসল বৃদ্ধির জন্য নির্বিচারে কীটনাশক ব্যবহার করা হয়েছে। ফলে, অভাবনীয় পানি দূষণের কারণে মাছের উৎপাদন হ্রাসসহ জীব বৈচিত্র্যের উপর বিরূপ প্রভাব পড়েছে। ব্যাঙ, কেঁচোসহ অনেক উপকারী কীটপতঙ্গ নিধনের ফলে পরিবেশের ভারসাম্য নষ্ট হয়েছে। এছাড়া দীর্ঘদিন ধরে ইট ভাটার জ্বালানি সরবরাহের জন্য নির্বিচারে বড় বড় বৃক্ষ নিধনের ফলে পরিবেশের অপূরণীয় ক্ষতি সাধিত হয়েছে।

কোন কোন এলাকায় পানির প্রাপ্যতা কমে গেছে। শুষ্ক মৌসুমে রবিশস্য চাষে সমস্যা হচ্ছে। মাটিতে

রস থাকছে না। ভূ-গর্ভস্থ পানির স্তর নিচে নেমে যাওয়ায় টিউবওয়েলে পানি উঠতে চায় না। নদীগুলোতে আগের মতো পানি নেই। নদীকে ঘিরে নদীতীরবর্তী মানুষের যে জীবনযাত্রা তার স্বরূপ বদলে গেছে। হতদরিদ্র নারীদেরকে প্রকৃতির কাছ থেকে জীবনের নানা উপকরণ সংগ্রহ করতে হয়। প্রাকৃতিক বিপর্যয়ের কারণে কৃষি ও খাদ্য নিরাপত্তা, পানিসম্পদের ব্যবহার, মানববসতি ও স্থানান্তর প্রক্রিয়া, জ্বালানি ও যোগাযোগ দারুণভাবে বিঘ্নিত হলে নারীর অসহায়ত্ব বাড়াবে। মাটি, পানি, বায়ু দূষণ ও মরুকরণের ফলে প্রাকৃতিক জ্বালানি ও শস্য সংগ্রহে সমস্যা দেখা দিবে। জলবায়ু পরিবর্তন ও পরিবেশ বিপর্যয়ের মারাত্মক অভিঘাতে নারী ও শিশুরাই আগে এবং অধিকমাত্রায় দুর্ভোগের স্বীকার হবে।

সমাজজীবনে উন্নয়নের মিশ্র প্রভাব উন্নয়নের স্বরূপ নিয়ে নতুন করে ভাববার অবকাশ তৈরি করেছে। আয় বৃদ্ধি, অর্থনৈতিক অবকাঠামো উন্নয়ন, ব্যবসা বাণিজ্যের অগ্রগতি ইত্যাদি ক্ষেত্রে কতগুলো সূচকে ধনাত্মক পরিবর্তন সাধিত হয়েছে, আবার মানবিক দৃষ্টিকোণ থেকে বিচার করলে কয়েকটি সামাজিক সূচকের অবনতি লক্ষ করা যায়। গত কয়েক দশকে এ অঞ্চলে বাল্যবিবাহ, বহুবিবাহ, অন্ধবিশ্বাস ও কুসংস্কার হ্রাস পেয়েছে। নারী শিক্ষার প্রসার ঘটেছে। বিয়ে রেজিস্ট্রি, জন্ম নিবন্ধন ইত্যাদি সূচকে সাফল্য অর্জিত হয়েছে। মাদকাসক্তি, যৌতুক, পারিবারিক নির্যাতন, যৌন হয়রানি, ধর্ষণ, ইভটিজিং-এগুলোর সংঘটন কোনো কোনো ক্ষেত্রে উদ্বেগজনক মাত্রায় রয়ে গেছে। অনেক ক্ষেত্রেই পিতা ও স্বামীর সম্পত্তির ন্যায্য অংশ থেকে নারীদের বঞ্চিত করা হয়। নারীদের পরিবার প্রতিপালনে নিবেদিত থাকতে হয়। অথচ, পারিবারিক সম্পত্তিতে, ব্যাংক হিসাবে, ফার্মে তাদের মালিকানা কম। ফলে যে কোন বিপর্যয়ের মুখে তারা নিজেদেরকে অধিক অসহায় মনে করেন।

নারী ও পুরুষ শ্রমিকের বেতনের মধ্যে বৈষম্য কমেনি, একজন পুরুষ শ্রমিক দৈনিক গড়ে ৩৭৫.০০ (তিনশত পাঁচাত্তর) টাকা মজুরি পেলেও একজন নারী শ্রমিক পায় ২২৫.০০ (দুইশত পঁচিশ) টাকা। ফসল বোনার সময়, ধানের চারা রোপনের সময়, ফসল কাটা ও মাড়াইয়ের সময় শ্রমের চাহিদা বেড়ে যায় এবং মজুরি ৫০% থেকে ১০০% বৃদ্ধি পায়। অন্য সময়ে শ্রমের চাহিদা কমে যায়, কৃষি মজুরিও কমে। অনেকক্ষেত্রে, পুরুষদের সাথে নারী এবং কখনোবা শিশুদেরও অনেক ঝুঁকিপূর্ণ কাজে, যেমন- ইটের ভাটায়, বাড়ি ও স্থাপত্য নির্মাণে, ইট-পাথর ভাঙ্গা, রাস্তা মেরামত ইত্যাদি কাজে শ্রম দিতে হয়।

শিক্ষা, সচেতনতা, তথ্য ও যোগাযোগের উন্নতির ফলে জীবন, পরিবেশ ও পারিপার্শ্বিক অবস্থা সম্পর্কে এ অঞ্চলের মানুষের জ্ঞান বেড়েছে এবং সমাজজীবনে পরিবর্তন ও উন্নয়নের সূচনা হয়েছে একথা বলা যায়। কিন্তু সেই অর্জিত জ্ঞান তাদের মনোভাব ও জীবনচর্চার ক্ষেত্রে আশানুরূপ পরিবর্তন ঘটাতে পারেনি। সেনিটেশন, পয়গনিষ্কাশন ব্যবস্থা, স্বাস্থ্য সচেতনতা বৃদ্ধি ও পরিবেশ দূষণ রোধের ক্ষেত্রে অর্জিত জ্ঞান অনুযায়ী এ অঞ্চলের, বিশেষ করে গ্রামীণ আপামর জনসাধারণের মনোভাবের পরিবর্তন ও জীবনচর্চায় আশানুরূপ উন্নয়ন না ঘটলে অর্থনৈতিক উন্নয়নের সুফল অর্জন সম্ভব হবে না।

দিনাজপুরে অনধিক ১২ (বার) টি ক্ষুদ্র নৃ-গোষ্ঠীর পরিচয় পাওয়া যায়। এ সব জনগোষ্ঠীর সংখ্যা জেলার মোট জনসংখ্যার ৪% এর বেশি। ক্ষুদ্র (সাঁওতাল, ওরাও, মুন্ডারী, মালপাহাড়ী প্রভৃতি) জনগোষ্ঠীর উপর চলমান উন্নয়ন প্রক্রিয়ার বিরূপ প্রভাব লক্ষ করা যায়। উন্নয়নের চলমান এই পুঁজিবাদি প্রক্রিয়াটি তাদেরকে অন্তর্ভুক্ত করে আপন করে নিতে পারে নাই বরং দূরে ঠেলে দিয়েছে। ক্ষুদ্র

নৃ-গোষ্ঠীর মানুষদের নিজস্ব ভাষা, সংস্কৃতি, অর্থনীতি সবকিছু যেন হারিয়ে যেতে বসেছে। তাদের নিজস্ব একান্ত আপন ভূবনটিতে তারা যেন আর বিচরণ করছে না। মানব বৈচিত্র্য রক্ষার স্বার্থে হলেও এ সকল জনগোষ্ঠীর ভাগ্য উন্নয়নে উদ্যোগ গ্রহণ করা জরুরি।



দিনাজপুরে এখনো অনেক উপজেলায় প্রয়োজনীয় রাস্তাঘাট, সেতু এবং বিদ্যুৎ-এর অভাব রয়েছে। কোন কোন ইউনিয়নে পাকা রাস্তা নেই। হাট-বাজারসহ প্রয়োজনীয় অবকাঠামোর উন্নয়ন হলে এসকল এলাকায় ব্যবসা-বাণিজ্য ও যোগাযোগ বৃদ্ধি পাবে। প্রত্যন্ত অঞ্চলসমূহে শিক্ষিতের হার, বিদেশে চাকরি করার হার একেবারে কম।

উত্তরাঞ্চলের জেলাগুলোর মধ্যে রাজশাহীর ন্যায় রংপুর সম্প্রতি বিভাগে উন্নীত হওয়ায় এখানে নতুন করে উন্নয়ন কর্মকাণ্ডের সূচনা হয়েছে। অবকাঠামোগত উন্নয়নের ক্ষেত্রে দিনাজপুরের তুলনায় রংপুরে কিছুটা বৈচিত্র্য লক্ষ করা যায়। রাজশাহীকে অনেকে শিক্ষা ও শান্তির নগরি বলে থাকেন। এ অঞ্চলটি উদ্যান, গবাদি পশুর উন্নয়ন ও মাছ চাষে অপেক্ষাকৃত সফল হয়েছে। উত্তরাঞ্চলের প্রবেশদ্বার বগুড়ার যোগাযোগ অবকাঠামো বেশ সমৃদ্ধ। দিনাজপুরের তুলনায় বগুড়া শিল্পক্ষেত্রে অনেক উন্নত। এসকল বিচারে উন্নয়নে দিনাজপুরের অবস্থান আশাব্যঞ্জক নয়।

### ১৪. অর্থনৈতিক উন্নয়নের সম্ভাবনা

দিনাজপুর অঞ্চলে কৃষিভিত্তিক শিল্প উন্নয়নের প্রচুর সম্ভাবনা রয়েছে। এ অঞ্চলের উৎপাদিত ফলমূল কাঁচামাল হিসাবে ব্যবহার করে জ্যাম্, জেলি, জুসসহ বেশ কিছু ভোগ্যপণ্য উৎপাদন করা যায়। দিনাজপুরে পর্যটন শিল্প বিকাশের এবং উন্নয়নের আছে যথেষ্ট সুযোগ ও সম্ভাবনা। দিনাজপুর রাজবাড়ি, ঘোড়াঘাট দুর্গ মসজিদ প্রভৃতি প্রাচীন স্থাপত্য নিদর্শনগুলিকে বিলীন হওয়া থেকে রক্ষা করা জরুরি। কাস্তজিউ মন্দির ও রামসাগরকে কেন্দ্র করে পর্যটন শিল্পকে সমৃদ্ধ করা যায়। এ উদ্দেশ্যে প্রয়োজনীয় অবকাঠামো গড়ে তোলা প্রয়োজন। ব্যক্তিগত উদ্যোগেও স্বপ্নপুরীর মত আকর্ষণীয় বিনোদন কেন্দ্র গড়ে তোলা সম্ভব। দিনাজপুর অঞ্চলে বেশকিছু ক্ষুদ্র ও কুটির শিল্প অনুন্নত ও ক্ষয়িষ্ণু অবস্থায় টিকে আছে। যেমন- চিড়াকুটা (ধান থেকে চিড়া তৈরি করা), মৃৎশিল্প, তাঁত, বাঁশ ও বেত শিল্প ইত্যাদি ক্ষেত্রে উন্নয়নমূলক কর্মকাণ্ড গ্রহণ করার যথেষ্ট অবকাশ রয়েছে। কৃৎকৌশলগত উন্নয়নের মাধ্যমে লোকপণ্যগুলোকে আরো সমৃদ্ধ করে উৎপাদন বাড়িয়ে বাজারজাতকরণের ব্যবস্থা করা যায়।

দিনাজপুর জেলার পার্বতীপুরে মধ্যপাড়া কঠিন শিলা প্রকল্প এবং বড়পুকুরিয়া কয়লা খনি প্রকল্প প্রধান খনিজ সম্পদ। মধ্যপাড়া কঠিন শিলা প্রকল্পের বার্ষিক উৎপাদন ক্ষমতা ১৬.৫ লক্ষ মে. টন। এর উৎপাদন থেকে সুলভ মূল্যে উন্নতমানের পাথরের সংস্থান করা যাবে। এই খনিতে মজুদ পাথরের চূর্ণ (স্টোন ডাস্ট) দেশের সিমেন্ট শিল্পের উন্নয়নে বিশেষ ভূমিকা রাখতে পারে। বড়পুকুরিয়া কয়লা খনিতে প্রাপ্ত কয়লা তাপ বিদ্যুৎ উৎপাদনে জ্বালানি হিসাবে ব্যবহৃত হলে বিদ্যুৎ উৎপাদন বৃদ্ধি পাবে। ব্যবসা-বাণিজ্য ও শিল্পায়নের প্রসার ঘটবে। প্রকল্প দুটিতে বিপুল পরিমাণ কর্মসংস্থানের সুযোগ সৃষ্টি হবে এবং এগুলো বৈদেশিক মুদ্রা সাশ্রয়ে সহায়ক হবে।

দিনাজপুরে করতোয়া, আত্রাই, পুনর্ভবাসহ ১৯ (উনিশ) টি নদীর অস্তিত্ব পাওয়া যায়। নদীপথের মোট দৈর্ঘ্য ৭২৪ কি: মি:। পূর্বে এসকল নদীকে কেন্দ্র করে একটি নদীভিত্তিক অর্থনৈতিক জীবন ব্যবস্থা ছিল। কালক্রমে নদীগুলোর নাব্যতা হ্রাস পাওয়ায় সেই ব্যবস্থাও ভেঙ্গে পড়ে। কৃষি উৎপাদন বৃদ্ধি এবং পরিবেশ সংরক্ষণে এই নদীগুলোর গুরুত্ব অপরিসীম। এই নদীগুলো খননের মাধ্যমে ভূ-গর্ভস্থ পানির বিকল্প হিসেবে প্রাকৃতিক উৎস থেকে সেচের পানির সংস্থান করা যেতে পারে। তাতে সেচ সুবিধা বৃদ্ধি পাবে। দিনাজপুর সদর উপজেলায় কয়েকটি বড় দিঘি (সুখসাগর, আনন্দ সাগর, মাতাসাগর) রয়েছে। এগুলোর প্রকৃত সীমানা এবং নৈসর্গিক সৌন্দর্য রক্ষা করা প্রয়োজন। দিনাজপুর বড়মাঠ এই এলাকার একটি অন্যতম শ্রেষ্ঠ সম্পদ। এর বিস্তৃত পরিসর ও পরিবেশ সংরক্ষণে দিনাজপুরবাসীর গুরুত্বপূর্ণ দায়িত্ব রয়েছে।

### ১৫. সুপারিশসমূহ

(ক) নিরাপদ কৃষি উৎপাদনকে অগ্রাধিকার দিতে হবে। যাতে ভূ-গর্ভস্থ পানি কম ব্যবহৃত হয়। এজন্য ভূট্টা, আলু, সরিষা ও মসলা জাতীয় ফসল বেশি উৎপাদন করতে হবে। কোন এলাকা কোন শস্য উৎপাদনের উপযোগী তা নির্ধারণ করে বিশেষ শস্য অঞ্চল গঠন করতে হবে। দিনাজপুরের উন্নয়নে ভূমির সর্বোচ্চ ব্যবহার নিশ্চিত করে বাণিজ্যিকভাবে লাভজনক অধিক মূল্যবিশিষ্ট শস্যের (এইচভিসি) উৎপাদন বৃদ্ধি করতে হবে। কোন জমি অপরিষ্কৃতভাবে বা অকর্ষিতভাবে ফেলে রাখতে দেয়া যাবে না। সম্ভাব্য ক্ষেত্রে ভূমিহীনদের মধ্যে খাস জমি বণ্টনের ব্যবস্থা করতে হবে। কৃষির আধুনিকায়ন, মৌসুমী ফল ও সবজি (আম, লিচু, কাঁঠাল ও টমেটো) সংরক্ষণ ও ফলের জুস তৈরির কারখানা স্থাপনের মাধ্যমে বেকার সমস্যার সমাধানসহ বৈদেশিক মুদ্রা অর্জন করা সম্ভব।

(খ) আন্তঃআঞ্চলিক ও আন্তর্জাতিক শিল্প-বাণিজ্য বিকাশের লক্ষ্যে দিনাজপুরকেন্দ্রীক পরিষ্কৃত বিশেষ অর্থনৈতিক অঞ্চল প্রতিষ্ঠা করা প্রয়োজন। শিল্প উন্নয়নে বেসরকারি খাতকে এগিয়ে আসতে হবে এবং কৃষিভিত্তিক শিল্প উন্নয়নের বিপুল সম্ভাবনাকে কাজে লাগাতে হবে। দিনাজপুরের শিল্প উন্নয়নের জন্য প্রয়োজনীয় সংখ্যক উন্নয়ন ব্যাংকের শাখা স্থাপন, বেসরকারি ব্যাংকের শাখা বৃদ্ধিকরণ এবং লীজ ফাইন্যান্সিং প্রতিষ্ঠানের শাখা স্থাপনের মাধ্যমে ঋণ মঞ্জুরী কর্তৃপক্ষের বিকেন্দ্রীকরণ করা সম্ভব। দিনাজপুরের বন্ধ হয়ে যাওয়া শিল্প-কারখানা চালু করার ব্যবস্থা গ্রহণ এবং সেতাবাগঞ্জ চিনিকলের আধুনিকায়ন, পুনর্বাসন ও পরিবর্ধনের মাধ্যমে লাভজনকভাবে পরিচালনার ব্যবস্থা গ্রহণ করতে হবে।

(গ) ব্যবসা-বাণিজ্যের প্রসারের জন্য দিনাজপুরসহ উত্তরাঞ্চলের সকল জেলার রাস্তাঘাট, যাতায়াত ও যোগাযোগ ব্যবস্থা উন্নত করে গড়ে তোলার বিকল্প নেই। বৃহত্তর দিনাজপুর মহাসড়ককে ৪ লেনবিশিষ্ট করে রংপুর-বগুড়া-সিরাজগঞ্জ-ঢাকার সাথে পরিবহন ব্যবস্থার উন্নয়ন সাধন করা প্রয়োজন।

(ঘ) মানব সম্পদ উন্নয়নে প্রয়োজনীয় প্রাতিষ্ঠানিক অবকাঠামো সৃষ্টি করে সরকারি ও বেসরকারি উদ্যোগে মানবসম্পদ উন্নয়নে কার্যকর কর্মসূচি বাস্তবায়ন করতে হবে। শিক্ষার প্রসার, শিক্ষার মান বৃদ্ধি এবং স্বাস্থ্য সেবার ব্যয় হ্রাসসহ স্বাস্থ্য সচেতনতা বাড়ানোর পদক্ষেপ গ্রহণ করতে হবে। বেসরকারি উন্নয়ন সংস্থাগুলোকে ঋণমুখী কার্যক্রম পরিচালনার ধারণা থেকে বেরিয়ে এসে শিক্ষা, মানবসম্পদ উন্নয়ন, প্রশিক্ষণ, শিল্প ও কর্মসংস্থানমুখী কার্যক্রম গ্রহণ করতে হবে।

(ঙ) দিনাজপুরের ঐতিহ্যবাহী পুরাকীর্তিসমূহের সংস্কার ও সংরক্ষণ করে পর্যটন শিল্পের উন্নয়ন ঘটানো সম্ভব। পর্যটন শিল্পের বিকাশে অবকাঠামোগত উন্নয়নসহ প্রয়োজনীয় পদক্ষেপ গ্রহণ করা প্রয়োজন।

(চ) বিরল ও বাংলাহিলি স্থলবন্দরের আধুনিকায়ন ও অবকাঠামো উন্নয়নের মাধ্যমে আমদানি ও রপ্তানি (ভারত, ভূটান ও নেপাল) বাণিজ্য বৃদ্ধি করা যায়।

(ছ) দিনাজপুরের মহারাজা ও জনগণের খননকৃত দিঘি ও পুকুরগুলিকে সংস্কারের মাধ্যমে মৎস্য চাষ ও উৎপাদন বৃদ্ধি করা যায়।

### ১৬. উপসংহার

কোন অঞ্চল বা সমাজের উন্নয়নের সুষ্ঠু সম্ভাবনাগুলো বাস্তবে পরিণত হয় সেই অঞ্চলে বা সমাজে বসবাসকারী মানুষের নিজস্ব প্রচেষ্টায়। অর্থাৎ, উন্নয়ন সূচিত হয় সমাজের অভ্যন্তর থেকেই নিজস্ব উদ্যোগ ও প্রচেষ্টায়, বাইরে থেকে নয়। বহির্জগতের যত উপকরণ-তার যোগ উন্নয়নকে ত্বরান্বিত করে মাত্র- উন্নয়নকে সূচিত করতে পারে না। দিনাজপুরের উন্নয়নে সরকারি বিভিন্ন উন্নয়নমূলক কর্মসূচির

কার্যকর ও সফল বাস্তবায়নের পাশাপাশি বেসরকারি উন্নয়ন সংস্থাগুলোকে গুরুত্বপূর্ণ ভূমিকা পালন করতে হবে। এ অঞ্চলের ব্যবসায়ী উদ্যোক্তা শ্রেণিকে শিল্পের উন্নয়নে এগিয়ে আসতে হবে। নতুন উদ্যোগ ও উদ্ভাবনী প্রচেষ্টার মাধ্যমে জনগণের বেকারত্ব দূর করতে হবে। দিনাজপুরের বিভিন্ন সমস্যা ও সম্ভাবনা তুলে ধরার ক্ষেত্রে গণমাধ্যমের ভূমিকা রয়েছে। সর্বোপরি শিক্ষা ও সচেতনতা বৃদ্ধির সর্বোচ্চ প্রচেষ্টার মাধ্যমে এ অঞ্চলের মানুষের উন্নত ভবিষ্যৎ বিনির্মাণ করা সম্ভব। জনগণের মনে, চিন্তায় ও কর্মে উন্নত জীবনের আকাঙ্ক্ষা বাড়িয়ে দিতে পারলে দিনাজপুরের উন্নয়ন প্রক্রিয়া বেগবান হবে।

### গ্রন্থপঞ্জি

আলী, মেহরাব। দিনাজপুরের ইতিহাস সমগ্র, ৫ম খণ্ড। দিনাজপুর: দিনাজপুরের ইতিহাস প্রকাশনা প্রকল্প, ২০০২।

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গণপ্রজাতন্ত্রী বাংলাদেশ সরকার। আদমশুমারি ও গৃহগণনা ২০১১। বাংলাদেশ পরিসংখ্যান ব্যুরো (বিবিএস), পরিকল্পনা মন্ত্রণালয়, জুন ২০১২।

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## **Value Chain Analysis of Beef Cattle in Selected Areas of Northern Bangladesh**

**P. K. Sarma\***  
**S. K. Raha\***  
**M. I. A. Mia\***  
**H. Jørgensen\***

**Abstract:** *The study was conducted in Pabna and Sirajganj districts of Bangladesh during the period 2013-2014 to examine the beef cattle value chain focus on actors, understanding relationships, opportunities, and bottlenecks and suggesting the specific areas of intervention to develop the value chain. In total 220 respondents comprising 180 producers, 18 traders, 6 brokers, 3 butcher shops, 2 supermarkets, 2 meat processing companies, 3 hotel owners, and 6 consumers were interviewed. The study followed GTZ, ACDI/VOCA, and M4P value chain analytical framework but only mapping value chain analytical technique was used because of its clear understanding of the sequence of activities and the key actors and relationships involved in the value chain. This analytical is carried out in qualitative and quantitative terms through graphics presenting the various actors of the chain, their linkages and all operations of the chain from pre-production (supply of inputs) to meat processing and marketing. The researcher found that beef cattle value chains improve livelihoods, increase incomes and promote economic growth by supporting development of domestic industries, improving local markets, and expanding export opportunities and also identified areas within the value chains where strategic policy and institutional reviews need to be undertaken to address specific constraints affecting the overall performance of the value chains. The researcher recommended promoting the beef productivity and competitiveness, it can be enhanced by improving fodder production, processing and preservation, breed and provision of animal health extension services, credit facilities, technology transfer through established in demonstration beef fattening farm, campaigns vaccination and de-worming and market linkage. The study recommends intervention in the area of linking actors in*

\* Bangladesh Agricultural University Research System (BAURES), Department of Agribusiness and Marketing, Bangladesh Agricultural University, Mymensingh-2202, Bangladesh and Danish Agricultural Advisory Council, Knowledge Center for Agriculture, Denmark.

*the value chain to prospective markets for them to benefit from the various activities.*

**Key words:** Beef cattle, Value chain analysis, Actors, Mapping

## 1. Introduction

The study focused on beef cattle value chain analysis of Shathia and Raigonj char areas under Pabna and Sirajganj districts respectively because of hinterlands of beef cattle. The indigenous beef cattle in the study areas comprise rich livestock resource base on creating opportunities for additional employment and alternative source of income and cattle population. It can also provide food security, as draught animal and liquid assets for mitigation the family risk and need. On the other hand, in our country beef cattle has high demand but supply is always short. Fattened beef cattle has a high demand during various Muslim's Festivals particularly *Eid-ul-Azha* in every year. The study aimed at analysing the value chain structure of the beef sub sector in char areas where hinterlands of beef cattle supply is increasingly becoming important.

The specific objectives of the study are to identify primary actors in the value chain while pointing out their roles and interrelationships and to identify associated challenges and opportunities for improving the value chain.

## 2. Materials and Methods

### 2.1 Conceptual Framework of Value Chain Analysis

The objective of value chain analysis (VCA) is to increase the valuation of the materials at every stage of the value addition chain, from the farm level to the marketing of the finished products. According to Fearn et al., (2012), VCA assists in identifying strategic and operational misalignment as well as misallocation of sources and it provides an opportunity for improvement by creating value, environmental and social responsibility. In addition, Sharma et al., (2010) indicated that VCA creates a sustainable competitive advantage, particularly when there is a diversification of value added activities, which includes a strong supply of raw materials and established connection within and outside the business units. Value chain describes the full range of activities which are required to bring a product or service from conception, through the different phases of production, delivery to final consumers and final disposal after use (Kit et al., 2006, Kapslinky and Morris, 2000). Value chain promotion is an effective way of fostering rural-urban linkages and the concept provides a useful analytical framework for market and sub-sector analysis (ECAPAPA, 2006). The concept of Value chain is discussed from three distinct traditions: the French 'Filière concept', Porters concept and Wallerstein's concept of Global commodity chain (Raikes et al., 2000). The Filière is used to describe the flow of physical inputs and services in the production of a final product and is essentially similar to the modern value chain

concept (Melle et al., 2007). Value chain approach presents a good picture of the process of creating value. Value chain analysis helps in understanding of connection among actors in the chain and the way trade takes place. An agricultural value chain is considered as an economic unit of analysis of a particular commodity or group of related commodities that encompasses a meaningful grouping of economic activities that are linked vertically by market relationships (Getachew, 2012). The first step in value chain analysis is mapping of the core processes and activities in the chain (Mmasa and Msuya, 2011). Value chain mapping is the process of developing a visual depiction of the basic structure of the value chain. Value chain map illustrates the way the product flows from raw material to end markets and presents how the industry functions (McCormick and Schmitz (2001). Visualizing networks will give a better understanding of connections between actors and processes in a value chain, demonstrate interdependency between actors and processes in the value chain and create awareness of stakeholders to look beyond their own involvement in the value chain (Michael et al., 2010). The philosophical important of the categorization that was described above was based on the need to identify primary activities that were core in order to gain the competitive advantage and secondary activities that would be the drivers to attaining these advantages, such as competencies and assets (Sanchez & Heene, 2004). Nevertheless, the value chain model by Proter (1985) was critiqued for excluding important aspects such as market creation, strategy, customer service and distribution from the main activities (Morden, 1999). Moreover, Morden (1999) further suggested that procurement of goods should be the core activity in any value addition. Other highlighted that the entire process is important given the complexity of generating internal and external data such as gaining competitive advantage (Partridge & Perren, 1993; Hergert & Morris, 1989).

Based on the above discussion on conceptual framework of value chain analysis only mapping value chain analytical technique is used in this study.

**2.2 Study Area:** The study was carried out in Pabna and Sirajganj districts under the northern Char areas of Bangladesh. The zone was chosen because of its status as one of the major cattle growing areas in the country. Large volume of beef cattle is traded in urban centers located in the zone. Also, the prospect for value addition is promising due to the presence of emerging processing industries.

**2.3 Sources and types of data:** Primary data were utilized for this study. Primary data were obtained through the use of pretested questionnaire and focus group discussions. Primary data were collected from actors of the value chain including producers, marketers and processors. The primary data were collected include: quantity of plantain produced, marketed, processed, flow of the product, volume of product in the flow, as well as associated constraints and opportunities in the chain. Researcher followed the five steps to determine the sample size;

- i) Basing on the availability of budget, timescale, performance to decide the sample size;
- ii) Elect the representative regions for beef cattle production in two areas that located in supply hinterlands/ areas.
- iii) Select representative communes that located in these districts
- iv) Select farmers, arrange annual surveys and carry out face to face interviews
- v) Select local collectors, middlemen, slaughter houses and enterprises

The sample is distributed as follow;

- 180 beef cattle farmers households;
- 34 different value chain actors;
- 4 slaughter house; and
- 2 meat processing companies

**2.4 Analytical Procedure:** Collected data were analyzed using descriptive statistics such as frequency, percentage and tables. Value Chain mapping was analyzed using functional analysis. The core processes, actors involved, flow and quantity of product at each node of the value chain were determined. A flow chart was used to represent the activities in the value chain. Analytical frameworks were proposed by international organizations such as GTZ, ACIDI/VOCA, M4P (Market for Poor) and were applied because these frameworks are according context of research.

### 3. Results and Discussion

The results of the present study are represented in this section. The results are presented under the following sub-headings;

#### 3.1 Beef Value Chain Actors, Functions and Relationships

Key players of beef cattle in selected char areas comprise a number of participants or actors. The value chain analysis of beef cattle production in study areas consists of a complex network of stakeholders, who work within specific stages from farm to plate. The chain integrates beef cattle producers, traders, butchers, wholesalers and retailers. The beef cattle are moved from farmers to traders, then to butchers who slaughter animals and convert them into marketable products. The products finally reach consumers through wholesalers and retailers.

**3.1.1 Input Suppliers:** Input supply for beef production consists of the supply of animals for fattening, provision of animal health services, feed and provision of credit services. The present study found that there were 5 (five) types of main

inputs supplying actors of beef cattle sub-system agribusiness of northern Bangladesh. The primary actors in the cattle value chain include the following: a) Calves supplier, b) Beef Cattle feed (grass, legumes, concentrate feed, mineral mixtures) supplier, c) Medicine and veterinary support provider, d) Tools, Technology and other equipment (equipment needed for slaughtering and butchering, ropes, etc.) supplier, and e) Support service actors

**3.1.2 Cattle Farmers/Producers:** The smallholder producers in the study areas are the major suppliers of beef cattle for domestic consumption and meat processing for the Bengal Meat Processing Industries Limited (BMPIL) along Pabna Meat Company. Particularly the smallholder cattle farmers supply fattened beef cattle to the terminal markets of Gabtoli cattle market all year-round. The producers of these areas have a strong tradition in which 3-4 head of beef cattle are tethered and managed by stall feeding. In this production system, the farmers usually use beef cattle after the final phase of their primary purposes leading to very high cost of production at the final stage of fattening period.

**3.1.3 Traders:** These market agents usually operate in the primary beef markets, buy up to 5-8 animals on a given marketing day using their own capital or big traders' money and they have trade ties with affiliated large traders. These traders have detailed knowledge of the production system and related environs in cases where disputes arise with regard to transactions.

**3.1.4 Collectors and transporters:** These market actors serve as mediators between buyers and sellers in the livestock market. They are usually expected to link buyers with sellers and facilitate the terms of exchange.

**3.1.5 Processors/slaughters:** The primary processing work is done at abattoirs including: de-hiding, quartering the whole carcass and transport to clients (butchers, hotels, and/ supermarkets, etc.). Supermarkets also further process the meat for their retail outlets. and hotels process the meat into different retail food commodities.

**3.1.6 Butchers:** Butchers are those who are engaged in selling of cattle meat to consumers. They are found in rural as well as in urban areas. They usually buy cattle from primary and secondary markets before slaughtering them and selling the meat to various consumers. They may prepare standard cuts of meat for sale in retail or wholesale food establishments. That is because they require fleshy animals, since raw cut meat is becoming a popular product in larger towns. Butchers serve both raw and processed meat to individual consumers and institutional buyers. Two types of butchers are found, one is roadside butcher who slaughtering cattle in a traditional way in villages and do not use slaughter houses and the second one is employed butchers.

**3.1.6.1 Roadside butchers of beef:** Roadside and market stall butchers account for 75-80 percent of all retailed meat and are the backbone of the meat supply



chain. They have no cooling facilities and therefore only stock meat that can be sold within the day. Processing by these butchers is minimal and there is unhygienic handling of meat at this level. Modern butchereries and supermarket butcher stands meet a higher standard of hygiene and food safety and cater for the premium segment of the meat market. There is use of standard equipment, such as displays, and freezers. A range of processed meats and products are made available. Prices are at a steep premium to mainstream market prices.

**3.1.6.2 Employed butchers:** The employed butchers are employed by supermarkets, grocery stores, butcher shops, City corporation and other agribusiness actors. They only slaughter cattle as per their requirement. Sometime they charge wage per cattle and took hides and sell to other party.

**3.1.7 Distributors:** Pabna and Sirajganj districts are beef cattle supply hinterlands of Bangladesh. Conventionally many cattle markets in these areas are categorized into primary market, secondary market and terminal market. The basis of such classifications is mainly the number of animals that attended the market per market day and the number of market participants in the market. In terms of number of animals, primary, secondary and terminal markets are those in which less than 200 heads, 200–500 heads and greater than 500 heads of animals attend the market per day, respectively. In terms of market participants, primary markets are those in which the main sellers are producers and the main buyers are local assemblers and secondary markets are those in which the main sellers are local assemblers and main buyers are big traders. In terminal market the main sellers are traders and main buyers are butchers and restaurants.

Though various routes /channels, beef cattle are brought into Gabtoli terminal market at Dhaka for trade. The actors like bepany/traders purchase these beef cattle from farmers of different areas, town, and villages and transport them via trucks, mini trucks, Votboti and- Nosimon, etc. The distribution system of beef cattle includes the following main factors:

- i) Farmers sell their animals to the local butchers and bepany by carrying them in small local markets;
- ii) Bepany/traders purchase directly from the farmers at source/farm level to transport them to the main market of Dhaka city for further trade;
- iii) Local bepany of local market purchase these animals to further sell to butchers;
- iv) Traders purchase animals from Irshordi, Sirajganj, Pabna and Aronkhola market also supply cattle to Dhaka; and
- v) Wholesalers purchase cattle to further sell to small butchers after slaughtering.

**3.2 Distribution Network:** The company regular distributing their beef products in their target market including restaurants, lounges, hotels, and mega shops like Agora, Nandan and Meena Bazar as they have a huge demand for frozen beef products to cater the never ending demand of their customers. Now, Bengal Meat Industry regularly supplies to five star hotels like Radisson, Westin, Pan Pacific Sonargaon and 25 butcher shop (like Dhali Super Store, Lavender, Bengal Meat Butcher Shop, Non Stop Mega Shop, Saad Musa City Center, Pick & Pay, Carre Family, Daily Super Shop, Western Bazar, Family Needs Ltd etc.) in Dhaka. High quality conscious individual customers who are high income level and lives in urban areas buy meat from butcher shops as per their requirements.

### **3.2.1 Supermarket butcher stands:**

Dhaka city accommodates a number of shopping malls and large super markets constructed and equipped according to international standards: Agora, Nandan and Meena Bazar, are malls that accommodate supermarkets with dedicated Asian style butcher stands. Prices for processed meat in supermarkets don't vary much due to the dominance in the market by the leading processing company "Quality Cuts" that caters for this higher income segment of the population. The prices are typically significantly higher in comparison to those in road side butchers. The consumer with a higher income prefers meat that is offered in a hygienic and attractive way, with a broad variety of retail cuts on offer and is apparently able and willing to pay much higher prices for that type of product. According to the operators of butcher stands in supermarkets, minced beef is the best seller among beef products indicating that there are many consumers, irrespective of income levels, prefer to purchase minced beef in supermarkets rather than roadside butchers. This is an indication that consumers are willing to pay more for meat that has been processed in a hygienic manner and offers opportunities for expansion in the meat processing and packaging sectors.

**3.2.2 Retailers:** They buy cattle from large and small-scale traders before selling them on to individual consumers, butchers and hotels and restaurants at terminal market. Some of them own or rent holding centers for animals and use supplementary feeding. These retailers have better financial capacities than small-scale traders and wholesalers. Retailers play an important role in determining the market price of cattle at farm gate, roadside and at other primary and secondary market places.

**3.2.3 Consumers:** They are the end value chain actors in the study area. Beef consumers as mentioned above are domestic consumers who buy either processed meat from butchers and supermarkets or who, as a group, buy beef cattle to slaughter and then share the meat. In the study, two types of consumers found actively such as:

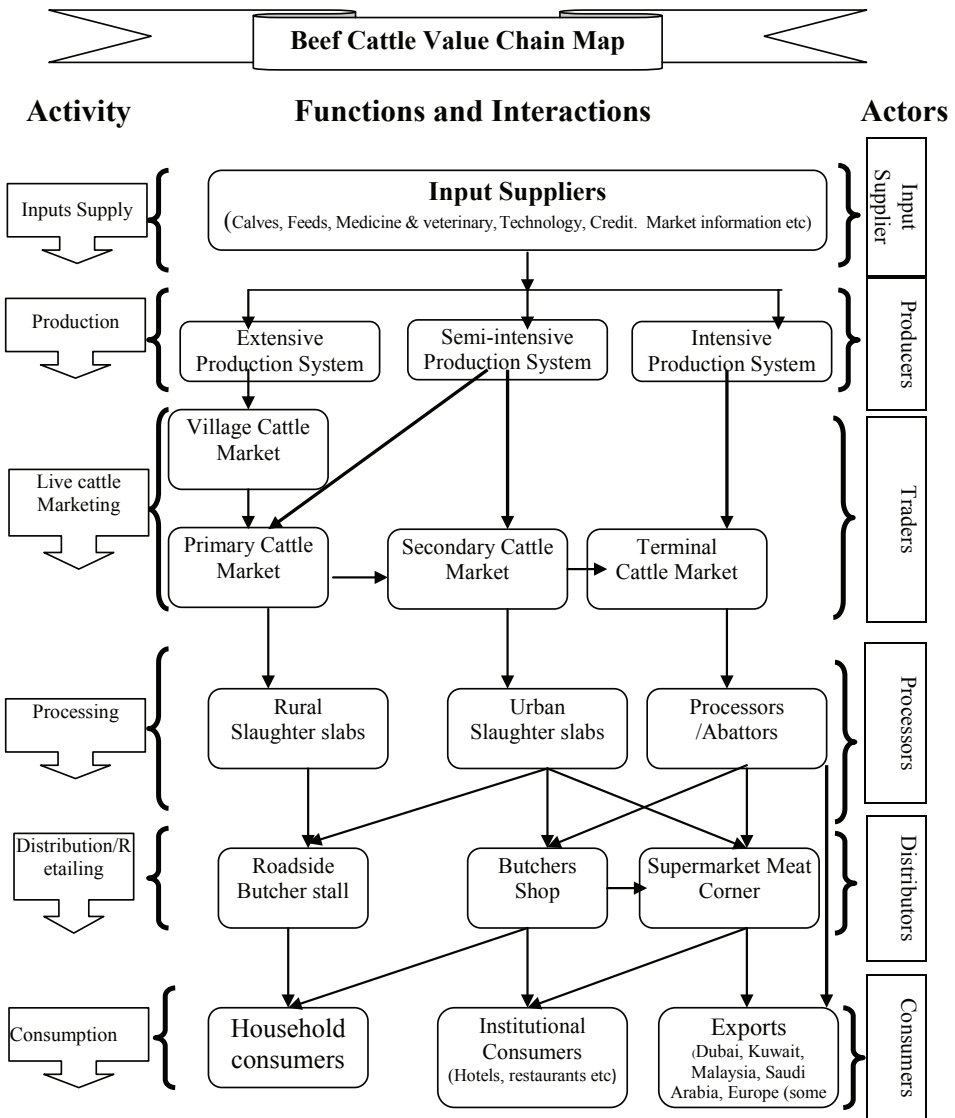
**3.2.3.1 Hotels and Restaurants:** These are the final actors in the value chain.

Hotels are supplied with carcasses as per their specific requirements by butchers, The hotels and restaurants prepare dishes such as beef curry, brown meat, beef masala biryani, beef tehari, beef nehari, kababs, koftay, paya curry, noodles, hotdogs, pizzas, burgers, soup, sandwiches etc. and sell them to their customers. Hotels and restaurants in Pabna, Sirajganj and other smaller towns can buy beef cattle from producers, collectors and small-scale traders. However, those in larger towns and cities, like Dhaka, Chittagonj, rely on retailers and large-scale traders and meat processing company to supply slaughter animals for their purposes.

**3.2.2.2 Individual consumers/Household consumers:** Individual consumers are market actors who buy directly from any butcher shop that satisfies their needs for household consumption. During certain holydays of the year groups of individual consumers come together and buy beef cattle to slaughter and to share the meat. They buy from the retailers. Meat quality and quantity aside, there is prestige in slaughtering fattened and sterile cattle. However, most low-income consumers buy mid-aged cattle, since they cannot afford the price of younger ones.

### 3.3 Beef Value Chain Map

The information gathered during the study enabled the longitudinal mapping of the beef cattle value chain in the study area as presented in Figure 1. The value chain map illustrates the way in which beef cattle and their products flow from production areas to end markets and how the overall beef cattle sector operates. It is a visual representation of the structure of the value chain and its main characteristics or “a narrative description of the main characteristics of the value chain”(UNIDO, 2012). In the value chain map (Figure 1) the marketing functions are represented on a vertical axis on the left hand side of the diagram and the existing actors are represented using boxes with solid outlines, which may encompass several vertically integrated functions. The product and/or service flows between nodes are represented by arrows; for example, from production to wholesaling, from wholesaling to retail or export, or from primary wholesaling to secondary wholesaling (in the case of a series of ‘actors’). The movement of a good or service between nodes implies that value is added to the product. The end market segments are placed at the top of the diagram and represented by ellipses. There are several channels, or ‘strands’, in the value chain. These are denoted by numerals at the top of the diagram and defined by product types, routes to market and end market segments. The number of actors in each segment, the flow volumes and profit margins constitute an important input to the value chain. Based on quantitative data interesting findings are emerged from the mapping which are presented below;



**Figure 1. Beef Value Chain Map**

Source: Authors' illustration 2014.

### 3.4 Cost and returns at different stages of beef value chain

Table 1 presents the cost and returns at different stages of beef value chain. In the rearing stage, farmers' contribution is 49.36% of cost of value addition and received net margin only 21.58% which is lower than cost in the value chain. In the live animal trading stage, trader contributes 9.50% to costs of value addition and received 21.37% of net margin. On the other hand, butcher, processing company and hotel or restaurant owner incurred cost at 4.39%, 6.50% and 29.71% and

received net margin at 14.19%, 17.25% and 25.61% respectively. The traders, butchers and meat processing companies were more benefited in the chain. To make businesses sustainable initiatives should be taken at farmer's level by facilitating support services and development market linkage.

**Table 1. Distribution of value addition across different stages of the value chain (in BDT/Cattle)**

Actors	Purchasing Price of cattle	Purchase of additional materials and services	Total costs	Total return	Net margin
	<i>a</i>	<i>b</i>	<i>c=a+b</i>	<i>d</i>	<i>e=d-c</i>
Farmer	29138.76	11319.29 (49.36%)	40458.05	50747.61	10289.56 (21.58%)
Meat trader	50198.33	2177.62 (9.50%)	52375.95	62568.71	10192.76 (21.37%)
Butcher	62568.71	1129.42 (4.39%)	63698.13	70465.11	6766.98 (14.19%)
Meat processor	62568.71	1490.63 (6.50%)	64059.34	72285.05	8225.71 (17.25%)
Hotel and restaurant owner	76423.55	6812.85 (29.71)	83236.4	114320.31	12214.62 (25.61%)

Note: Figures within parenthesis indicate percentage of cost and value addition and net margin in the chain  
Source: Field Survey 2014

The contributing costs in the value chain are by farmers (49.30%), traders (9.50%), butcher (4.39%), meat processors (6.50%) and restaurant owners (29.71%). The highest profit captured by farmer (21.58% in 3 to 5 months) followed by traders (21.37% in 7 to 10 days), butchers (14.19% in 2-3 days), meat processors (17.25% in 2-7 days) days and restaurants' share was 25.61% during the value adding activities. Among the actors, the butchers and meat processors captured more profit in terms of time involvement in the chain. Butchers, smaller traders, hotel and restaurant owners and larger traders are earning higher net margins than beef cattle producers who are doing all work of producing the beef cattle and bearing the associated risks.

### 3.4 Bottlenecks and Intervention of Beef Cattle Value Chain Development

Table 2 summarizes the challenging/ bottlenecks and possible strategies focus on overcome the problem to develop beef cattle value chain in the study areas.

**Table 2. Major bottlenecks and intervention for development of beef cattle value chain**

Bottlenecks/ Challenges	Level	Possible intervention and Strategies
i) Inadequate access to calf, feed and veterinary services. ii) Lack of grazing land.	Input Supplier	i) Linkage between cattle producers and input sellers ii) Facilitate development of entrepreneurs in input sector. iii) Provide feed processing techniques for preservation cattle feed iv) Allotment of Khas land to actual users

<ul style="list-style-type: none"> <li>i) Lack of access to market information and appropriate fattening technologies.</li> <li>ii) Lack of capital</li> <li>iii) Low productivity.</li> <li>iv) Lack of support services.</li> </ul>	Producers	<ul style="list-style-type: none"> <li>i) Promotion of market information &amp; production technologies by DLS and NGOs</li> <li>ii) Provide easy access to finance to farmers for purchase of inputs and other related services.</li> <li>iii) Facilitate introduction and adoption of crossbred calves and fattening technologies that will improve productivity</li> <li>iv) Development of cattle producers group, contractual arrangements and needs advocacy for support services</li> </ul>
<ul style="list-style-type: none"> <li>i) Poor access to market information and transportation.</li> <li>ii) Lack of access to finance of cattle traders.</li> <li>iii) Illegal highway toll or market toll.</li> <li>iv) High risk to carry cash during the marketing.</li> <li>v) Lack of market infrastructures.</li> </ul>	Live Animal Traders	<ul style="list-style-type: none"> <li>i) Establish MIS and disseminate information on price, demand-supply situation &amp; road conditions through SMS &amp; national media.</li> <li>ii) Provide specialized cattle transport vehicle.</li> <li>iii) Provide credit to traders without land grantee .</li> <li>iv) Establish low and force.</li> <li>v) Explore possibility of extension banking hour during the <i>hat</i> day.</li> <li>vi) Develop cattle market infrastructures including cattle holding space, drainage, and water supply etc.</li> </ul>
<ul style="list-style-type: none"> <li>i) Importation of beef processing equipment</li> <li>ii) Lack of sustainable beef cattle supply</li> <li>iii) Lack of easy access to <i>Hallal</i> Certificate</li> <li>iv) Lack of investment in establishment of meat processing firm</li> <li>v) Lack of hygienic cattle slaughtering slab</li> </ul>	Processors	<ul style="list-style-type: none"> <li>i) Tax free import of beef processing equipment.</li> <li>ii) Linkage development with contract farmers and Processing plant / wholesale beef traders</li> <li>iii) Smoothing the process of issuing certificates by veterinary surgeon and Islamic foundation</li> <li>iv) Encourage establishment of meat processing firm through public-Private partnership model</li> <li>v) Establish and use hygienic cattle slaughtering slab.</li> </ul>
<ul style="list-style-type: none"> <li>i) Unwilling to pay for quality beef</li> <li>ii) Lack of hygienic beef retail place</li> <li>iii) Lack of transportation</li> <li>iv) Buffalo meat mix with beef</li> </ul>	Distributors/ Retailers	<ul style="list-style-type: none"> <li>i) Awareness development among the customer about safe and quality beef and price</li> <li>ii) Develop hygienic retail store and beef packaging system.</li> <li>iii) Arrange transportation facilities to carry beef from slaughterhouse to store in the market</li> <li>iv) Monitoring and provide punishment of dishonest beef seller.</li> </ul>
<ul style="list-style-type: none"> <li>i) Lack of fresh, hygienic and <i>Hallal</i> beef.</li> <li>ii) Lack of quality</li> <li>iii) High price</li> </ul>	Consumers	<ul style="list-style-type: none"> <li>i) Provide training to butcher for ensuring fresh, hygienic and <i>Hallal</i> beef.</li> <li>ii) Dissemination of information about safe and quality beef</li> <li>iii) Ensure supply of quality beef by following govt. rules</li> <li>iv) Promotion of consumerism.</li> </ul>

Source: Field survey, 2014.

#### 4. Conclusion

The value chain analysis is very crucial issue facing the agribusiness sector of the country economy as the Char agribusiness has been noted for the sale of live animal production and marketing is one of the major livelihood options in study areas. The beef cattle value chain actors are producers, collectors, brokers, traders, butchers, processors and retailers. Value chains provide an excellent framework for assessing opportunities for poor people in livestock markets. They allow focus on the individual components of production and marketing chains that need to be improved, as well as the benefits of different institutional arrangements, needed public investment and enabling policies and regulations. Scope exists for up scaling of activities at different stages in value chain. They generate income, and employment for farmers, traders, service providers, butchers, processors and

exporters, etc. There is a very strong interest in the development of branded meat products that can be supported by certified production and processing protocols that are subject to investigations. A number of different forms and opportunities can be expected to arise. Initial support and the provision of expertise will facilitate this development.

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## **Supply Chain Analysis for the Development of Poultry Feed Industry in Bangladesh**

**M. Azadul Haque\***  
**M. Akteruzzaman\***  
**M. A. Hashem\***

**Abstract:** *The study aims to examine the supply chain analysis of poultry feed covering Dhaka, Gazipur, Narsingdi, Kishoreganj and Mymensingh district. In total 30 feed mills which categorized as high, medium and low quality on the basis of feed conversion ratio (FCR) along with 45 dealers; 15 sub-dealers and 120 farmers purposively. The primary data were collected during March 2013 to March 2014 by using survey schedule, KII and FGD. In addition, the secondary data were collected from different government documents. It is evident that the cost of feed was found Tk 39295, Tk 38643 and Tk 37218 per MT (metric ton) for high, medium and low quality feed mills, respectively. The gross returns were found to Tk 43160, Tk 42330 and Tk 40500 per MT and gross margin were Tk 6486, Tk 5957 and Tk 5285 per MT, respectively. The net returns were found Tk 3865, Tk 3687 and Tk 3279.2 per MT, respectively. It indicates that total gross return, gross margin and net return were higher than for high quality feed mill than medium and low quality feed mill. It is also evident that about 60% of raw materials were purchased from Dinajpur, Rangpur, Rajshahi, Jamalpur and Haor and coastal areas such as Bagergerhat, Chittagong and Khulna, where 100% of feed additives were imported. The unavailability of raw materials was the major problem for feed mills operation which influenced feed price and quality. If these problems could be solved within a reasonable time, stakeholders' would be able to get more benefits and run business smoothly.*

### **1. Introduction**

Livestock is playing an important role in the national economy by contributing significantly to agriculture and to the gross domestic product (GDP) of Bangladesh. The agricultural sector contributes 12.57% in the GDP whereas livestock sector contributes 2.15% in the GDP (BBS, 2014). Furthermore, it plays a pivotal

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\* The authors are respectively PhD Fellow, Department of Agricultural Economics and Professors Department of Agricultural Economics Professor, Department of Animal Science, BAU, Mymensingh.

role in the rural socioeconomic system as maximum households are directly involved in livestock. Total investment in poultry industry was Tk 150 billion with an annual turnover of Tk. 200 to 250 billion (Chowdhury, 2013). About 6 million people are employed in this industry and the number of commercial poultry farms in Bangladesh were 114,000 in 2010; 98000 in 2011 and 75000 in 2012 (Chowdhury, 2013). This has created job opportunity for more than 6 million people. Poultry industry is one of the major among livestock sub-sectors that committed to supply cheap sources of good quality nutritious animal protein to the nation. Poultry meat production was 30.21 lac tonnes and egg production 67542.80 lac in 2013/14 (BER, 2014). People in Bangladesh raise poultry mainly with a view to getting meat and egg to fulfill their day-to-day's consumption. Poultry plays a pivotal role in bridging the protein gap of animal origin in Bangladesh. Meat holds an important position in our daily diet. Chicken meat is also highly acceptable by all the people of almost all religions and cheap source of animal protein. Local as well as crossbred chicken production is still important system to support the fast growing human population with high quality protein. Table 1 shows that among animal population in Bangladesh, poultry population was 2329.9 lac in 2005-06 and in 2012-13 it reaches to 2932.35 lac (BER, 2013). Chowdhury (2013) pointed out that the per capita consumption of all meat is 14.67 kg and that of egg is 31 numbers as against the requirements of 56 kg meat and 365 eggs, respectively. The per capita poultry meat availability is approximately one-fifth of the consumed meat (3 kg) which needs to be increased more than double to satisfy the current demand of 7.67 kg while that of egg more than three times to meet the per capita minimum requirement of 102 eggs (Begum et al. 2011).

The poultry industry is crucial in the context of agricultural growth and improvement of diet for the people in Bangladesh. This industry is particularly important in the sense that it is a significant source of supply of protein and nutrition in a household's nutritional intake. Poultry is a common enterprise in rural Bangladesh. The poultry industry in Bangladesh is very important for the reduction of poverty and creation of employment opportunities. In the recent times, the demand for milk has increased by 6 percent and eggs by 5.2 percent. Fish and cattle production require a longer time. But poultry production is relatively faster and easier, if public and private sector initiatives go side by side.

**Table 1: Numbers of livestock and poultry population in Bangladesh (in lac)**

Particular	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Total livestock	464.70	475.10	485.00	495.58	506.52	512.66	528.36	530.20	535.90	539.72	543.57
Total Poultry	2329.90	2459.70	2523.10	2626.28	2707.12	2788.06	2885.66	2932.35	3041.72	3122.93	3206.33

Source: BER, 2014 and DLS, 2016

Poultry feed mill industry as an agribusiness enterprise is comparatively new in

Bangladesh. Total feed business, especially the business of concentrates was controlled by some feed traders. Bangladesh is a feed deficit country. At present there are about 250 registered feed mills in this country (Uddin, 2014). These feed mills are not produced sufficient amounts of feed. Shortage of feed is major constraints to the development of poultry sector in Bangladesh. There is a general agreement that low poultry production in Bangladesh is mainly due to lack of feed staff (Table 2). The major feed additives are: toxin binder, mold inhibitor, enzymes, synthetic amino acids and vitamins, feed premixes, vitamin-mineral premixes, trace minerals, organic acids, probiotics, salmonella killer, antibiotic for therapeutic use through feeds (antibiotic as growth promoter is strictly prohibited to use in the feed according to Feed Act 2010). Most of the feed additives have been imported by the Health companies and feed millers. Major Feed ingredients that have been imported by the commercial feed millers are: Meat and Bone meal, fish meal, protein concentrates, fish meal, soybean meal where around 50% is locally produced (Uddin, 2014). Though, due to the government's initiatives, supply situation of feed has improved slightly, but still supply is very much inadequate in relation to high increasing demand. The expansion of commercial feed industry in Bangladesh can possible to fulfill more than 80% of the total compound feed requirements. Considering the existing growth rate of poultry, cattle and aquaculture, the estimated annual compound feed requirement would be 10.60 million MT in 2020-21.

**Table 2: Annual feed requirements (MT) & commercial feed supply**

Particulars	Year	
	2001-2002	2010-2011
Broiler PS	54,268	255,500
DOC (broiler)	301,077	858,000
Layer PS	10,336	19,710
DOC (layer)	810,146	1,357,070
Cattle	5,066	10,106
Fish	-	800,000
Total feed required (MT)	1, 180,893	3,300,386
Industrial compound feed supply (MT)	281,550	2,767,440
Availability (%)	23.84	83.85

Source: FAO, 2013.

By ensuring the supply of quality feed for livestock sub-sector, the feed mill industry is enhancing the whole economy significantly through its forward linkage effect. The feed mill industry improves the efficiency and digestibility of feed through scientific formulation and processing and helps efficient use of scarce feed

resources. This industry also generates a number of employments in the processing plants and involves a number of people in feed distribution channels. This increases the importance of the industry day by day. Realizing the importance of this industry, the GOB is trying to make involved more private entrepreneurs here. This study is an modest effort undertaken to examine the cost effective supply chain of raw materials and supply of poultry feed. The specific objectives are to investigate the backward and forward linkages of feed mills; to examine the cost effective supply chain of poultry sector by estimating the marketing cost, margin and efficiency of feed miller and market intermediaries; and to find out the farmers' perception about the quality of feeds of different feed millers. The information may be helpful to the existing and potential entrepreneurs and market participants to improve their supply chain and decisions.

## 2. Methodology

The study was mainly based on field survey in addition of some secondary information. Purposive sampling technique was used in selected 30 feed mills. It was categorized by high, medium and low quality feed mill on the basis of feed conversion ratio (FCR). One more important part of research work is sample selection. In a complete enumeration, the essential information is collected from different stakeholders'. The field work conducted with feed miller, dealer, different sizes of poultry farm owners and farmers. 30 feed mills, 45 dealer, 15 sub-dealer and 120 farms were selected on the basis of quality (FCR) from Dhaka, Gazipur, Narsingdi, Kishoreganj and Mymensingh districts. FCR categorized on the basis of collected from firms level data from feed performance. Table 3 shows that a multi-stages stratified sampling was adopted in this study. The selected 30 feed mills categorized on the basis of feed conversion ratio (FCR) that is high quality feed mills (FCR; below 1.5 to 1.6), medium quality feed mills (FCR: 1.6 up to 1.7) and low quality feed mills (FCR: 1.7 up). The selected commercial farms were categorized by flock size small scale: < 1000 birds, medium scale: 1001-2000 birds and large scale: above 2000 birds.

**Table 3: Distribution of sampled feed mills and poultry farms**

Quality of feed mills (FCR basis)	Number of feed mills	Poultry farms			Total farm
		Small scale (< 1000 birds)	Medium scale (1001-2000 birds)	Large scale (Above 2000 birds)	
High	10	20	10	10	40
Medium	10	20	10	10	40
Low	10	20	10	10	40
Total	30	60	30	30	120

In conformity with the objectives of the study, a structured questionnaire developed for collecting relevant primary data from the poultry feed miller, dealer and

sub-dealer and farmers. The present study covered approximately from March –December 2013 to July-December 2014 study period and data analyzed with a combination of tabular and statistical techniques. For analyzing the data, descriptive statistics such as sum, average, ratio, percentages, etc. was derived and calculated to present the results. In this study, profit was calculated by deducting total costs from total returns. The following equation was used to assess the profitability of poultry feed production and broiler production. The profitability of feed production and individual farmers was derived in terms of gross return, gross margin, net return and benefit cost ratio (undiscounted) of different enterprise. When analyzing profitability of broiler farming, and poultry feed producing it is important to economic value. The formulas need for the calculation of profitability is discussed below:

### Gross return

Gross return calculated by multiplying the total volume of output of an enterprise by the average price in the harvesting period (Dillon and Hardaker, 1993). The following equation was used to estimate GR:

$$GR_i = \sum_{i=1}^n Q_i P_i$$

Where,

GR<sub>i</sub> = Gross return from i-th product;

Q<sub>i</sub> = Quantity of the i-th product;

P<sub>i</sub> = Average price of the i-th product; and i = 1,2,3.....n.

### Gross margin

Gross margin calculated by the difference between gross return and total variable costs. That is,

$$GM = GR - TVC$$

Where,

GM= Gross margin;

GR= Gross return; and

TVC = Total variable cost.

### Net return

Net return analysis considered fixed costs i.e., cost of land rent, interest on operating capital, etc. Net return calculated by deducting all costs (variable and fixed) from the gross return. To estimate the relative profitability of different agricultural enterprises, profit equation of the following algebraic form was used:

$$\Pi = \sum_{i=1}^n (P_{Y_i} \cdot Y_i) - \sum_{i=1}^n (P_{X_i} \cdot X_i) - \text{TFC}$$

Where,

$\Pi$  = Net return;

$P_{Y_i}$  = Price per unit of the i-th produce;

$Y_i$  = Quantity of the i-th produce;

$P_{X_i}$  = Price per unit of the i-th inputs;

$X_i$  = Quantity of the i-th inputs;

TFC = Total fixed costs; and  $i = 1, 2, 3, \dots n$  (number of items).

### Marketing System

An attempt was made to characterise the existing marketing systems of poultry and their products. The following steps were followed in characterising marketing systems of the poultry products.

#### Marketing margin (MM):

Gross margin = sales price – purchase price

#### Net marketing margin (NMM):

Net margin = gross margin – marketing costs

#### Return on Working Capital (ROWC):

$$\text{Return on working capital} = \frac{\text{Net margin}}{\text{Working capital}} \times 100$$

Working capital = purchase price + marketing costs

Farmers' perception determinate by using Likert Scale Methods

### 3. Results and Discussion

#### 3.1 Backward and Forward Linkages

Poultry feed mills provide an important linkage between feed grain producers and feed using farms. The collection of raw materials related to poultry feed production is backward linkage and feed distribution is forward linkage. Raw materials were collected from two sources—firstly from domestic source and secondly import

from others countries. Rice bran and rice polish was mainly collected from the rice processing mills spread all over the country. But the major portion of domestic rice bran and polish were supplied from the Rajshahi and Rangpur divisions. Table 4 shows that 60% maize were collected from domestic sources like; Dinajpur, Rangpur, Rajshahi and Northan area and 40% maize were imported from India, USA, Bhutan and Brazil. 80% of rice polish and rice bran collected from Dinajpur, Rangpur, Rajshahi and Jamalpur area a small portion of rice polish and rice bran was also imported from India and Thailand. 40% of full fat soybean and soybean meals were collected from Noakhali, Northern area and 60% of full fat soybean and soybean meals were imported from India, USA, Brazil. 80% of fish meal, fish fat, dried fish and poultry meat, poultry fat, dried poultry were mainly collected from costal and haor areas such as- Bagerhat, Chittagong and Sundarban area of Bangladesh and 20% from China, Brazil Vietnam and Indonesia. A small portion of coconut cake came from Bagerhat and Khulna districts of Bangladesh, but 80% of coconut cake and copra meal imported from Sri Lanka and India (Field survey, 2014). The raw material collection channels, which were used commonly by the feed mills of Bangladesh, are illustrated in following Figure 1.

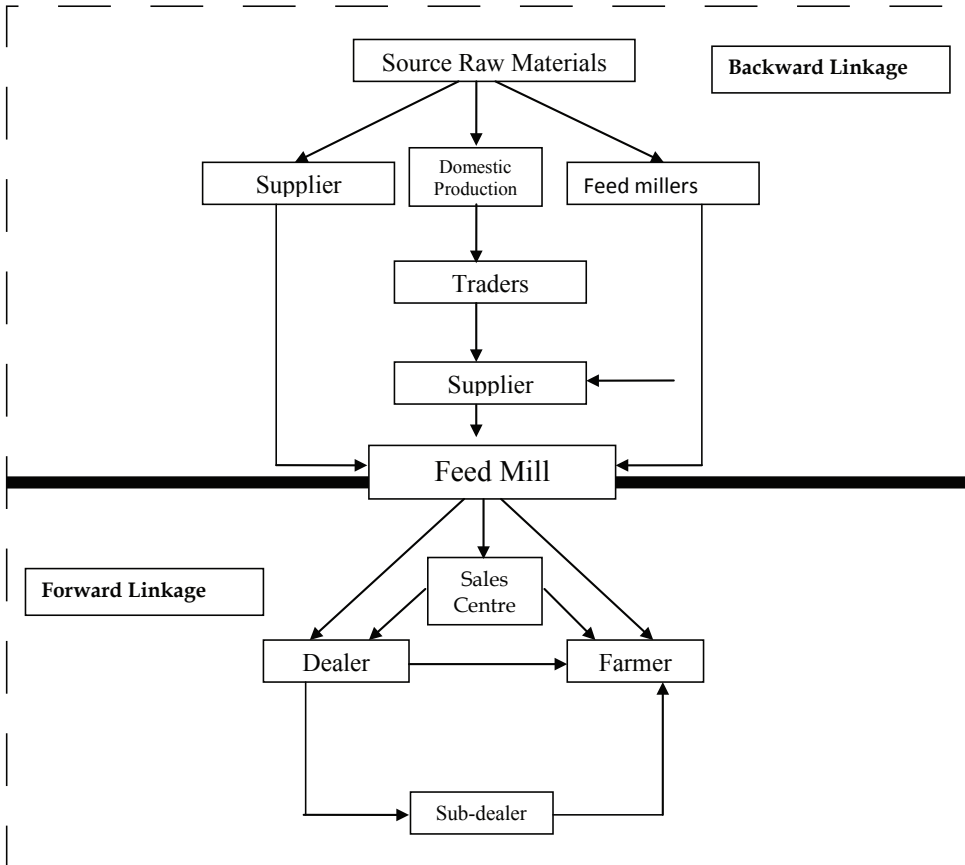


Table 4: Sources of raw material of poultry feed



Items	Domestic sources		Imported	
	Main districts	Percent	Main country	Percent
Maize	Dinajpur, Rangpur, Rajshahi and Northan Area	60.0	India, USA, Bhutan and Brazil	40.0
Rice bran and rice polish	Dinajpur, Rangpur, Rajshahi and Jamalpur Area	80.0	India, Thailand	20.0
Full fat soybean and soybean meals	Noakhali, Luckpur, Northern area	40.0	India, USA, Brazil	60.0
Fish meal, fish fat, dried fish	Haor areas, coastal areas such as Bagerhat, Chittagong and Sundarban	80.0	China, Brazil Vietnam, Indonesia	20.0
Coconut cake	Bagerhat and Khulna	20.0	Sri Lanka and India	80.0
Protein concentrates			Netherlands and some other countries of Europe.	100.0
Vitamins and mineral premixes, other chemicals and medicines			America, Germany, China, Vietnam and India	100.0
Feed binders			America, India, China and Malaysia	100.0

Source: Field survey, 2014

### 3.2 Production Cost of Poultry Feed

The term cost generally refers to outlay funds for poultry feed mill. Cost items are classified into two major groups e.g., fixed cost and variable cost and these together equaled total cost. In the study average high quality poultry feed production cost was higher than average medium and average low quality of poultry feed. High quality poultry feed production cost was Tk 39295 per tonne (Tk 39.29/kg) where medium and low quality of poultry feed production cost per metric ton was Tk 38643 (38.63 per kg) and Tk 37218 (37.49 per kg), respectively (Table 5 and Figure 2). All variable and fixed cost is decreasing with feed quality because of quality feed depends on different feed production items cost.

**Table 5: Production cost of different quality poultry feeds mills**

Item	High quality (Tk/MT)	Medium quality (Tk/MT)	Low quality (Tk/MT)
<b>A. Variable Cost</b>			
Raw Material Cost	32203.9	32082	31389
Electricity cost	450.41	440	400.7
Marketing cost	3000	2888.3	2552.8
Maintenance cost	120.33	100.88	110
Interest on working capital	900.04	862.6	763
Total variable cost	36674	36373	35215
<b>B. Fixed Cost</b>			
Land use cost	320.73	290	250
Machinery, tools & equipment cost	820.24	739.33	687.8
Building ,warehouse & others cost	400.53	350.7	300
Salary &wages cost	1030.1	850	730
Electrification gas/generator cost	20	10	10
Permanent labor cost	30	30	28
Total Fixed Cost	2621	2270.03	2005.8
Total Cost (A+B)	39295	38643	37218

Source: Author’s estimation based on field survey, 2014.

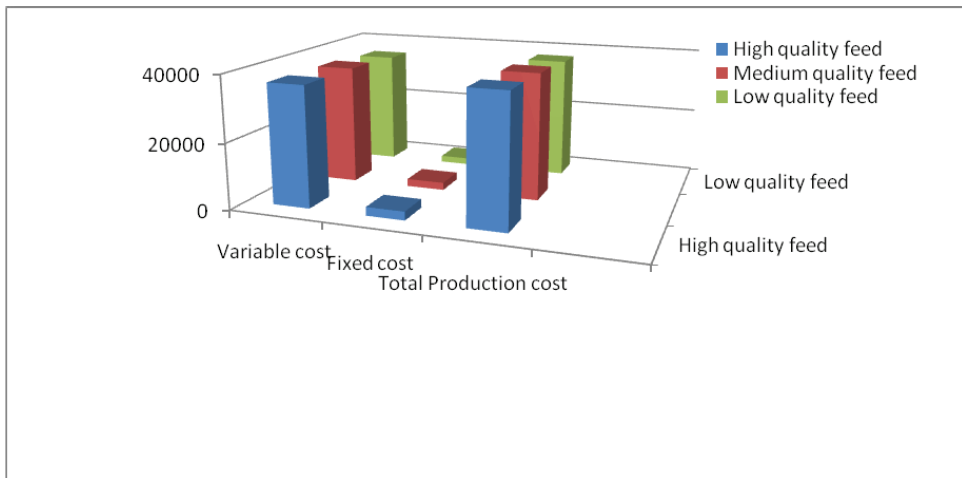


Figure 2: Different quality feed production cost

In this study average gross return from high quality poultry feed production was higher than average medium and low quality of poultry feed. High quality poultry feed gross returns was Tk 43160 per tonne where Tk 42330 and Tk40500 per tonne, respectively a average medium and low quality of poultry feed which has been shown in Table 6.

**Table 6: Return from different poultry feed mills**

Item	Total Quantity (MT/Month)	Sales Price Tk/kg	Gross Return (Taka)	Gross Return (Tk/MT)
High quality feed	11321	43.16	488614360	43160
Medium quality feed	6778	42.33	286912740	42330
Low quality feed	1743	40.5	70591500	40500
All average	6614	42	282039533	41997

Source: Author's estimation based on field survey, 2014.

In this study gross margins were calculated by deducting variable cost from gross return. Average gross margin, net return and BCR (undiscounted) was Tk 6058, Tk 3438 and 1.1 per tonne, respectively for high quality poultry feed mill, Tk 5957, Tk 3687, 1.12 for average medium quality poultry feed mill and Tk 5285, Tk3282 and 1.10 for average low quality poultry feed (Table 7). In this study area high quality feed production per month was more than medium and low quality feed production because of high quality feed demand higher than medium and low quality feed.

**Table 7: Total return, gross margin, net return, BCR (undiscounted) for different poultry feed production**

Item	High quality feed Tk/MT	Medium quality feed Tk/MT	Low quality feed Tk/MT
A. Gross Return (GR)	43160	42330	40500
B. Variable Cost (VC)	37102	36373	35215
C. Fixed Cost (FC)	2620	2270	2003
D. Total Cost (TC)=(B+C)	39722	38643	37218
E. Gross Margin (GM) = (A-B)	6058	5957	5285
F. Net Return (NR)=( E-C)	3438	3687	3282
G. Benefit Cost Ratio(BCR= A/D)	1.1	1.12	1.10
H. Net Return per Taka Investment (F/D)	0.10	0.11	0.1

Source: Author's estimation based on field survey, 2014.

### 3.3 Poultry Feed Production Steps

In order to get prepared feed, the feed ingredients have to go through a long mechanical process. The whole process can be divided into seven stages which are as follows:

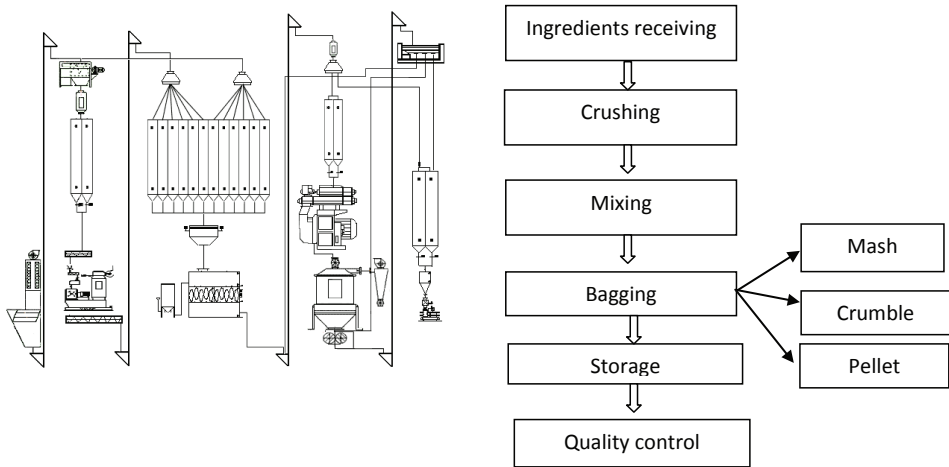


Figure 3: Steps involved in poultry feeds production

Bagging is an important step in feed processing. For bagging the feed, bags made of polypropylene (PP) are used. Brand name, trademark of the producer, specification of feed, net weight, date of production and other necessary information are printed on the bags. Each bag generally contains 50kg feed-which gives it an easy handling and well stacking characteristics. After preparing feed, different types of feeds are stored separately. Distribution channel plays a very important role in achieving marketing objectives of a company. By performing the work of transferring products from producers to consumers, a distribution channel overcomes the time, place and possession gaps that separate goods and services from those who need or want them. The feed mills under this category used slightly more complex channels to distribute their products. An outline of the distribution channels used by the privately owned feed mills is illustrated in Figure 3.

On the basis of Figure 3, the following channels of distribution can be identified-

Channel I: Feed mill →Sales Centre→Dealer→Poultry farm

Channel II: Feed mill →Dealer→ Poultry farm

Channel III: Feed mill→Poultry farm

Channel IV: Feed mill→Dealer→Sub-dealer→Poultry farm

Channel V: Feed mill →Sales Centre →Dealerr→Sub-dealer→Poultry farm

Among the above mentioned channels, channel-I and II were the most important

channels and also used widely as the main channels. Their marketing margins were shown in Table 8 and Figure 4.

**Table 8: Marketing margin of poultry feed miller, dealer and sub-dealer**

Level of quality	Level of intermediaries	Purchase price/ (Tk/MT)	Sales price/ MT(Tk.)	Gross marketing margin/ (Tk/MT)	Marketing cost/ MT(Tk.)	Net marketing margin/ (Tk/MT)	Return on working capital (%)
High quality	Miller	39295	43160	3865	3000	865	8.07
	Dealer	43160	44643	1483	566.85	916.15	2.10
	Sub-Dealer	43360	44643	1283	348.94	934.06	2.13
Medium quality	Miller	38643	42600	3957	2880	1077	9.66
	Dealer	42600	43756	1156	563.03	592.97	1.37
	Sub-Dealer	42806	43756	950	331.95	618.05	1.43
Low quality	Miller	37218	41010	3792	2550	1242	9.91
	Dealer	41010	42050	1040	472.46	567.54	1.36
	Sub-Dealer	40900	42050	1150	313.79	836.21	2.03

Source: Author's estimation based on field survey, 2014

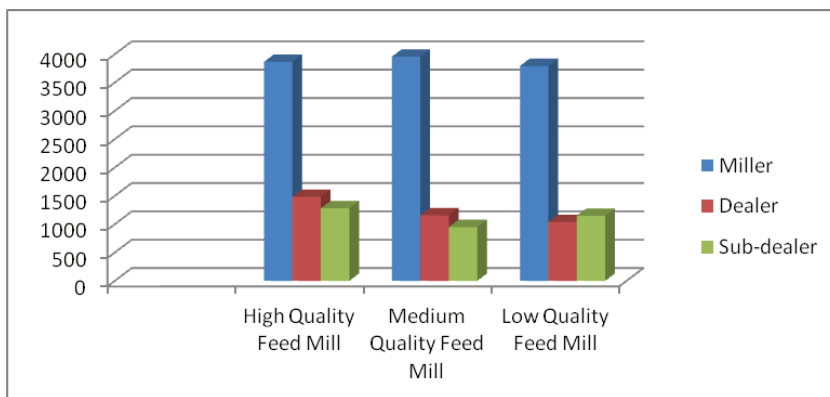


Figure 4: Marketing margin of poultry feed miller, dealer and sub-dealer

### 3.4 Farmers Perception on Performance of different Quality Feeds on Broiler Production

The word performance refers to the degree of success in achieving stated objectives. It's could make to achieve its goals. Performance means execution of an action or the fulfillment of a promise (<http://en.wikipedia.org/wiki/performance>). The performance of poultry feeds quality refers its effects on broiler production. High, medium and low quality of poultry feeds qualities depend on use of quality of ingredients, nutritional contents and storage life etc. and their qualitative

features of feeds. Another it refers management of feed mills, sales personnel, technical assistance and supports provided by the feed mills aimed to influence its performance on FCR.

High, medium and low quality poultry feed mills performance and their farmer perception on broiler production is discussed below. A subset of poultry feeds quality is a practice which strives to build performance standards into the implementation of feeds on broiler production. It is concluded that the high quality feed intake farms profit were more than medium and low quality poultry feeds intake farms.

### **3.4.1 Perception on different quality feed mills**

Perception means senses or mind of cognition or understanding and interpretation of sensory information (<http://en.wikipedia.org/wiki/perception>). The poultry farmer's perception about high, medium and low quality feeds means their opinions or interpretation after farming on feeds FCR.

#### **Determinates of perception**

After feeds performance on broiler production farmers easily share their opinion which quality feeds has more influence on FCR. In this section, farmers' perception investigates about high, medium and low quality feed with the help of Likert Scale method.

#### **Perception of farmers on different quality poultry feeds; Likert Scale Methods**

Farmer's perception of broiler production by using different quality feeds investigated in this study. Five point of Likert Scale used for measuring perception of the different stakeholders'. There were 3 statements of high, medium and low quality feeds including for both favour and disfavour against 5 point scale. All the statement arranged randomly under their opinions. Each stakeholder was asked to indicate his extent of agreement or disagreement against each statement along a 5-point scale, i.e., strongly agree, agree, undecided, disagree and strongly disagree. Weights assigned to these responses were 5, 4, 3, 2 and 1 in favour and 1, 2, 3, 4 and 5 in disfavor. The total score of stakeholder was determined by summing up the weights for responses against all the statements. Table 9 shows that the weighted scores (ws) of high, medium and low quality feed were 570, 430 and 360 and their ranked 1st, 2nd and 3rd of the statements based on farmers perception, respectively. The rank of high quality feed was in 1st rank that means high quality feeds performance was better than medium and low.

**Table 9: Perception of farmers on different quality feeds**

Different quality feed mills (On the basis of FCR)	Strongly agree	Agree	Undecided	Disagree	Strongly disagree	Weighted score	Rank
High	95	20	1	3	1	570	1
Medium	60	10	10	20	20	430	2
Low	30	20	15	30	25	360	3

Source: Author's estimated based on field survey, 2014

Note: FCR= Feed Conversion Ratio

#### 4. Conclusion

The findings of the study indicate that the high quality feed performance are better than those of medium and low quality feed. The poultry feed production cost and gross margin, gross return and net return of high quality feed mills are higher than the medium and lower quality feed mills. The study concluded that the benefit from broiler production is dependent on supplying the birds with the highest achievable quality of feed. The study also identified the unavailability of raw materials which were the major problems for feed mills operation which influenced feed price of poultry feed and quality. The findings of the study also indicate that the profitability of poultry feed production is quite satisfactory and have capability to attract interest of the entrepreneurs of Bangladesh. The study further reveals that the trading of poultry feed is a profitable venture to the dealers and sub-dealers. The poultry feed industry is performing a vital role in the development of poultry industry in Bangladesh.

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## **Determinants of Rice Production in the Northern Districts of Bangladesh: A Stepwise Regression Analysis**

**Md. Sariful Islam\***  
**Kazi Julfikar Ali\***  
**M. Moazzem Hossain Khan\***

**Abstract:** *This study examines the impact of education on rice production in Bangladesh. The study employed farm level cross sectional data from the village of Paschim Saidpur of Shibganj Upazila of Bogra. Farm level data used in this study are collected by employing random sampling technique. Structured questionnaire is used to collect data from 96 rice farmers in the study area. The Ordinary Least Squares (OLS) Regression and Stepwise Regression methods are used to identify the determining factors of rice production in Bangladesh. Stepwise Regression is used to identify the most important variables or the inappropriate variables, which are not important in the model. The results of the study show that education has a statistically significant and positive effect on rice production in Bangladesh. The study also shows that input cost, labour cost, cultivable land and extension service have also statistical significance and positive effect on rice production in Bangladesh. The policy suggestion of the study that the government should emphasize on education through literacy campaigning, training and adult continuing education programs so that rice production is increased. In addition, the government should also take the initiative so that the farmer can easily adapt modern agricultural inputs.*

### **1. Introduction**

The development vision for agriculture under seventh Five Year Plan emphasises on ensuring food security in Bangladesh (GOB, 2015). Rice is the staple food for 153.6 million people (Economic Review, 2013). Rice is the main and most dominant food crop. It provides 47.5 percent of rural employment (Economic Review, 2013). More than 95% of population consumes rice and it alone provides 76% of calorie and 66% of the total protein requirement of daily food intake (Bhuiyan et

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\* Assistant Professor, Department of Economics, Joypurhat Govt. College, Joypurhat, Bangladesh, Assistant Professor, Department of Economics, University of Rajshahi, Bangladesh and Professor, Department of Economics, University of Rajshahi, Bangladesh

al., 2002). About 77% area of arable land is used for rice production in Bangladesh (IRRI, 2012). Bangladesh needs to import rice almost every year as it faces a deficit of rice. In 2011-12 FY, the total import of rice through public and private sectors was 5.23 lakh metric tons (Economic Review, 2012). This deficit can be overcome by enhancing the productivity of rice and introducing new technology. Adoptions of new technologies are difficult, especially for a poor developing country with low-skilled workers, low GDP and huge unemployment. Most of the farmers are illiterate and live on a subsistence farm. As a result, their income level is very low compared to other developing countries. So, it is difficult for them to gear up income without identifying the determinants of rice production. Although agriculture is the main stream of her economy, education for scientific method of agriculture is still felt necessary in this country. It means that lack of productive education is too acute in her agriculture. It is notable that productivity increases income with education. As education is an indispensable element for economic and social progress (Dev et al.1995). Most of the people live in rural areas and maintain their livelihood from the cultivation of rice. Rice cultivation also provides a safety net for the poor. Given the importance of rice in Bangladesh, this study focuses the determinants of rice production.

Agriculture sector alone is employing 47.3 percent of the total labour force of the country (Labour Force Survey, 2010). That is why; agriculture is not only the mainstay of the rural populace, but also the main occupation of the nation as a whole.

Several past studies have so far been done in this field. The findings of these studies differed widely from each other. A number of studies have assessed the relation between education and agricultural production (Wu, 1977; Lockheed et al., 1980; Jamison & Lua, 1982; Philips, 1987; Hassan et al., 2003; Minh-Phuong, 2006; Asadullah and Rahman, 2006; Onphanhdala, 2009; Yasmeeen et al., 2011; Girgin, 2011; Rehman et al. 2012) and another number of studies has assessed the impact of education on agricultural production (Singh, 1974; Welch, 1970; Pudasaini, 1983) in national and international arena. Asadullah and Rahman (2006) found that the different level of education have a positive and significant effect on rice production in Bangladesh. They found that the primary and secondary level of education is more relevant in rice production than tertiary level. They also found that the education is a matter in raising production, boosting potential output and improving farmer productive efficiency. Salehin et al. (2009) found that the education of the farmers has a significant and positive effect on rice production in Bangladesh. They also found that educated farmers are likely to be more receptive to the modern facts and ideas, they have much mental strength in deciding on a matter related to problem solving or adoption of technologies in their everyday life. Haq (2012) showed that primary education has positive value and its impact on rice productivity is significant. He found that farmers with primary education seem

effective to rise per unit of rice productivity in Bangladesh. He also found that the farmers, who have only a primary school degree, might spend enough time for farm production. Nargis and Lee (2013) found that education has a statistically significant and positive effect on rice production in Bangladesh. They also found that farmers who are more educated are likely to be more efficient compared to their less-educated counterparts, perhaps because of their better skills, access to information, and good farm planning. Cotlear (1986) found that education has a vital role in agricultural production, but this role depends significantly on its technical and economic situation. He found that the effect of completing primary education in urban areas was much larger than that of completing primary education in rural schools. He also found that the different levels of education are related with a higher possibility of adoption, but only in the initial stages of the distribution process. Duraisamy (1989) found that education has a positive and significant effect on rice production in India. He found that education, expand the probability of adoption of modernization on new techniques in rice production. He found that the higher level of education is required to better understand, make out new information and utilise in an effective way. He also found that the level of using high-yielding rice varieties in India was positively related to level of education. Appleton & Balihuta (1996) found that the years of schooling of farmers have a positive and statistically significant effect on agricultural production in Uganda. They found that crop production was increased if the education level of farmers increased. They found that the education changes farmer's techniques and practices. They also showed that education affects the use of controlling for capital and purchased inputs. Dominique van de Walle (2003) studied the impact of education on agricultural productivity in Vietnam. Three major results come out of her study of irrigation and agricultural productivity in Vietnam. First, education of the household head and other family members make a significant contribution to farm profitability. Second, there also seems to exist important complementarities between education and irrigation, thereby giving some indication that education does help Vietnamese farmers make better use of agricultural technology, and third, primary education, but not higher levels of education, has significant impact on farm profitability. Years of schooling are found to have a significant impact on rice productivity, even though it is a small one. Grigin (2011) found that a statistically positive relationship between education and wheat output in Turkey. He also found that there is a great chance that educated farmer contributed positively to agricultural productivity growth, which was just one of the intended aims of the education. Rehman et al. (2012) founded education is one of the most important determinants of agricultural production. They examined that education makes aware the producer about the latest production techniques, which enables him to increase crop production. They also showed that education affects crop production positively in Pakistan. One percent increase in education enrollment leads to 4% increase crop production. Most of the studies included aggregate level of educa-

tion, input cost, cultivable land, family labour and extension service as explanatory variables. However, most of them did not include hired labour cost. The general forms of Cobb-Douglas production function used most of the studies. These studies have applied to examine the effect of education on agricultural production through ordinary least squares regression model. They did not explain the pitfalls of their model regarding the impact of education on rice production. To have a clear picture of impact of education on rice production in Bangladesh, it is required to enquire deeply. Disaggregate level of education is used as explanatory variable rather than aggregate level of education in this study. The shortcomings of the classical linear regression model have discussed systematically In this study,. As a result, the findings would provide more reliable than others study. That is why, this study demands greater importance in their arena. In this study, the ridge regression applied to explore the impact of education on rice production. This is a scope to do research in this area to fill this gap. To our knowledge, this research is first of its kinds in Bangladesh.

The main objective of this study is to identify the determinants of rice production of northern district in Bangladesh by using cross sectional data. The rest of the paper is structured as follows: Methodology and data of the study is presented in Section 2, while the results and discussion are presented in Section 3. Finally, summary and policy implications are presented in Section 4

## **2. Methodology of the Study**

### **2.1 Selection of the Study Area**

Shibganj Upazila of Bogra district has been purposively selected as the study area for the study. The study has been conducted to identify the determinants of rice production in the village of Paschim Saidpur in Shibgonj Upazila under Bogra district. The Shibgonj upazila comprises of 409 villages (BBS, 2012). The villagers primarily rely on agriculture activities. Therefore, their earnings depend on agricultural activities. Rice is the main agricultural crops in the study area. That is why; Shibganj has been selected for the study. Comparatively the rice production of this Upazila is higher than the other Upazila of Bogra district (Bangladesh Bureau of Statistics, Bogra Branch, 2012).

### **2.2 Methods of Data Collection**

The study is based on primary and secondary data. The primary data have been collected by using a structured questionnaire. Before preparing and applying the questionnaire to the final survey, pre pilot and pilot survey have been done. The pre pilot survey is carried out through the Agricultural Office of Shibganj, concerned Sub-Assistant Agriculture Officer's (SAAO's), and academics. The pilot survey was conducted during November 2012 to December 2012. Afterwards, the final survey was carried out during December 2012 to January 2013.

Secondary data have also been collected from related books, articles, journals, unpublished theses, Population Census of Bangladesh, various issues of Economic Review, Agriculture census, Bangladesh Rice Research Institute (BRRI), Department of Agriculture Extension (DAE), Bangladesh Bureau of Statistics (BBS), Bangladesh Bureau of Statistics Bogra Branch, Ministry of Agriculture, Ministry of Planning, and Internet Sources etc.

**2.3 Sampling Technique of the Study**

An up to date list of all farmers of the selected village has been collected from Upazila Agriculture Office. The list comprised 127 farmers, which constituted the population. In this study, random sampling technique was employed to collect the data. The numbers of farm household were selected randomly by using determination of sampling formula (Krejcie and Morgan, 1970) for regression analysis. Thus, the sample size was 96.

**2.4 Empirical Theory and Method**

In this study, the standard method of analysis follows Jamison and Lau (1982). They used a production function for agriculture output as their basic tool to analyze the effect of education on crops production. They included various explanatory variables in their model particularly area under cultivation, labour input (family labour), education level of household head and extension service. The input cost and hired labour cost for crops production are not included in their model. Input and hired labour is a vital ingredient in any stage of production. In this aspect, we have modified their model through including input cost and hired labour cost. The Cobb-Douglas type production function is used in this study.

$$Y = AK_i^{\beta_1} L_i^{\beta_2} T_i^{\beta_3} e^{\beta_4 Ed + DExt + \mu_i} \dots\dots\dots (1)$$

Equation (1) provides nonlinear relationship between output and inputs. So, the nonlinear relationship can be linearized by both side natural logarithms (ln).

$$\ln Y = \ln A + \beta_1 \ln K_i + \beta_2 \ln L_i + \beta_3 \ln T_i + (\beta_4 Ed + DExt + \mu_i) \ln e$$

$$= \beta_0 + \beta_1 \ln K_i + \beta_2 \ln L_i + \beta_3 \ln T_i + \beta_4 Ed + DExt + \mu_i \dots\dots\dots (2)$$

Where,  $\ln A = \beta_0$  and  $\ln e = 1$ .

Thus, the model is linear in the parameters  $\beta_0, \beta_1, \beta_2, \beta_3$  and  $\beta_4$ . So, the model is a linear regression model. So, the fitted model of this study is as follows

$$\ln Y = \beta_0 + \beta_1 \ln K_i + \beta_2 \ln L_i + \beta_3 \ln T_i + \beta_4 Ed + DExt + \mu_i \dots\dots\dots (3)$$

where,  $Y_i$  = total output of rice (kilogram),  $K_i$  = input cost (irrigation and others input cost),

$L_i$  = labour cost (family labour and hired labour),  $T_i$  = cultivable land (decimal),

$E_d$  = education of the farmer

Ed = years of schooling of the farmer

Ext = extension service (from friends/Neighbours /agriculture officers/others)

D = 1 if taken extension service

D = 0 otherwise

$\mu_i$  = error term

The error term is assumed random and serially independent having zero mean with finite variance. In order to determine the appropriate technique of estimation, the empirical model is estimated by the ordinary least squares (OLS) method. To better facilitate different diagnostic tests like heteroscedasticity, autocorrelation, multicollinearity are checked in this study.

## **2.5 Definition of the Variables and Research Hypothesis**

### **Output**

Output is defined as the physical output of rice per decimal. Physical output is defined as the total production of rice cultivated area. It is measured in kilogram per decimal.

### **Input Cost**

Input cost is defined as the sum total of expenditures on seeds, seedbed preparation, plough units, irrigation, organic and inorganic fertilizers, insecticides, fungicides, herbicides, harvesting and threshing cost.

### **Labour Cost**

Labour unit is measured in man-days of eight hours. There are two types of labour cost in rice production. One hired labour cost and another family labour cost. Labour cost consist of these two types.

### **Cultivable Land**

Cultivable land that is used by ploughing, sowing, and raising crops. It is expressed as decimal.

### **Education**

Year of schooling may be represented as a level of education. It is defined as the number of academic years that a person has taken his/her lesson in educational institutions in this study. Level of education can be divided into five categories. These are illiterate, primary, secondary, higher secondary and tertiary.

### **Extension Service**

The contact between agriculture extension agents or officers and farmers is introduced as a measure of the availability of information about new and improved

inputs. It is measured in dummy variable.

## 2.6 Regression Analysis

As the main objective of this study is the determinants of rice production, the cause effect analysis is suitable for achieving this objective. To do so, regression analysis has applied in this study. It is appealing because it provides a conceptually simple method for investigating functional relationship among variables.

### 2.6.1 Stepwise Regression

Stepwise regression can be achieved either by trying out one independent variable at a time and including it in the regression model if it is statistical significant, or by including all potential independent variables in the model and eliminating those that are not statistically significant, or by a combination of both methods. Stepwise regression includes regression models in which the choice of predictive variables is carried out by an automatic procedure.

Stepwise regression model is a step-by-step iterative construction of a regression model. Process of independent variables carried out in two ways-by including independent variables in the regression model one by one at a time if they are statistically significant, or by including all the independent variables initially and then removing them one by one if they prove to be statistically insignificant semi-automatic selection.

## 3. Results and Discussion

The determinants of education on rice production have been examined by using descriptive and inferential statistics. Regression analysis has been employed to estimate the determinants of rice production in the study area. Both quantitative and dichotomous variables are employed as explanatory variables in this study.

### 3.1 Descriptive Statistics

Table 3.1 shows the variables that are used in estimations and their sample statistics namely maximum and minimum values, mean and standard deviation.

**Table 3.1: Descriptive Statistics of the Variables**

Item	No. of cultivators	Minimum	Maximum	Mean	Standard Deviation
Output (Kg)	96	950.00	7400.00	3349.4792	1818.48744
Yield (kg)	96	18.29	26.77	22.5571	1.80761
Input cost (Tk.)	96	2825.00	18500.00	9919.7292	4848.35533
Input cost(Tk.) per decimal	96	51.52	75.76	68.4541	6.88155
Labour cost (Tk.)	96	2150.00	15800.00	7907.2500	4064.15996



Labour cost (Tk.) per decimal	96	42.42	60.00	53.9425	4.89606
Cultivable land (decimal)	96	49.00	330.00	148.7604	80.75144
Education (years of schooling)	96	0.00	16.00	5.4479	4.35979
Extension service (percentage)	Yes= 63.5 No= 36.5				

Source: Field survey, December 2012 and January 2013

The mean, standard deviation, minimum and maximum of the variables have been presented in Table 3.1. In Table 3.1, it is found that the average yield of rice is 22.55 kilograms with maximum average yield of 26.77 kilograms and minimum average yield of 18.29 kilograms. The average value of input cost is 68.45 Tk. with maximum and minimum average value of input cost is 75.76 Tk. and 51.52 Tk. respectively. The average value of labour cost is 53.94 Tk. with the maximum and minimum average value of labour cost is 60.00 Tk. and 42.42 Tk. respectively. The average of cultivable land is 148.76 decimal with the maximum and minimum of the cultivable land is 330 decimal and 49 decimal respectively. Table 3.1, the average level of education of the respondent is 5.45 years and the standard deviation of the education level of the respondent is 4.35 years. Maximum education level of the respondent is 16 years and minimum is 0.00 years. Maximum and minimum education level shows a wide variation of the respondents. About 63.5% respondents of the study area are taken agricultural extension service from Sub Assistance Agriculture Officers and rest of 36.5% do not take one.

### 3.2 Empirical Results

The empirical results of the production function in equation (3) presented in Table 3.2.

**Table 3.2: Empirical Results of Multiple Regressions**

	$\hat{\beta}$	St. Error	<i>t</i>	<i>P</i> value	Eigenvalue	Tolerance	VIF
1	2	3	4	5	6	7	8
Intercept	2.958936*	0.203502	14.5401	0.000	5.580	-	-
Input cost(k)	0.094997	0.076228	1.246219	0.21591	0.334	0.01031	96.990
Labor cost(L)	-0.08956	0.080282	-1.11562	0.26755	0.080	0.008665	115.40
Cultivable Land(T)	0.985187*	0.0447	22.04012	0.000	0.006	0.026428	37.838
Education (E)	0.128338*	0.01413	9.082654	0.000	0.000093	0.605364	1.6518
Extension Service(S)	0.07379*	0.010781	6.844345	0.000	0.000017	0.591772	1.6898
<i>R</i> <sup>2</sup>	0.9953						
Adjusted <i>R</i> <sup>2</sup>	0.9950						

Source: Field survey, December 2012 and January 2013

\* Highly significant

In Table 3.2, the findings show that the input cost of production is insignificant and the coefficient of input cost of production is 0.094997. The results indicate that as input cost of production increases by Tk.1 with output increases by 0.094997 kilogram. The labour cost of production is statistically insignificant .The coefficient of labour cost of production is

-0.08956. The results indicate that if the labour cost of production increases by Tk.1, then the total output decreases by -0.08956 kilogram. The cultivable land is statistically highly significant. The coefficient of cultivable land is 0.985187.The results indicate that the cultivable land increases by 1 decimal, total production increases by 0.985187 kilogram per decimal.

The coefficient of illiterate farmer is 2.958936, which is highly significant. This is because, if the farmers experience increases, their total output increases. In this study, the level of experience is the highest of illiterate rice farmer. The coefficient of education of farmer (literate farmer) is  $(2.958936 + 0.128338) = 3.087274$ , which is highly significant. It indicates that if the education of farmer increases, their total output increases by 3.087274 kilogram. The coefficient of extension service is 0.074288 and it is statistically highly significant. It indicates that if the extension service increases, their total output increases by 0.074288 kilogram.

In Table 3.2, two variables of this model provide insignificant results and one is opposite sign. So, this model might suffer from multicollinearity problem.

### 3.3 Reliability and Validity

To ensure the reliability of the questionnaire Cronbach’s alpha test has been used in this study. The result of Cronbach’s alpha test is given in Table 3.3.

**Table 3.3 Test of Reliability**

Number of observation	Number of items	Cronbach’s Alpha
96	6	0.860

In Table 3.3, it is observed that Cronbach’s alpha is 0.860 which indicates a high level of internal consistency for our scale with this specific sample. In this study, variables and questions are drawn from literature, which ensured the validity of the questionnaire (Ali and Noman, 2013).

### 3.4 Diagnostic of the Model

To check the reliability of the above results, the diagnosis of normality, multicollinearity, heteroscedasticity and autocorrelation are essential. For our postulated model, accounting to the rule of thumb multicollinearity is not a troublesome problem. Again, to judge the validity of the above-mentioned results, though not predictable for cross-section data, the test for presence or absence of autocorrelation or serial correlation has been conducted.

### 3.5 Normality Test

Jarque-Bera test is used to identify the normality of the model.

**Table 3.4 Normality test by Jarqua-Bera test statistic**

Skewness	Kurtosis	Jarque-Bera statistic	<i>P</i> value
0.232	2.905	0.900345	0.637518

Source: Field survey, December 2012 and January 2013

### 3.6 Fit of the Model

**Table 3.5: Analysis of Variance (ANOVA)**

	Sums of Squares	df	Mean Squares	<i>F</i>	<i>P</i> value
Regression	29.24732	8	3.655915	2669.48	0.000
Residual	0.119149	87	0.00137		
Total	29.36647	95			

Source: Field survey, December 2012 and January 2013

Table 3.5, ANOVA summarizes how much of the variance in the data (total sum of squares) are accounted for by the factor effect (factor sum of squares) and how much is random error (residual sum of squares). From Table 3.5, *F* value is 2669.48 and the *p* value is 0.000. This indicates that the results obtained from regression output are highly significant. Therefore, it is clear that the model is a better fit statistically.

### 3.7 Heteroscedasticity

Heteroscedasticity is obtained by white heteroscedasticity test.

**Table 3.6: White Heteroscedasticity Test**

		<i>P</i> value
<i>F</i> Statistic	1.592681	0.115773
Obser* $R^2$	16.56698	0.121353

Source: Field survey, December 2012 and January 2013

As can be observed from Table 3.6, there is no heteroscedasticity in the error term of the model. The result is confirmed by White heteroscedasticity test. Obser\* $R^2$  =16.56698 which has, asymptotically, a chi-square distribution with 44 df. The 20% critical chi-square value for 44 df is 51.639. Since the calculated value of chi-square is less than the critical value at 20% level of significance, it can be said that there is no heteroscedasticity in the error term of the model.

### 3.8 Autocorrelation

The Breusch-Godfrey serial correlation and Durbin-Watson statistic have been

used to test for presence of serial correlation among the residuals. From Table 3.7, the Breusch-Godfrey LM test statistic of 3.4275 exceeds the critical chi-square (1) value. So, it can be said that the model is free from autocorrelation. The value of the Durbin-Watson statistic ranges from 0 to 4(Gujarati, 2003). As a general rule of thumb, the residuals are not correlated if the Durbin-Watson statistic is approximately 2 and an acceptable range is 1.50 to 2.50 (Alam et.al, 2013).

**Table 3.7: Breusch-Godfrey Serial Correlation LM and Durbin-Watson Tests**

		P value
F Statistics	1.570064	0.214005
Obser*R-squared	3.420147	0.180852
d Statistic (DW)	1.833	

In Table 3.7, the value of d statistic is 1.833, which is about 2. It indicates that there is no serial correlation.

### 3.9 Multicollinearity

Table 3.2 shows that there are three of eigenvalues close to zero and three VIF's values more than 10. These results indicate that the model suffers from multicollinearity. It can also be found that the value of R<sup>2</sup> and adjusted R<sup>2</sup> are very high.

### 3.10 Results of Stepwise regression

The results of stepwise regression have been shown in Table 3.8.

**Table 3.8: Empirical Results of Stepwise Regression**

	$\hat{\beta}$	St. Error	t	P value	Tolerance	VIF
1	2	3	4	5	6	7
Cultivable Land (T)	0.390515*	0.053678	7.275116	0.0000	0.215944	4.630838
Input cost (K)	0.289784*	0.058724	4.934686	0.0000	0.204707	4.885027
Labour cost (L)	0.284742*	0.05717	4.980611	0.0000	0.201343	4.966646
Education (E)	0.135826*	0.042759	3.176541	0.002042	0.77894	1.283796
R <sup>2</sup>	0.944759					
Adjusted R <sup>2</sup>	0.941690					

Source: Field survey, December 2012 and January 2013

\* Highly significant

All VIF values are less than 5 which is shown in Table 3.8. These results indicate that this model is free from multicollinearity problems. It also shows the different results between Table 3.2 and Table 3.8. All variables are statistically significant in Table 3.8.

The coefficient of cultivable land is 0.390515 it is statistically highly significant. The results indicate that the cultivable land increases by 1 decimal, total production increases by 0.390515 kilograms per decimal. The same results were found by Cotlear (1986), Appleton & Balihuta (1996), Yang (1997), Weir (1999) and

Rehman et al. (2012).

The coefficient of the input cost of production is 0.289784 and it is statistically highly significant. The results indicate that as an input cost of production increases by Tk.1, output increases by 0.289784 kilograms. The same results in line with Appleton & Balihuta (1996) and Weir (1999).

The coefficient of labour cost of production is 0.284742 it is statistically highly significant. The results indicate that if the labour cost of production increases by Tk.1, then output increases by 0.284742 kilograms. The findings were consistent with studies by Cotlear (1986), Appleton & Balihuta (1996), Yang (1997) and Weir (1999).

The coefficient of illiterate farmer is 0.791315, which is highly significant. This is because, if the farmers experience increases, their total output increases. In this study, the level of experience is the highest of illiterate rice farmers.

The coefficient of education is  $(0.791315 + 0.135826) = 0.927141$ , which is significant. It indicates if the education of farmer increases, their total output increases by 0.927141 kilogram. The similar results were found by Singh (1974), Dominique van de Walle (2003), Onphanhdala (2009) and Haq (2012).

#### 4. Conclusion

In this study, the determinants of rice production are very important for policy formulation and strategies for the development of agriculture sector. In this study, multiple regression model and stepwise regression model have been used to estimate the determinants of rice production. In addition, the empirical findings of the multiple regressions show that most of the variables are highly involved in multicollinearity. In order to overcome this problems ridge regression has been used in this study. The empirical results of stepwise regression reveal that the all the explanatory variables have positive and statistical significance effect on rice production. The findings of the study show that the main determinant of the rice production is land. The second important determinant of rice production is input cost. The input cost of production has positive effect on rice production. Labour cost is the third important factors of rice production. Education is the fourth important factors of rice production. To boost up rice production of Bangladesh the government should put emphasis on education so as to the farmer can easily adapt modern agricultural inputs, pest and irrigation management. There are a few agricultural training institutions in our country. Agro based courses must be included in the primary level schools or institutions. In addition, number of agricultural institute must be increased throughout the country, which in turn will increase the number of people with agricultural knowledge. It certainly would have a positive impact on the agricultural productivity. In Bangladesh, the government should take the responsibility of the expansion of agricultural education, research and development. The illiterate farmers do not know about the modern

technological cultivation technique. The government should create the eagerness among the farmers about the modern cultivation. At first, it needs to expand the general education on the emphasis of agricultural education in the rural area. Now, it is very important to expand the agricultural education and research because educated and trained farmers show their eagerness to use the modern technology and input. The lack of education is the barrier of development. Therefore, the government should try to expand education among the farmers. Besides, the government should take proper steps to teach the people practically who are educated in modern agricultural system, HYV seeds, the use of insecticide, fertilizer, irrigation etc., so that their productivity may increase. To avoid excessive use of seeds, irrigation, fertilizer, pesticides, herbicides and fungicides, farmers should have a minimum level of education and training. Extension service plays a pivotal role in raising the awareness of farmers to respond changing the production pattern. Extension service is important for rice farmers and it has positive effect on rice production. Government should take necessary step to increase extension service to the farmers. Day by day land fragmentation is increasing. So, policies should be formulated in such a way that the existing land tenure and land fragmentation system cannot reduce cultivable land. Therefore, the farmer could be educated and proper trained so that they become capable to operate the latest technologies and inputs should be adapted by rice farmers for reducing the land and environmental degradation, increasing productivity and welfare of rice farmer in Bangladesh. Labour cost is a very essential factor, which affects the rice production. Government should be emphasizing the need of education to improve the ability of rice farmers to receive and understand information regarding modern technology, so that their productivity may increase.

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## IMPACT OF CLIMATE CHANGE ON RICE PRODUCTIVITY IN BANGLADESH: EVIDENCE FROM PANEL DATA

A. K. M. Abdullah Al-Amin\*

M. Saidur Rahman\*

A. H. M. Saiful Islam\*

**Abstract:** *The study scrutinizes the possible impacts of climate change on rice productivity in Bangladesh through climatic and non-climatic parameters. Secondary data were used, for this purpose covering 210 observations corresponding to seven districts with panel data for 30 years during 1982-2011. Simple linear regression model was employed to draw the relationship between climatic factors and rice productivity. Empirical results based on Prais-Winsten models with panels corrected standard errors (PCSEs) estimation shows that increase in average minimum temperature and average maximum temperature had positive effect on rice productivity. Non climatic factor (i.e., irrigation area) was found an imperative to increase rice productivity. Among the five climatic parameters (i.e., average minimum humidity, average maximum humidity, average minimum temperature, average maximum temperature, and average rainfall) and two non-climatic factors (viz. irrigated area under rice crop, and share of forest area) average maximum humidity had negative effect on the productivity of rice. Policy guidelines from this study suggest to increase more irrigation facilities and to promote adaptation to climate change by developing new varieties that will be more tolerant to humidity and requires less water.*

**Keywords:** Bangladesh, Climate change, Panel data, Rice productivity

### 1. Introduction

Agriculture typically plays a vital role in the economies of developing countries than the developed. Agriculture is one of the most important sectors of Bangladesh

\* The authors are respectively Lecturer, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh, Professor, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh and Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh. The authors are thankful to Bangladesh Meteorological Department (BMD) for the supply of climate data and to Mr. Sheikh Mohammad Sayem, Assistant Professor, Department of Agricultural Statistics, Bangladesh Agricultural University for his constructive help in data analysis.

economy Nargis and Lee (2013). The sector contributes around 16.77 percent to the gross domestic product (GDP) of the country and employs around 47.5 percent of the total labour force. Moreover, the sector feeds up around 160 million people of the country and provides survival and nutrition for the farm households of rural areas (GoB, 2014). Agriculture is a pillar of Bangladesh economy, using more than 70 percent of land area (FAO, 2009) and accounting for nearly 20 percent of GDP and 65 percent of the labour force, employed primarily on small-holder farms (Yu *et al.*, 2010). The main agricultural commodities in Bangladesh are rice, wheat, maize, jute, sugarcane, potato, vegetables, oilseeds and pulses. Among these crops, rice is widely cultivated all over the country throughout the year. It is one of the leading food crops to fulfill the demand of carbohydrate in Bangladesh. At present, rice is cultivated in 28228 acres of land. It alone constitutes the lion's share of total food grain production in Bangladesh. It is also the most important crop to millions of farmers, who grow it on millions of hectares throughout the region, and to the many landless workers who derive income from working on these farms. Since independence food autarky of Bangladesh has become dependent on rice production.

Agriculture is situated at the interface between ecosystems and society. As such agriculture is affected by the changes in the global environmental conditions. Both natural and human activities are responsible for this vulnerability. Natural activities include earth motion, sun's intensity volcanic eruption, forest fires and the circulation of the ocean, etc. The earth's climate is dynamic; it is changing since ancient era; and it is most important natural factor that responsible for climate variability. Due to human activities the quantity of green house gases (GHGs) in the atmosphere is rising. Human driven activities are increasing the quantity of carbon dioxide, methane, nitrous oxide, chloro fluorocarbons (CFCs) and other gases has lead to global climate change. Bosello and Zhang (2005) study estimated the relationship between climate change and agriculture. In case of food grain crops, several studies provide the evidence that productivity of food grain crop negatively affected due to climate change. Agronomists have long warned that farms in developing countries are often more sensitive to warming than US farms (Rosenzweig and Perry 1994; Reilly *et al.*, 1996). The impacts of climate change<sup>1</sup> on agriculture food production are global concerns and for that matter Bangladesh,

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<sup>1</sup> Climate change in IPCC usage refers to a change in the state of the climate that can be identified (e.g., using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity. This usage differs from that in the United Nations Framework Convention on Climate Change (UNFCCC), where climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods. The present study uses climatic parameters (e.g., temperature, rainfall and humidity) to represent the climate change. Thirty years climatic data from seven climatic station of Bangladesh has been used for the study.

where lives and livelihoods depend mainly on agriculture, are exposed to great danger. Bangladesh is frequently cited as one of the most vulnerable countries to climate change (Huq, 2001; Rahman *et al.*, 2003; UNDP, 2007; Huq *et al.*, 2007) because of its disadvantageous geographic location; flat and low-lying topography; high population density; high levels of poverty; reliance of many livelihoods on climate sensitive sectors, particularly agriculture and fisheries; and inefficient institutional aspects (Climate Change Cell, 2006). Many of the anticipated adverse affects of climate change, such as sea level rise, higher temperatures, enhanced monsoon precipitation, and an increase in cyclone intensity, will aggravate the existing stresses that already impede development in Bangladesh, particularly by reducing water and food security and damaging essential infrastructure (MOEF, 2005).

As mentioned earlier, human activities also enhance the vulnerability. Human activities are responsible for climate change and environmental degradation such as growing population, rapid urbanization, higher industrialization, use of modern technology, innovation, higher economic growth and development, transport, building construction, reduction in forest area, burning fossil fuels, grazing cattle, development of cities, and others (Ahmad *et al.*, 2011; Patnaik and Narayanan, 2010). For being a sensitive sector now-a-day's agriculture is in hindrance due to high population growth all over the world. The growing population hampers the arable land and it is also a challenging job to feed the increasing population. In Bangladesh, it has been declared as number one national problem. In fact, it's present population has come to a stage of explosion. Bangladesh has high population density, with a current population equivalent to half of the population of the United States living in an area the size of the state of Iowa (Ruane *et al.*, 2013).

Many impact studies focus on the agricultural sector for several reasons. The first reason is that agricultural production is directly exposed to change in temperatures and precipitation (Boulidam, 2012; Geethalakshmi *et al.*, 2011; Sheehy *et al.*, 2006; Sinha, 1991). The second reason is that agricultural production and consumption still comprise a large share of income in poorer developing economies. In this context, it is important to know how climate change affects the productivity of rice crop in Bangladesh. In this study the authors intend to examine the impact of climatic and non-climatic factors on rice productivity to facilitate development of appropriate farm policies.

## **2. Materials and Methods**

### **2.1 Dataset**

The data set for the present study is covering 210 observations corresponding to seven districts (viz. Rangpur, Dinajpur, Sylhet, Rajshahi, Comilla, Jessore and Barisal) with panel data for 30 years during 1982-2011. To estimate the impact on rice productivity, climatic and non-climatic data are used. Agricultural data are

taken from 'The Yearbook of Agricultural Statistics' and 'Bangladesh Statistical Yearbook'. Production of rice has been estimated in thousand tonnes. Data of climatic variables are taken from Bangladesh Meteorological Department (BMD). Climatic data includes yearly average rainfall, average maximum temperature, average minimum temperature, average maximum humidity and average minimum humidity.

## 2.2 Model specification

Simple Linear Regression Model (Mongi *et al.*, 2010, Haim *et al.*, 2008) is used in the present study, to investigate the impact of climatic and non-climatic factors on rice productivity. This model considers that climatic variables are similar to other agriculture and socioeconomic inputs for agriculture crop growth. The simple linear regression model is specified as:

$$(tp)_{it} = f\{(as)_{it}, (ia)_{it}, (sfa)_{it}, (aminhu)_{it}, (amaxhu)_{it}, (amint)_{it}, (amaxt)_{it}, (arf)_{it}\} \quad (1)$$

Where,  $tp$  is total production of rice (thousand tonnes);  $i$  is cross sectional groups of districts 1 to 7;  $t$  is time period for 1982-2011;  $as$  is area sown under rice crop (hectares);  $ia$  is irrigated area under rice crop (hectares);  $sfa$  is share of forest area (percentage);  $aminhu$  is average minimum humidity (percentage);  $amaxhu$  is average maximum humidity (percentage);  $amint$  is average minimum temperature (degree celsius);  $amaxt$  is average maximum temperature (degree celsius);  $arf$  is average rainfall (millimeter).

Now divide by  $tp$  to  $as$  (for production per hectare land or rice productivity) equation (1) is:

$$(tp/as)_{it} = \beta_0 + \beta_1 (ia)_{it} + \beta_2 (sfa)_{it} + \beta_3 (aminhu)_{it} + \beta_4 (amaxhu)_{it} + \beta_5 (amint)_{it} + \beta_6 (amaxt)_{it} + \beta_7 (arf)_{it} + \mu_{it} \quad (2)$$

Where,  $(tp/as)$  is rice productivity that is output per hectare of land;  $\beta_0$  is constant coefficient and  $\beta_1 - \beta_7$  are regression coefficient for corresponding explanatory variables and  $\mu_{it}$  is an error term.

According to (Baltagi, 2005) cross-sectional dependence is a problem in macro panels with long time series (over 20-30 years). Cross-sectional dependence can lead to bias in tests results (also called contemporaneous correlation). Keeping this view in mind, Prais Winsten models<sup>2</sup> with panels corrected standard errors (PCSEs) estimation are used, to avoid the problem of heteroscedasticity and cross-sectional dependence. Kumar and Sharma (2014) also used this model to investigate climate change and sugarcane productivity in India. However, PCSEs have all the options for panel heteroscedasticity, panel autocorrelation and contemporaneous correlation.

### 3. Results and Discussion

#### 3.1 Overall scenarios of the study areas

Summary statistics of different variables are given in Table 1. From the table it is evident that Barisal and Comilla districts had more variability compare to other districts in terms of productivity. Conversely, the coefficient of variation for productivity was lower in case of Rangpur district, indicating more consistent productivity. Rice crops under irrigated area were less uniform in Dinajpur district. The variation in irrigated area and share of forest area were less in Sylhet district. The coefficient of variation for average minimum humidity and average maximum temperature were the greatest in Rajshahi district than that of other districts; means that Rajshahi district had more variability in these two climatic parameters. The variability of average minimum temperature in Sylhet district was higher compare to other selected districts for the study. Rice production of Sylhet district had the benefit of rainfall, on the other hand, Rangpur and Dinajpur suffered much for the high inconsistency in rainfall.

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<sup>2</sup> Prais–Winsten estimation is a procedure meant to take care of the serial correlation of type AR(1) in a linear model. Conceived by Sigbert Prais and Christopher Winsten in 1954, it is a modification of Cochrane–Orcutt estimation in the sense that it does not lose the first observation and leads to more efficiency as a result. For example, consider the model

$$Y_t = \alpha + X_t \beta + \varepsilon_t$$

Where,  $Y_t$  is the time series of interest at time  $t$ ,  $\beta$  is a vector of coefficients,  $X_t$  is a matrix of explanatory variables, and  $\varepsilon_t$  is the error term. The error term can be serially correlated over time:  $\varepsilon_t = \rho\varepsilon_{t-1} + e_t$ ,  $|\rho| < 1$  and  $\varepsilon_t$  is a white noise. In addition to the Cochrane–Orcutt procedure transformation, which is:

$$y_t - \rho y_{t-1} = \alpha(1 - \rho) + \beta(X_t - \rho X_{t-1}) + e_t.$$

for  $t=2,3,\dots,T$ . Prais-Winsten procedure makes a reasonable transformation for  $t=1$  in the following form:

$$\sqrt{1 - \rho^2} y_1 = \alpha \sqrt{1 - \rho^2} + (\sqrt{1 - \rho^2} X_1) \beta + \sqrt{1 - \rho^2} \varepsilon_1.$$

Then the usual least squares estimation is done.



**Table 1. Descriptive Statistics**

Districts		Rangpur	Rajshahi	Dinajpur	Jessore	Barisal	Sylhet	Comilla
Productivity (tp/as)	Mean	2.18	2.27	2.02	2.31	1.85	1.85	2.52
	SD	0.56	0.64	0.58	0.75	2.01	0.51	2.19
	CV	25.69	28.19	28.71	32.47	108.65	27.57	86.90
Irrigated area under rice crop (Ia)	Mean	288133	311126	254952	238953	77081	238739	223908
	SD	133583	143515	507881	117425	32148	43516	73287
	CV	46.36	46.13	199.21	49.14	41.71	18.23	32.73
Share of forest area (Sfa)	Mean	2.03	2.17	7.97	0.00	57.60	68.16	0.59
	SD	0.75	0.89	2.96	0.00	54.30	3.11	0.15
	CV	36.95	41.01	37.14	-	94.27	4.56	25.42
Average minimum humidity (Aminhu)	Mean	42.32	36.41	38.27	40.98	46.52	40.21	44.68
	SD	2.76	3.10	2.59	2.84	2.67	2.96	2.39
	CV	6.52	8.51	6.77	6.93	5.74	7.36	5.35
Average maximum humidity (Amaxhu)	Mean	99.22	99.34	98.78	98.51	99.96	99.48	99.46
	SD	0.47	0.40	0.51	0.77	0.10	0.63	0.51
	CV	0.47	0.40	0.51	0.78	0.10	0.63	0.51
Average minimum temperature (Amint)	Mean	19.82	19.99	19.64	20.52	20.90	19.61	20.54
	SD	0.41	0.54	0.47	0.42	0.40	3.22	0.39
	CV	2.07	2.70	2.39	2.05	1.91	16.42	1.90
Average maximum temperature (Amaxt)	Mean	29.00	30.12	29.41	31.15	30.12	29.53	29.69
	SD	0.32	2.25	0.36	0.57	0.36	0.62	0.79
	CV	1.10	7.47	1.22	1.83	1.19	2.10	2.66
Average rainfall (Arf)	Mean	6.32	3.87	5.46	4.61	5.62	11.01	5.61
	SD	1.38	0.77	1.25	0.86	0.93	1.76	1.08
	CV	21.84	19.89	22.89	18.66	16.55	15.99	19.25

Source: Authors' own estimation

### 3.2 Regional climate trends

Agriculture in Bangladesh always depends on nature. The nature itself has peculiar characteristics, for that reason the agricultural production also shows variability. Climatic parameters are less uniform throughout the rice growing seasons. The climate scenarios vary from district to district. The present study also shows the climatic variability among seven districts. Figure 1 shows that average rainfall in Rangpur district had a fluctuating trend and since 2009 it was decreasing. Average minimum humidity had little bit fluctuation, but average minimum and maximum temperature had approximately static nature. With this climatic condition rice productivity in this region indicated increasing trend.

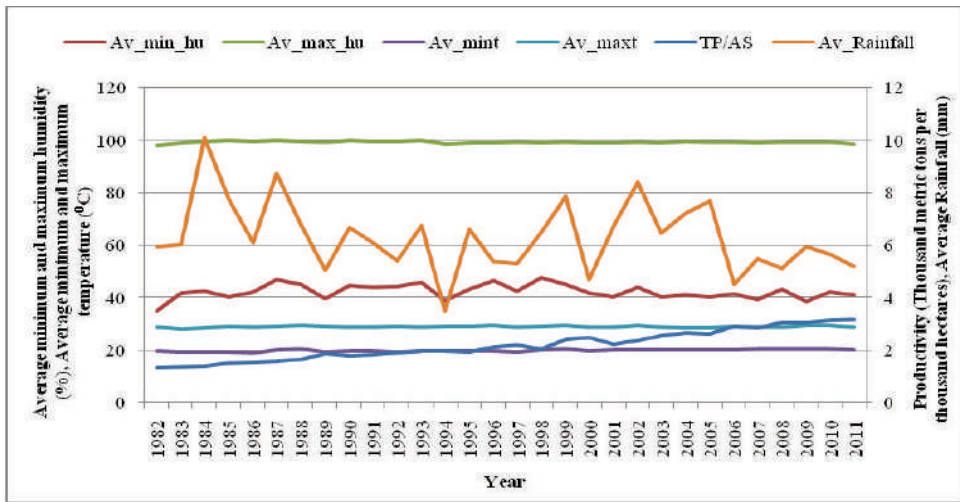


Figure 1. Trend of productivity and climatic variables in Rangpur district

Figure 2 indicates that average rainfall in Rajshahi district fluctuating over the years. From 2007 average rainfall in Rajshahi was decreasing after 2010 average rainfall was increasing. Rice productivity in this region was increasing sharply. In Rajshahi, average minimum humidity was increasing since 2009. Conversely average maximum humidity had more or less static trend. In Figure 3 it is evident that, with the increase in average rainfall, rice productivity in Dinajpur district was increasing. Although average maximum humidity was approximately static but average minimum humidity had increasing trend. Figure 4 reveals that compare to other districts, average rainfall in Jessore had less fluctuation. Productivity in this region was increasing rapidly since 2005 with mild fluctuation. Average minimum humidity was fluctuating over the years.

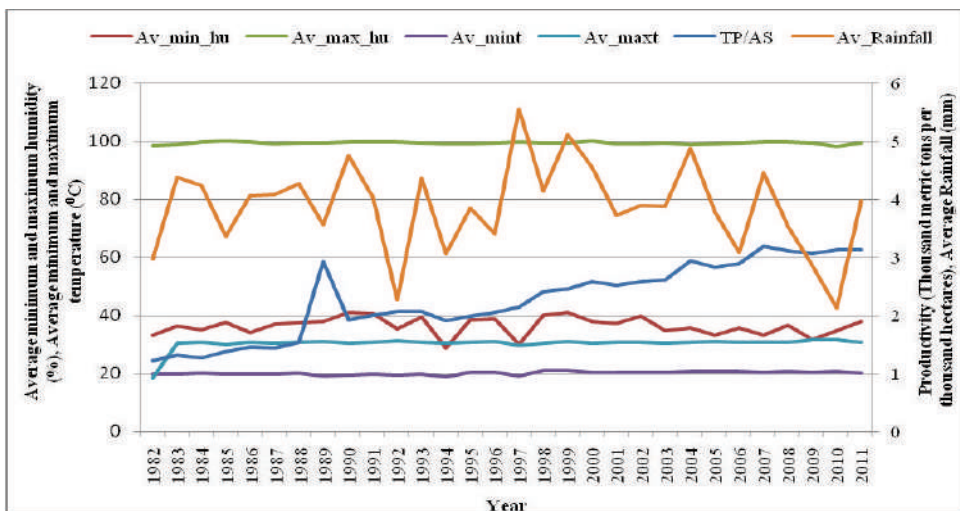


Figure 2. Trend of productivity and climatic variables in Rajshahi district

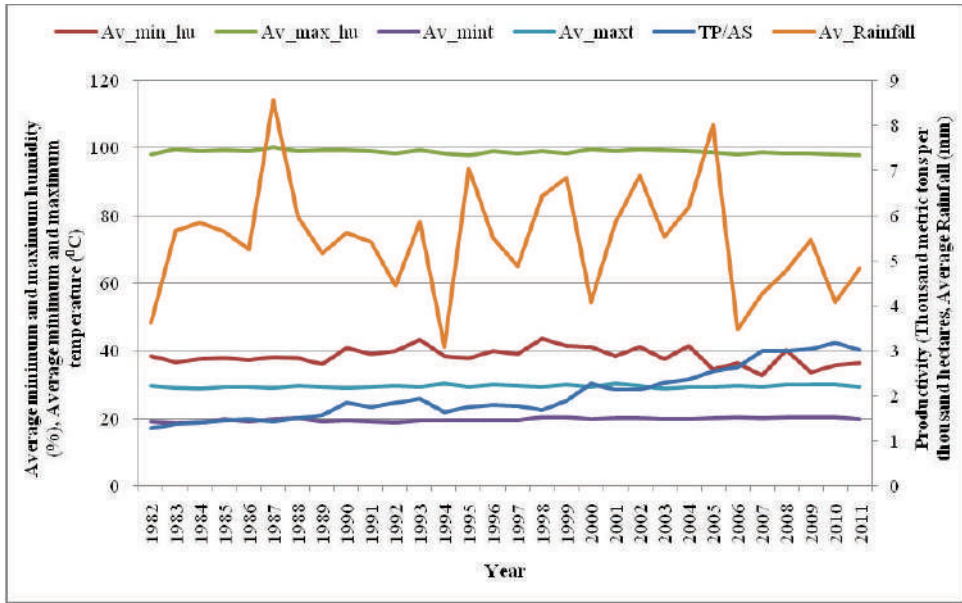


Figure 3. Trend of productivity and climatic variables in Dinajpur district

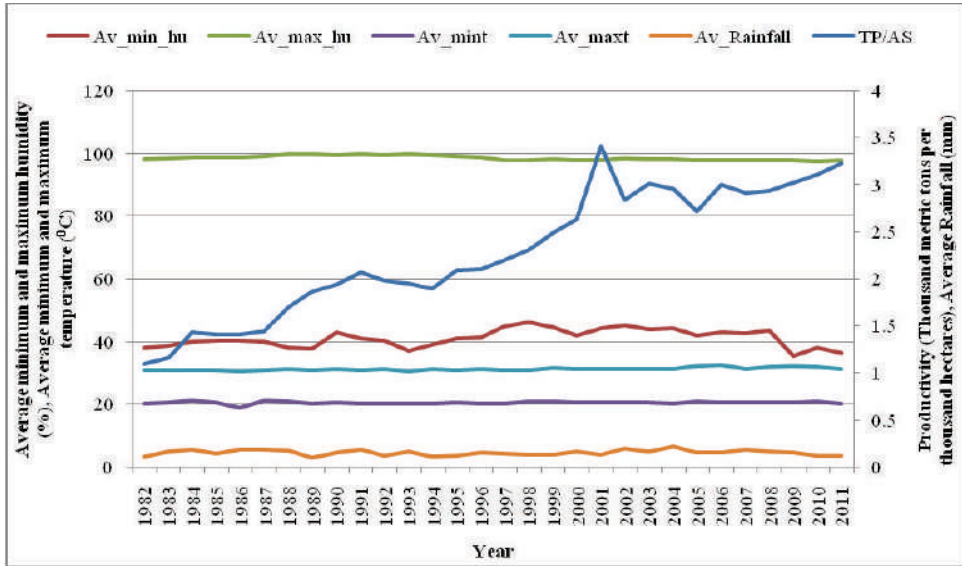


Figure 4. Trend of productivity and climatic variables in Jessore district

Figure 5 shows that average minimum humidity was decreasing in Barisal district. Average rainfall was fluctuating over the years. Figure 6 represents the Sylhet district, where rainfall was decreasing drastically since 2009 and rice productivity was approximately static. Figure 7 indicates that rice productivity in Comilla district was increasing with little bit fluctuation. Rainfall was highly fluctuating there since 1988 to 1994. It is also found that average minimum humidity was

fluctuating over the years. Average maximum humidity had little bit fluctuation.

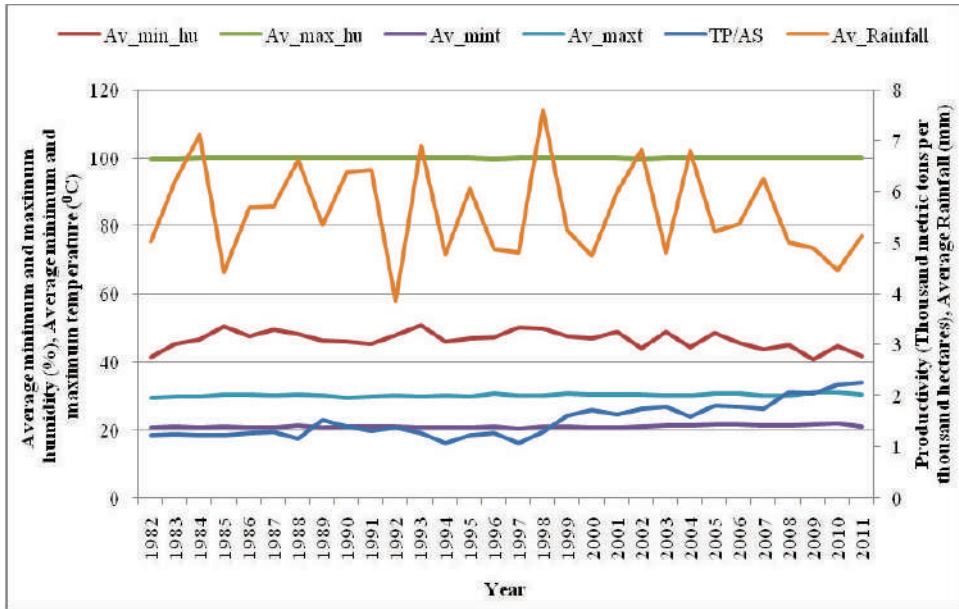


Figure 5. Trend of productivity and climatic variables in Barisal district

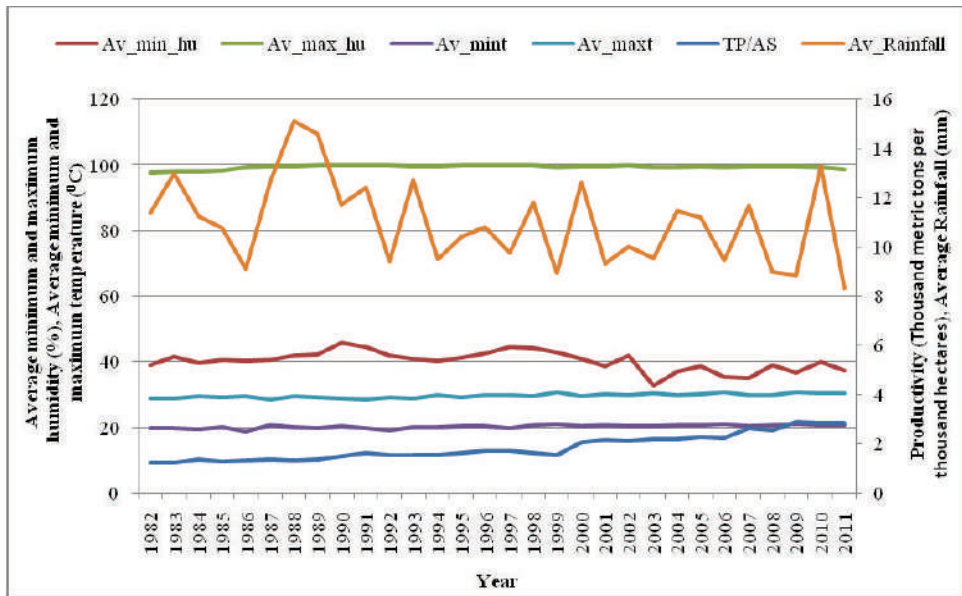


Figure 6. Trend of productivity and climatic variables in Sylhet district

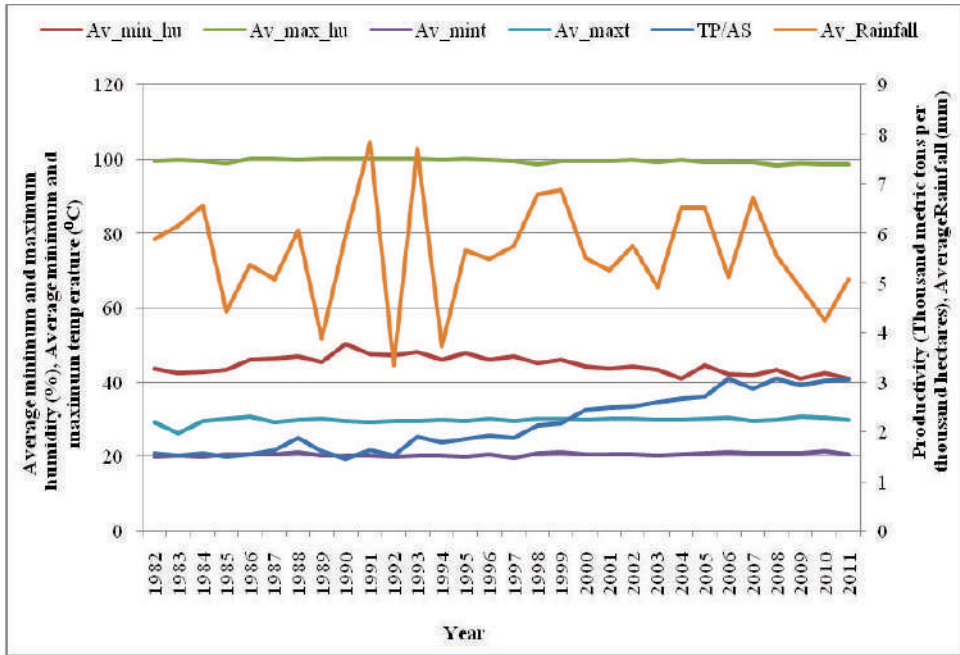


Figure 7. Trend of productivity and climatic variables in Comilla district

### 3.3 Influential factors on rice productivity

Table 2 gives the empirical results for the regression estimation for rice productivity. Table 2 discloses that irrigation area under rice crop, average minimum temperature and average maximum temperature were found to be significant at 1 percent, 5 percent and 10 percent level of significance, respectively. In case of non-climatic variable irrigation area was found an imperative to increase rice productivity. The results support with the findings of (Olesen and Bindi, 2002; Lee *et al.*, 2012; Gupta *et al.*, 2012; Kumar and Sharma, 2014). Irrigation area under rice crop was highly significant, which is expected and the sign is intuitive (higher the proportion of land under irrigated rice, higher is the yield). Therefore, providing sufficient water is crucial on rice production, as agriculture is one of the largest consumers of water resources in Bangladesh. (Yeo, 1999) mentioned that agriculture is already the largest consumer of water resources in semiarid regions. (Lee *et al.*, 2012) showed that providing sufficient water is crucial on agriculture production in tropical Asian countries, and also mentioned that the characteristic of rice-based Asian agriculture since rice is mostly cultivated in flooded field thus requires water all the time.

**Table 2. Regression results based on Prais-Winsten models with panel corrected standard errors (PCSEs) estimation**

Variables	Coeff.	Panel corrected Std. Errors	z	P >  z
Ia	0.0000*	0.0000	5.25	0.0000
Sfa	-0.0031	0.0043	-0.73	0.464
Aminhu	0.0172	0.0199	0.86	0.389
Amaxhu	-0.2714*	0.1081	-2.51	0.012
Amint	0.0856**	0.0375	2.28	0.023
Amaxt	0.0932***	0.0488	1.91	0.056
Arf	0.0149	0.0406	0.37	0.714
Cons. Coeff.	23.5254**	11.1913	2.10	0.036
R-squared	0.1298			
Prob> chi2	0.0000			
Wald chi2 (7)	55.20			
Number of obs	210			

Note: \*, \*\* and \*\*\* indicates the 1%, 5% and 10% significance level for respective variables.

Relative humidity (RH)<sup>3</sup> directly influences the water relations of plant and indirectly affects leaf growth, photosynthesis, pollination, occurrence of diseases and finally economic yield. Under high humidity, RH is negatively correlated with grain yield. The yield reduction was 144 kg/ha with an increase in one percent of mean monthly RH for maize, and similarly, wheat grain yield is reduced in high RH (Agrometeorology, 2015). The present study showed that average maximum humidity had negative effect on rice productivity, meaning that an increase in humidity decreases the rice productivity. (Matsui, 1997; Ayinde *et al.*, 2013) also have the same results. (Matsui, 1997) showed that in the humidity treatment, the number of pollen grain on each stigma decreased gradually as the relative humidity increased from 45 percent to 75 percent. (Ayinde *et al.*, 2013) mentioned that 1 percent increase in humidity caused 17 percent reduction in rice production in Niger state.

Climate change is expected to affect agriculture very differently in different parts of the world (Parry *et al.*, 1999). The resulting effects depend on current climatic conditions, the direction of change and the availability of resources and infrastructure to cope with change. In the same fashion, the climatic parameters act in different ways in different parts of the universe. In the current study, average minimum temperature and average maximum temperature had significant positive impact on rice productivity. Meaning that increase in average minimum temperature and

<sup>3</sup> Relative humidity (RH) refers to water vapor, exclusive of condensed water, in the atmosphere. It is the ratio, expressed as a percentage of vapor pressure to saturation vapor pressure at the existing temperature.

average maximum temperature increases rice productivity. This result is in the line of (Lee *et al.*, 2012; Olesen and Bindi, 2002; Mahmood *et al.*, 2012; Zakaria *et al.*, 2014). As we know, rice is C3 plant, and C3 plants are likely to be benefited from extra CO<sub>2</sub>. However, CO<sub>2</sub> fertilization could lead to some increase in agricultural productivity, particularly rice productivity. In field studies in the tropics, the increasing atmospheric concentration of CO<sub>2</sub> alone was found to significantly enhance rice crop yield (Lewis *et al.*, 1995). Atmospheric CO<sub>2</sub> levels are expected to have a positive effect on C3 plants, increasing their growth rate and cutting transpiration rates. Rice plants may also be able to use water more efficiently under higher CO<sub>2</sub> levels. Olesen and Bindi (2002) mentioned that global warming will extend the length of the potential growing season, allowing earlier planting of crops in the spring and earlier maturation and harvesting. Lee *et al.* (2012) showed that increase in temperature during the summer season marginally increases agricultural production in tropical Asian countries. (Zakaria *et al.*, 2014) showed positive effects of maximum temperature on Aus and Aman rice yield in Bangladesh. Sarker *et al.* (2012) mentioned that the influences of maximum temperature and minimum temperature are more pronounced compared with that of rainfall. Although rice yield may rise, an increase in temperature would induce rising demand for irrigation water. Parry (2000) mentioned that more water will be required per unit area under drier conditions, and peak irrigation demands are also predicted to rise due to more severe heat waves.

Increment in forest area may be harmful for rice productivity but it was insignificant, and the meaning is that any rising in forest area may reduce the area under rice crop; and resulting that productivity may go down. Kumar and Sharma (2013) also had the same result with significant impact.

#### **4. Remarks**

Based on the findings of this research, it can be concluded that there is existence of climate change in Bangladesh and this is really affecting the productivity of rice. Rice production in Bangladesh is adversely affected by average maximum humidity. Irrigated area under rice crop, average minimum temperature and average maximum temperature had positive effect on rice productivity. Climate change hampers agricultural productivity especially rice productivity but still now, the scenarios are not so worse in Bangladesh. Although average minimum temperature and average maximum temperature increased rice productivity at the same time it increased irrigation demand which ultimately push for high irrigation cost. So, the indirect effect of raising temperature is not ignorable at all. Therefore, attention has to be paid in this regards for future protection. Based on the findings of the study, the following recommendations are suggested: First, it is true that impacts of climatic and non-climatic factors are present on rice productivity in Bangladesh. Therefore, more irrigation facilities for rice production have to be ensured, since the result shows that expansion of irrigated area has positive and

significant influence on rice productivity. Policy needs to adopt for reducing irrigation cost. Second, adaptation to climate change will be necessary such as developing new varieties that will be more tolerant to humidity, requires less water and developing proper adaptation programs and policies.

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# **Role of Higher Education to Raise Economic Productivity: The Case on Bangladesh**

**Muhammad Mahboob Ali\***

**Abstract:** *Higher education is very productive. In Bangladesh currently improvement of quality of higher education project has been undertaken. The study raised the question to examine the impact of higher education of the country for raising productivity. An opinion poll was conducted. The study observed that innovations in Higher education raise self-employment. It was strongly supported by 16% while it was moderately agreed by 21%. Social unrest decline was strongly agreed by 21% while moderately agreed by 32% Economic welfare rise was strongly agreed by 22% while moderately agreed by 29%. 24% The study recommends that more investment in the higher education be provided. To improve quality enhancement of public and private higher educational institutes, mandatory introduction of object oriented teaching-learning system, introducing lesson plans, class auditing, teachers evaluation by the students, improvement of continuous assessment process etc. are required. The study suggests that modern teaching-learning system should be established for which outcome based lesson plan should be prepared and class lecturers must be more realistic.*

**Keywords:** Higher education, Economic Productivity, Bangladesh

## **1. Introduction**

Higher education is one of the tools to add value in the economic progress of a country. Higher education is highly correlated to reinventing thinking beyond boundaries to Excel and knowledge based resource society. Education does not mean only studying. It also means transformation of a person into a good human being. Our young learners are found very caring but sometimes they do not get proper directives. They should not be used by the vested quarters to serve their interest. Moral principles and ethical behavior should be incorporated into our education system. Investment on higher education creates corner stone through value innovation through working in an effective market mechanism. Schultz(1961) observed that the most distinctive feature of our economic system is

\* Professor, Dhaka School of Economics and Chairman, Center for Breakthrough Thinking in Bangladesh.

the growth in human capital. Without proper human capital a nation cannot achieve social welfare. Higher education relates to reinvesting thinking beyond boundaries to excel. In Bangladesh only about 12 percent of the year twelve graduates can enter into higher education. More than 80 percent of these students are in the National University affiliated colleges. Others are in the public and private universities.

(Source:[http://siteresources.worldbank.org/EDUCATION/Resources/278200-1121703274255/1439264-1193249163062/](http://siteresources.worldbank.org/EDUCATION/Resources/278200-1121703274255/1439264-1193249163062/Bangladesh_countrySummary.pdf) Bangladesh\_countrySummary.pdf.)

However, quality of the student of national university varies depending on the nature of the colleges or institutes. Quality of approved institutes /colleges under National University is miserable and it is very difficult to control or assess quality as National University already failed to perform its duties since its inception. Under the leadership of our honorable Prime Minister, lot of steps has recently been taken to enhance quality of National University of Bangladesh.

Quality education helps to achieve reinventing thinking beyond boundaries to Excel. It has been coordinated at the place of work through perseverance, enthusiasm, interpersonal skill, adding the value, so that transformation of persons, groups, institutes with innovative ideas, thoughts, entrepreneurship and technological advancement can happen with the vertical and horizontal coordination of efficiency and effectiveness. In the continuous process of changing scenario, reinventing thinking beyond is needed to sustain in the long run. If one want to limit imagination within boundary, then it will be difficult for sustain, which is applicable not only individual cases but also institutional processes. This may create imbalance in the society and adverse impact on national development. Imaginary ideas can come into exact representation if one takes hard and stiff effort with proper stress and time management. Excel of creation provides us performance which exceeds other or be finer in a numeral of approbation or vicinity; act upon tremendously glowing around the development process. Benchmarking should be set at a global standard so that superiority complex in a smaller area cannot be grown and acceptability in the global village can be achieved using the proper yardstick for which the nation needs human capital at a larger extent. Govt. of Bangladesh is trying to improve high quality education. As per web link <http://www.heqep-ugc.gov.bd/>, Ministry of Education, with the assistance of the World Bank, has undertaken a Higher Education Quality Enhancement Project (HEQEP). The project aims at improving the quality of teaching-learning and research capabilities of the tertiary education institutions through encouraging both innovation and accountability and by enhancing the technical and institutional capacity of the higher education sector. The University Grants Commission of Bangladesh is the implementing agency of the project. A HEQEP Unit –Quality Assurance unit has been established in UGC for implementation, management, monitoring and evaluation of the activities. Through institutional quality assurance cell at university level now self-assessment process has been undertaken at dept.

level. After self-assessment, based on self-assessment report, external peer review will be done.

To create human capital expenditure on education should be raised. World Bank (2014) claimed that tertiary education faces many deep-rooted and intertwined challenges. In Bangladesh about 2.1% of its GDP to education is invested, but just 0.12% was allocated to tertiary education – a very low share by any standards. Low levels of funding left over little money for investing in research, labs, equipment, computers, books or electronic journals, and infrastructure maintenance for improvement of teaching, learning and research. UGC monitors higher educational institutes. Professional Bodies, International accreditation councils are also working in some higher educational institutes of Bangladesh.

Knowledge and research based education is a determining factor in a country like Bangladesh. Dissemination of knowledge can create high core competencies and maintain international benchmarking. Bangladesh should ensure knowledge and research based education especially at higher level of studies. Still University of Dhaka and Bangladesh University of Engineering and Technology (BUET) are proving their excellence as educational institutes. University of Chittagong is also famous for contributing in the society. Jahangirnagar University and Rajshahi University are also doing well. Some private universities have also proved their excellence. However, some private universities of Bangladesh do not accept higher degrees especially PhD from public universities of Bangladesh. This is true but unfortunate. Irony is that Bangladesh doesn't lack knowledgeable person but most of them are not interested in doing research work.

To become efficient and effective personnel with synergy for organizations, professionals in this universe need solid realities of the society. They should act in response to the diverse issues of multi-cultural capabilities and principles. They ought to keep pace for achieving excellence of pursuit despite the fact that distance prevails between those who are the service providers and who are receiving service at the end. This gap can be narrowed down though arranging proper distribution channel of learning. Education quality should be ensured through doing international standard of research work and dissemination of knowledge without hindrance. This will help to accumulate, allocate and distribute knowledge in the global perspective. The axiom of the educational institute should be to pursue knowledge and do research work among the policy makers, researchers, entrepreneurs, business community and civil society. Environment of the educational institute will work as a communicative hub among the world of business community and technology prone people in the global perspective. As such students must refrain from national politics but they may do student politics for welfare of their own. This will help to meet the demand of the current domestic and global turbulent situation through strengthening quality assurance and capacity building of the organizations of both domestic and international arena.

To attain knowledge based education not only private or public universities are sufficient. We need high quality branches of educational institutes in Bangladesh through cross border arrangement. Earlier in this country Victoria University, Australia had a campus which was also providing high quality education. But previous government did not allow them to run the educational institute.

In China, India, and Malaysia there are various branches of quality full foreign educational universities/institutes. It is unfortunate that some profit makers in the educational sector in the name of study center are doing misconduct. But for them we should not stop foreign branches of high quality educational institutes. Similar types of offences are being done by some private universities and medical colleges as reported by different dailies. UGC of Bangladesh may take appropriate measures so that cross border quality education institute branches can run in Bangladesh. UGC may address the issue of cross border education so that there is opportunity of education in quality education institutes for higher education in Bangladesh while those who are working as a study center and not maintaining the quality will have to be driven out. Parameters must be set upon course curriculum meeting global and national need, number of PhD faculties, research works, publications, interactive class rooms, peer reviewed journals, regular seminars, workshops, conferences, symposiums, books/journals in the library, appropriate technological use as a tool to take classes, cultural and co-curricular activities. Strong measures ought to be taken against those who are doing false business in the name of providing higher studies such as involvement of any private university or fake study center.

## 2. Literature Review

Psacharopoulos (1994) argued that the investment in education continues to be a very attractive investment opportunity in the world today - both from the private and the social point of view.

Brownand Lauder(1996) argued that a polarized society will not create high standards of educational achievement for all. They established a framework for reconciling the aims of equality of opportunity with economic prosperity under the present global economic conditions.

Blundell,Dearden,Meghir and Sianesi (1999) observed that there is a substantial body of evidence on the contribution of education to economic growth.

Heckman(1999) argued that the returns on human capital investments are greatest for the young for two reasons: (1) younger persons have a longer horizon over which to recoup the fruits of their investments; and (2) skill begets skill.

Ang et al. (2001) described that at Chapter:6 under the title "How Can We Tell if We Have Delivered the Goods?", regarding the Student-Centered Learning Environment under following broad headings:

- On the Role and Responsibilities of the Teacher
- On the Role and Responsibilities of Students
- On the Mode of Learning
- Classroom Instruction -On the Learning Outcomes, Goals, and Objectives
- On Instructional Strategies and Learning Activities
- On Assessment

Olssen and Peters (2005) commented that in a global neoliberal environment, the role of higher education for the economy is seen by governments as having greater importance to the extent that higher education has become the new star ship in the policy fleet for governments around the world. The recognition of economic importance of higher education and the necessity for economic viability has seen initiatives to promote greater entrepreneurial skills as well as the development of new performative measures to enhance output and to establish and achieve targets.

Hanushek and Woessmann (2007) found that the importance of both minimal and high-level skills, the complementarity of skills and the quality of economic institutions, and the robustness of the relationship between skills and growth. International comparisons incorporating expanded data on cognitive skills reveal much larger skill deficits in developing countries than generally derived from just school enrollment and attainment. The magnitude of change needed makes it clear that closing the economic gap with industrial countries will require major structural changes in schooling institutions.

Monem and Baniamin (2010) argued that the strategic plan document for higher education suggests that in the face of a changed scenario of higher education, quality improvement in the higher education has to be the main focus of attention and development of science and technology based education should be given top priority by the government and the private sector in the next two decades.

Mazumder (2012) commented that we must consider higher education as a critical investment towards the future of our nation to be competitive in the global marketplace.

Ahmed (2013) found that session jam is currently one of the most alarming situations prevailing in the universities in Bangladesh. It is hindering the higher education in Bangladesh.

Alam (2013) depicted that the interface between industry and university (especially private ones) should be made regular and strengthened; involvement of industry personnel in course-

Curriculum development and transaction will help close the gap between the two



vital sectors of the economy.

Clark (2013) commented that reinvention and overcoming past perceptions can be a daunting process. She also observes that sometimes, one's reinvention is by choice a creative embrace of a new direction. Her observations are based on facts as in attendance of an unrestraint with amid source of deliberations towards its renovation procedure which should be dedicated on amazing practical scenario so as to exclusively characterize by aptitude of innovative ideas, willingness, risk taking aptitudes, competencies, abilities and thoughts. Visionary zeal and Missionary activities may lead to pursue for attaining competitive advantage with superiority so that business environment can grow and put positive impact lead to higher growth of gross domestic product.

Sarkar, Rana and Zitu (2013) found that quality higher education is a much debated issue in Bangladesh nowadays. Comparatively, newly established general universities are suffering more due to low budgetary support than the older technical universities. Bangladesh as a developing country needs to develop and ensure minimum facilities for quality higher education in all the public universities without discrimination. If Bangladesh could successfully address the existing challenges of quality higher education and ensure essential facilities for the same through budgetary provision, it could provide world class higher education at moderate cost and it could be an example to the whole world.

Khaled (2014) observed that in Bangladesh at the academic level teachers use rote memorisation of text materials for students' knowledge or learning, instead of facilitating them to use brains how to think, understand, communicate, apply knowledge and solve real-life or work-place problems. There is not enough environmental - instruction- and assessment-wise - accommodation for students having special needs. Giving slow learners extra time for homework, quiz, test and examinations may be cited here as examples. Students are not looked after, according to their individual ability, need and interest by most of the teachers at all levels of education as they are intimidated or abused emotionally and physically to learn, instead of motivating them by differential instructions of teaching and learning for delivery of lesson plans, assessment, evaluation and reporting by any local jurisdiction curriculum guideline.

Siddiqi(2014) depicted that higher education should be promoted and provided in such a way as to achieve the required level of economic development. To provide higher education in a planned way, the country needs to prepare national manpower plans. Therefore, Bangladesh's Five Year Plans should contain a separate chapter on national manpower planning matching various targets of economic development. Higher education needs to be given higher priority than it has received in the past in national development plan.

Williams(2014) showsthat there is a definite connection between education and

economic development. The five major themes found in the data are that 1) there is a connection between education and economic development, 2) education is used as a tool for economic development, 3) there are challenges to strengthening the relationship between education and economic development, 4) steps can be taken to increase this relationship, and 5) Hattiesburg has “all the right ingredients” to tap into this alliance.

Ahmed and Rahaman (2016) depicted that Sustainable Development Goals 2030, titled “Transforming Our World: The 2030 Agenda for Sustainable Development” with 17 goals and 169 targets (including 43 means of implementation) were adopted at the United Nations in September 2015. The education goal SDG 4 has 7 targets and 3 means of implementation. They also argued that Bangladesh’s foreign aid strategy for education will need to be redesigned in view of targets of the Seventh Five Year Plan of Bangladesh (SFYP )and the Sustainable development goals(SDGs). Foreign aid will be an important source for financing education, in spite of Bangladesh being labeled as a (lower) middle income country. It is necessary to engage in dialogue with the traditional development partners on a continuing basis for continued support to fulfill the SDG4 agenda appropriately adapted and indicators for assessing and reporting progress elaborated. External assistance has to fit into the priorities and strategies designed through participation and dialogue with stakeholders the open dialogue needs to include the structural concerns which have to be addressed.

From aforesaid discussion, research question is to examine the impact of higher education of the country for raising productivity?

### **3. Objectives and Methodology of the Study**

Objectives have been taken as follows:

- i) To assess the standard of higher education of the country;
- ii) To evaluate impact of higher education on economic productivity of the country;
- iii) To provide some recommendations on the basis of the findings and discussions.

In search of aforesaid research questions the study has been undertaken. The study used both qualitative and quantitative assessment. An opinion pool has been conducted by the Center for Breakthrough thinking in Bangladesh on “Role of Higher education in Bangladesh to raise economic productivity”. An opinion survey was conducted in following cities Dhaka, Comilla, Chittagong, Sylhet, Rajshah, Barisal, Khulna and Rangpur. Random sampling technique was applied and time period of the study is 1 January 2014 to 31 November, 2014.

1203 questionnaires were received by September, 2014. Total numbers of ques-

tionnaires were distributed among 1600 person out of which 1203 questionnaires were received. Among the respondents the study has chosen medical students, engineering students, agriculture university students of both public and private educational institutes, teachers from above types of institutes, guardians of existing students, bankers of public and private sectors, journalists, politicians both present govt. supporter and opposition party supporter of the parliament. In the category of others respondents we have taken sample form Lawyers, agricultural scientists, job seekers, industrialists, women entrepreneur, non- resident Bangladeshis and business men. However, from received questionnaires, 89 questionnaires were not duly filled up for which these were rejected. Remaining questionnaires are valid and the results of these 1114 responses as well as some other relevant information's are duly reported. October and November is used for coding, data tabulation and analyzing and also writing study report.

The study does not consider quality of the students of National University for which they and their guardians are not included in the opinion poll survey. This is due to the fact that it will need more time and will involve huge costs.

#### 4. Analysis and Discussion

On the basis of opinion poll survey we are summarizing the results of the findings:

##### **Table 2. Impression about the recent steps on Higher education:**

(In percentage)

Type	Positive	Negative
Students	393	141
Guardians	103	19
Academicians	133	24
Bankers	54	27
Journalists	46	22
Politicians	54	21
Others	62	15

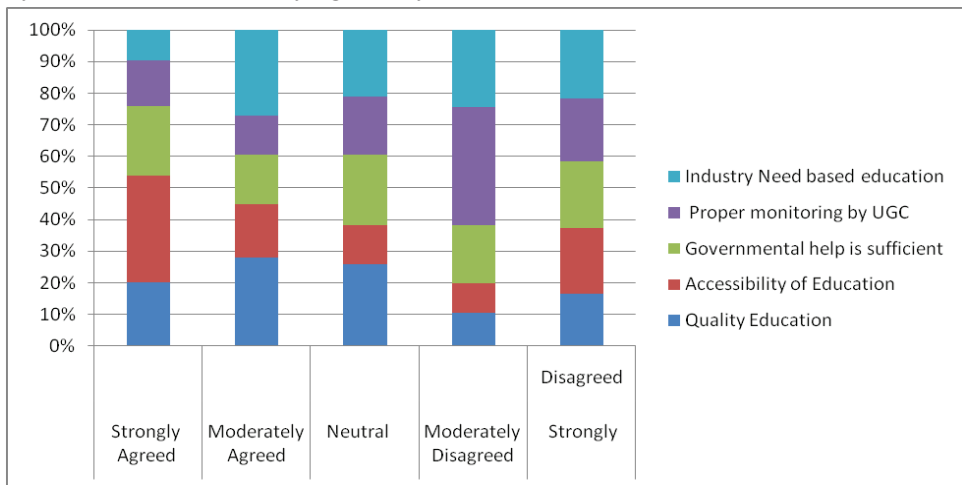
Most of the respondents thought that positive impacts on recent steps on higher educations have been taken by the GOB.

**Table: 2 Positive Impact on Bangladesh economy due to spread of Higher Education**

Type	Strongly Agreed	Moderately Agreed	Neutral	Moderately Disagreed	Strongly Disagreed
Quality Education	25%	25%	21%	9%	20%
Accessibility of Education	42%	15%	10%	8%	25%
Governmental help is sufficient	27%	14%	18%	16%	25%
Proper monitoring by UGC	18%	11%	15%	32%	24%
Industry Need based education	12%	24%	17%	21%	26%

Source: Ibid

From table : 3 we observed that about quality education,25% strongly agreed while moderately agreed by 25%.Accessibilty of education has been agreed strongly by 42% while moderately agreed by 15%.Government help is sufficient has been agreed strongly by 27% while moderately agreed by 14%.Proper monitoring of UGC has been agreed strongly by 18% while 11% moderately agreed. Regarding the questionof industry need based education has been agreed strongly by 12% while moderately agreed by 24%.



**Figure: 5 Comment on positive Impact on Bangladesh economy due to spread of Higher Education**

**Table: 3: Existing Higher education Situation**

Type	Strongly Agreed	Moderately agreed	Neutral	Moderately disagreed	Strongly disagreed
Excellence in Public Universities(General Education)	25%	22%	34%	12%	7%
Excellence in Public Universities(Technical Education)	15%	21%	32%	15%	17%
Excellence in Private Universities (Both general and technical Education)	10%	22%	19%	23%	26%
Excellence in Medical Education at Public Colleges and BSMMU	21%	32%	18%	21%	8%
Excellence in Medical Education at Private colleges	9%	17%	23%	39%	12%

(Source:Ibid)

From table 3, we observed that in case of Public universities (General education) excellence of education was strongly agreed by 25% while moderately agreed by 22% while for the technical education 15% strongly agreed about excellence and 21% agreed moderately. Regarding the question of excellence in Private universities both general and technical education only 10% strongly agreed while moderately agreed by 22%. Excellence in medical education at colleges and BSMMU 21% strongly agreed while 32% moderately agreed. Excellence in medical education at private colleges only 9% strongly agreed while moderately agreed by 17%.

**Table 4: Innovations in Higher Education**

Type	Strongly Agreed	Moderately Agreed	Neutral	Moderately Disagreed	Strongly Disagreed
Innovation occurred through use of ICT	15%	31%	21%	24%	9%
Innovation occurred through use of Interaction, participation and doing things based modern class room situation	9%	28%	27%	21%	15%
Giving more stress on Concept building rather than memorizing and proper communication skill development at higher education level	14%	22%	31%	22%	11%
Attention is given to develop knowledge and Skills	12%	14%	40%	27%	7%
Case studies ,presentations, assignments , real life experiences ,Field Trip, group studies, mobile apps use positively	19%	38%	19%	15%	9%
Test-Teach-Test method	7%	12%	31%	31%	19%
Problem Based learning	14%	14%	23%	31%	18%
Concept mapping	10%	14%	28%	29%	19%
Computer aided Instruction	16%	25%	36%	15%	8%
Teacher act as guided discovery	11%	21%	29%	24%	15%

(Source: ibid)

**Figure: 6: Innovations in Higher Education**

Innovation occurred through use of ICT has been strongly agreed by 15% while moderately agreed by 31%. Innovation occurred through use of Interaction, participation and doing things based modern class room situation was agreed by 9% while moderately agreed by 28%. Giving more stress on Concept building rather than memorizing and proper communication skill development at higher education level was strongly supported by 14% while 22% moderately supported. 12% strongly supported to the question about attention is given to develop knowledge and Skills while moderately agreed by 14%. Case studies, presentations, assignments, real life experiences, group studies, Field trip, mobile apps use positively agreed strongly and moderately by 19% and 38% respectively. Test-Teach-Test method has been agreed by strongly by 7% and moderately 12%.

In case of Problem Based learning, both strongly and moderately agreed. Concept mapping has been agreed by 10% strongly and 14% moderately. Computer aided instruction was agreed by 16% and 25% strongly and moderately respectively. Teacher acted as guided discovery was supported by 11% and 21% strongly and moderately respectively.

**Table: 7 Impact of Innovations in Higher Education's in the Socio-Economic Conditions**

Type	Strongly Agreed	Moderately Agreed	Neutral	Moderately Disagreed	Strongly Disagreed
Self-employment rises	16%	21%	26%	19%	18%
Social unrest declines	11%	32%	24%	23%	10%
Economic welfare rises	22%	29%	32%	11%	6%
Unemployment declines and purchasing power rises	24%	37%	18%	12%	9%
Gender Inequality declines	10%	24%	31%	21%	14%

(Source:ibid)

Due to innovations in Higher education's Self-employment rises was strongly supported by 16% while moderately agreed by 21%. Social unrest declines was strongly agreed by 21% while moderately agreed by 32%.Economic welfare rises were strongly agreed by 22% while moderately agreed by 29%. 24% and 37% agreed strongly and moderately agreed respectively regarding Unemployment declines and purchasing power rises. Gender Inequality declines was agreed by 10% while 24%, 31% strongly and moderately agreed respectively.

From the findings we observed that it was supported Psacharopoulos (1994) views. Higher education is beneficial for the society and individual perspective. Definitely blending of national and international accreditation council given to an educational institute will give more fruitful results. However, while going to International accreditation we must think about our national priority. New England Association of Schools and Colleges (NEASC) is not appropriate for Bangladesh as to get accreditation one-third must be GED courses and 25% of the faculties of the Institute must have USA degree. However, there are also lot of false accreditation council. However, in Bangladesh some universities like NSU does not recognize local degree despite they are doing business in Bangladesh and enlisted as private university of Bangladesh. This feudalistic attitude of NSU should be stopped by the UGC and Education ministry.

Another finding is that one of the influential member of UGC some years back who is currently Vice Chancellor of a Private University outside Dhaka while you

was a member of UGC at that time he gave false report with the help of Joint secretary of (Private University) Education Ministry of GOB against a Vice Chancellor of a Private University corrupt person in the educational atmosphere may destroy govt.'s good intention. Changing of word of the Teacher may be Cheater.

Session Jam of public universities should be eliminated. Otherwise extended time period creates frustration among the students. In this regard Ahmmed(2013) 's observation is quite logical.

Though govt. has raised investment on higher education recent years but it is not sufficient. Private and foreign investment through strategic alliance in the educational sector is very much important. Sarkar ,Rana and Zitu (2013) found should be considered as an important factor.

Present government may be thanked for their recent decision to give permission to open new private universities. Hope that in each district at least one public university should be set up. Side by side good colleges like Chittagong Government College, Dhaka College, Eden Girls' College may be considered to make full-fledged universities. In a country where population is more than 16.8 crore, we need more universities. Further we need high quality cross border educational institutes branches in Bangladesh. UGC can compulsorily ask for the faculties to do research work as a mandatory and at least two articles in a peer reviewed journal may be published in each year. Standard of the institutes/colleges under National University is very low. As such present government may set up an inquiry commission to find out how to improve the quality education of the institutes /universities. Expenditure on higher education must be raised by the government. Also Alumnus should come forward to provide donations to public universities. Syllabus should be international standard and suitable to the needs of the industry and class room atmosphere should be improved. Cross border higher education regulations should be prepared by the Ministry of Education of Bangladesh and a special bill may be placed in the National assembly. Without global institutes higher education is not properly feasible for which special steps are required by the government.

There should be a rule that each year at least two research based articles of a faculty must be published in peer reviewed journal. Many faculties in Bangladesh think that they have already finished education so why they should do further research. This sort of perception can be changed if UGC made compulsory rule for publication of research based articles. When more research work will be emphasized then quality education will be feasible.

Innovation along with proper research techniques, managerial skills and applicability of information and communication technology will lead to transformation of excellence. Innovation can enhance managerial skill and better access to the information which provides an opportunity to explore the idea of originality. Innovative



themes will help to gather knowledge in the area of achieving new products and services, fresh schemes of invention, opportunity for latest market scenario, original foundation of delivery, and dazzling performance of classification through brain storming. As such education institutes ought to put emphasis on innovation in quality education. Quality education may be very much constructive for thought provoking ideas, penetrating knowledge management, uniqueness and spread of information and communication technology. Process layout and designing of education should be done in such a manner that rejuvenation will work as a creativity to exemplify a dimensional assembling processes, superb distinct with the extent of deep-seated driving forces will fetch benefits for the participants as well as regional and global leaders and assist to formulate and implement strategies with extra zeal and passion. Knowledge diffusion will craft avenues to develop skills.

New incremental innovations or changes to the manufactured goods and also services may allow enlargement to carry on efficiently and effectively for profit growth and as such return on investment must be positive. Business can characteristically make distant mode of more technological innovations which can perhaps hope to fetch to souk through which successfully for reinventing thinking beyond boundaries with excel. There is a need for planned organizational harmony and procedure to handle innovation from thoughts phase to commercialization keeping the profit level at a normal profit. Political unrest, violence against women, immorality, unethical behavior, some banks unlawful profit gain through taking higher spread between interest rate on deposit and interest rate on advance, manipulation in the capital market, labor grievance, communalism, noncompliance of law and global attitudes towards countries like Bangladesh is a deep rooted problem. Dead weight loss cannot be permitted to work in the process. Moving forward is the lay for receiving to a goal oriented results at a boundary less world with diversified products and services supported by human capital since scared to make the require devoted jeopardy of really allowing latent can be reached through continuous process of strategic alliances among the partners not only domestically but regionally and globally. This may lead to achieve corner stone though capacity building with creation of new market space in different parts of the world. Through edge of boarders just about budding by no means in actuality search out an accurate counter at the same time as to if that budding by no means in actuality search out an accurate counter at the same time as to if that imminent was take an advantage often or if we very soon blow creative obstacles through knowledge diffusion. Rather social welfare should be accompanied by social justice and income equality for betterment of the individual, team spirit, organizations, society and the nation as a whole.

But some private universities are failing to impart quality education. Moreover, medical education in the private sector also varies depending on the nature of an

institute. To ensure quality education, course curricula should be designed in such a way that fulfillment of global as well as domestic needs are possible following the curricula. This will help society in becoming developed and young learners in transforming themselves into global people.

The need for global education should no longer be regarded as optional; it should become mandatory. The government should allow cross-border educational institutes in Bangladesh. More emphasis should be given on setting up high quality cross-border educational institutes having Honours, Masters, PhD and Post-doctoral courses. Same thing should be done in medical science area as well under the joint venture with the USA, Australia, Canada, and the UK specially. Accreditation council may be set up to ensure higher education at different universities in Bangladesh. To ensure quality education, UGC may stress the need for more research work by teachers and young learners. Economics is a subject that aims to ensure welfare of the people. Therefore, more emphasis should be laid on the need of society as well as social welfare. The syllabus of Economics should be reviewed and redesigned from the perspective of social obligations. An average young learner is now scared to study Economics. Main reason for this is use of mathematics at Honours and Masters Degree levels.

## **6. Conclusions and Recommendations**

Despite some limitations and problems are associated but higher education from 2009 to till now is improving. Quality assurance is the key factor. Definitely spread of education has been raised for with education ministry play key role. Teacher student relationship should be friendlier. Besides basic knowledge; out book knowledge should be raised. Pedagogy desires variety from the complete progress to constructive of the personnel to gaining knowledge and skill which should be fully utilized in each sort of educational institutes in the country. To create self-employment opportunities, Enterprise Economics/Entrepreneurial Management and also Blue Economy program should be launched in the country. Dhaka School of Economics is going to introduce one year Post –graduate diploma course on Enterprise development. This is a good initiative taken by Dr. Qazi Kholiqzaman Ahmad. Without learning now a days it is not possible to become self-employed.

Existing English language education system should be replaced by reading more English literatures and enhancing quality of English teacher. In the globalized world we have to create core competent human capital for which govt. is taking lot of steps. However, in the private sector some greedy business magnet thinks that education is source on making super normal profit. Coaching business should be stopped for which not only govt. but also needs of the guardians' active support are very much required. During the admission test in the undergraduate level question should be set on the basis of previous course curricula of the admission seekers not unseen questions. Otherwise it will have negative impact on the admission seekers.

Through examining some admission questions I found that questions are relatively making harder for the admission seekers.

National university should monitor its colleges/institutes for proving good quality education which needs further investigation by another researcher in future. Further a study should be done to assess the IQAC works of different higher educational institutes of Bangladesh.

Private University who does not comply with UGC and education ministry's rules and regulations bold steps should be taken to lose down. They must be closed down for the greater shake of the students. Recently UGC closed 12 private universities outer campus which is good decision. But strong regulatory measures are needed against other non-compliance universities. Like Malaysia, China and India, Govt. can give permission to set up outer campuses of World ranking and country ranking higher educational institute in the country. Vision of education has to make the students to become global standard benchmarking within 2021 when the nation will celebrate 50 years of independence. To reach this goal, the country needs to plan to expand research and training facilities and academic programs at higher level. Education is a tool that enriches students' minds with the skills necessary to compete and succeed in a challenging world, and also with the knowledge to maintain peace and justice in the society. Graduating students of the country should turn to very best ambassadors of liberality toward society free from the fetters of colors and castes, of faith, of non-communalism, of gender, and of nationality, as Khalil Gibran says "Generosity is giving more than you can, and pride is taking less than you need" (Source: Internet).

Teacher should pursue students for co-curricular activities. Concept building with patriotism is the important factor for students to give future leadership of the country. Appreciate the sense and collision of the tangible can put together into practice in each one presentation pointer would provide innovative thoughts for production and service expansion.

Those who are involved in providing quality education in this money centric world must possess high ethical and moral values. Quality education will be able to create ample opportunities for knowledge diffusion to build a distinguished record and provide a guideline for the present and future domestic and global scenario.

Quality Assurance of Teaching & Learning Process should consist of Curriculum design, review & approval process, Teacher Quality, Lesson Plan(given at Appendix), Research and Extension, Quality of assurance of assessments/ examinations, stakeholders' inputs, examiners, students' feedback should be taken into cognizance. Support Staff Quality ought to include Number, type and qualification of support staff, career plan, training plan, appraisal system, award& recognition schemes, student/faculty feedback. Student Quality must consist of Student selection process, trend of student intakes, credit system, student workload, student

performance reports; Facilities and Infrastructure should be developed through number and type of facilities, utilization rates, downtime/uptime, maintenance plan, new facilities and upgrading plans, safety & health policy, facilities booking system. Student Advice and Support Mechanisms require report and feedback on student progress, coaching, mentoring and counseling schemes, and student feedback. Constructing yearly action plan include at the Institutional, Department and Program level to achieve quality education through arranging a road map to achieve the target. In case of Community Services -students should be encouraged to do community services as a part of academic need. IT infrastructure is the backbone of modern learning system. Library facilities should be raised for not only serious students but also those who are not serious students at all. Art and cultural support for the students as well as faculties ought to be arranged; Cultural heritage of 3000 years, History of independence war, Speech of Father of the Nation Bangabandhu Sheikh Mujibur Rahman on 7th March, 1971 etc. may be preserved by the universities. International collaborations, Number of International students, inbound and outbound exchange students, quality accommodation for international students may be arranged. Focus should be given on Culture, Innovation, Engagement, and Inclusiveness should be given.

Quality of Graduates must be at par at regional and global arena so that employment rate can be raised. Constructing self-assessment system at the program level, Faculty level and Institutional level must be done. Each Five year, review of quality process within institution in a cyclical manner should be done. Internal review of Quality assurance, external review of quality assurance through forming national accreditation council is required to ensure quality. Bangladeshi Ranking system for all level starting from primary to Higher education should be encouraged to introduce both for public and private initiatives and directly may be controlled from Prime Minister of the country. UGC should also take initiative to index research based journals of higher educational institutes.

To develop a perfect model in the educational arena we can use PPF which means Public-Private-Foreign collaboration. For example, in Bangladesh we can try to establish a branch of Asian Institute of Technology or University of Delhi. For Life science or medial education we can try to set up branch of Mahidol University, Thailand or Indian Institute of Technology Bombay (IITB). Regional cooperation will give us better market access and improvement of standardization in the regional perspective so that it will work as catalyst to attain competitive advantage and long run sustainability. Definitely it will give bigger options for continuity and improvement in the educational sector including teaching-learning, research and extension, consultancy. To have a win-win situation, regional cooperation is very important for which we should use the platform of BIMSTEC with special attention in the field of higher education. Like ASEAN University network and ASEAN Quality Assurance if BIMSTEC university network and BIMSTEC Quality Assur-

ance can be established.

Accreditation council should be set up for public –private universities and institutes/colleges of National University under Higher Education Quality Enhancement Project (HEQEP). Some global accreditation council is also working in the country. Return on investment on higher education through greater budgetary allocations as well as from private and foreign strategic alliances should be raised as it will enhance marginal social benefit and have positive impact on economic growth of the country and also add value at domestic and global value chain. Actually higher education's 'quality enhancement lead to social indifference curve to be tangent with grand utility possibility curve. Bangladesh needs to improve quality education for implementing SDG4.

### **Recommendations:**

- Under BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation) a regional body may develop an educational framework like ASEAN University Network. In Appendix, Proposed BIMSTEC Regional University for Quality enhancement is given at Figure:1. This can only be done if our Honourable Prime Minister of Government of Bangladesh Sheikh Hasinawho is a great leader of the globe if kindly take special initiative to include Education sector at BIMSTEC and regional cooperation for Higher education.
- Needs of the country should be identified, indicators should be set up at the institutional level to add value in domestic and Global value chain ;
- HEQEP project financed by World Bank with the help of UGC and QAU must be increased from 2018 to 2021 to establish in every HEIs Institutional Quality Assurance Cell.
- National Accreditation Council should be formed.
- Each HEI must have career counselling, co-curricular activities at department level and endorse real life education scenario with OBTL system.
- Sufficient Number of National Assessor for assessing Quality education will have to be appointed;
- For technical and vocational degree under separate ministry and minister - a new effective and efficient framework should be developed as well as executed so that current rate of technical education at 10% can be raised to global on an average rate 43%;
- Introduction of Flip board, Use of modern technology –Google class room etc. should be introduced for better teaching-learning environment at the course level;

- At the institutional level quality of Administration and management should be improved;
- Faculty must maintain course Diary;
- Physical and infrastructural development of Higher educational institutes where underdevelopment prevails , ought to be done without delay;
- At the institutional level QS ranking audit may be done for improvement;
- Best Higher Educational Institute may get recognition from the Government each year based on Internal and external evaluation and monitoring report;
- Best University Teacher of the Country should get National award each year;
- Researcher whose article will be published and also cited in Scopus or Thompson Reuters or more prestigious indexed journal may get incentives from their institutes;
- Ranking system of educational institutes at Bangladesh should be introduced;
- Journal indexing of research based on journal published from Higher educational institutes should be done by UGC should be done;
- Corrupt investors/educationist in the educational management must be penalized.

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## পাট শিল্পের বর্তমান সংকট, আর্থ- সামাজিক অবস্থার উপর এর প্রভাব প্রেক্ষিত বাংলাদেশ: (খুলনা-যশোর অঞ্চলের রাস্ত্রীয়ত্ব ৯ টি জুট মিলের পর্যালোচনা)

মোঃ জাহাঙ্গীর আলম\*

সারকথা: বাংলাদেশ তৃতীয় বিশ্বের একটা কৃষি নির্ভর উন্নয়নশীল দেশ। পৃথিবীর মোট উৎপাদিত পাটের ৭৫% এখানে উৎপাদিত হয়। দেশের তিন কোটি মানুষ বিভিন্নভাবে পাটের উপর নির্ভরশীল। এদেশের অর্থনীতির গতি যদিও মস্তুর তার পরেও কৃষির উপর নির্ভর করে এখানে কতকগুলো শিল্প গড়ে উঠেছে। এর মধ্যে পাট শিল্প অন্যতম। বিগত শতাব্দীর পঞ্চাশ এবং ষাটের দশকে এ ভূখণ্ডে অনেকগুলো পাট শিল্প গড়ে ওঠে। মূলত শুরুতে এ প্রতিষ্ঠান গুলোর অধিকাংশের মালিক ছিল পাকিস্তানের মাড়য়ারীরা। স্বাধীনতার পর বাংলাদেশ সরকার এগুলোকে রাষ্ট্রীয় কাঠামোর অধীন নিয়ে আসে। তখন রাষ্ট্রীয়ত্ব পাটকলের সংখ্যা ছিল ৭৮টি। এর মধ্যে ২০০৪ সাল নাগাত ৬০টির মত কারখানা লোকসানের অযুহাতে বিরাস্ত্রীয় করণ, আর্থশিক বা পুরোপুরি বন্ধ করে দেয়া হয়। আন্তর্জাতিক বাজারে পাটজাত পণ্যের চাহিদা ক্রমে বাড়ছে। মাঝে রপ্তানী তৎপরতা কম থাকলেও চলতি অর্থ বছরের প্রথম নয় মাসে পূর্ববর্তী বছরের একই সময়ের চেয়ে রপ্তানী চল্লিশ শতাংশ বেড়েছে। অবশ্য ২০০০ সালের পর থেকে বিভিন্ন সময়ে এ শিল্প নানা সংকটের মধ্যে অতিক্রম করেছে। এতে অর্থনৈতিক সর্বোপরি, রাজনৈতিক সামাজিক সংকটের সৃষ্টি করেছে। খুলনা যশোর অঞ্চলে বর্তমানে বি.জে.এম.সি-র নিয়ন্ত্রিত জুট মিলের সংখ্যা ৯টি। যেগুলো চালু আছে তার অবস্থাও সংকটাপন্ন। পাট শিল্পের এ দুরবস্থার কারণ এবং আর্থ-সামাজিক অবস্থার উপর এর প্রভাব সম্পর্কে জানা এ প্রবন্ধের মূল প্রতিপাদ্য।

উদ্দেশ্য এবং লক্ষ্য :

- পাট এবং পাট শিল্পের অতীত এবং বর্তমান সম্পর্ক বিশ্লেষণ।
- পাট ও পাট শিল্পের সাথে কৃষি অর্থনীতির যোগসূত্র বিশ্লেষণ।
- পাটের বর্তমান অবস্থার বিস্তারিত বিশ্লেষণ এবং সমস্যা চিহ্নিত করা।
- পাট ও পাট শিল্পের বর্তমান অবস্থায় অর্থনৈতিক ও সামাজিক প্রভাব পর্যালোচনা।
- ভবিষ্যতের সম্ভাবনার দিকটি খুঁজে দেখা এবং সুপারিশমালা তৈরি করা।

\* আলোচ্য প্রবন্ধে মূলতঃ মাধ্যমিক উৎস থেকে তথ্য সংগ্রহ করা হয়েছে। এর মধ্যে অন্যতম বাংলাদেশের বিভিন্ন অর্থনৈতিক সমীক্ষা। বাংলাদেশ পরিসংখ্যান ব্যুরো থেকে প্রকাশিত তথ্য। বিভিন্ন জাতীয় ও আন্তর্জাতিক পত্রিকা এবং প্রকাশনা। এ সম্পর্কে আন্তর্জাতিক এবং জাতীয় সেমিনারে উপস্থাপিত নানান। এছাড়াও, সরাসরি পাট শিল্পের কর্মকর্তা কর্মচারী ট্রেড ইউনিয়নের নেতৃত্ব, ভুক্তভোগী শ্রমিক এবং অন্যান্য পেশাজীবীদের সাথে ছোট দলে নিবিড় অনুসন্ধানের মাধ্যমে তথ্য সংগৃহীত হয়েছে।

## ১. ভূমিকা :

বাংলাদেশ বিশ্বের অন্যতম প্রধান পাট উৎপাদনকারী দেশ। বিশ্বের সবচেয়ে ভালমানের পাট এখানে উৎপাদিত হয়। পৃথিবীর মোট উৎপাদিত পাটের ৭৫ ভাগ এখানে উৎপাদিত হয়। এ দেশের তিন কোটি মানুষ বিভিন্নভাবে পাটের উপর নির্ভরশীল। বিগত শতাব্দীর পঞ্চাশ ও ষাটের দশকে এ ভূখণ্ডে পাট শিল্প গড়ে ওঠে। স্বাধীনতার পর বি.জে.এম.সি-র নিয়ন্ত্রিত ৭৮ টি পাটকল ছিল। তখন লাভজনক ছিল। সম্প্রতি এ শিল্পের বিপর্যয় নেমে আসে। লোকসানের অজুহাতে ২০০৪ সাল নাগাদ ৬০ টির মত কারখানা বিরাস্ত্রীয়করণ, আংশিক বা পুরোপুরি বন্ধ করে দেয়া হয়। যেগুলো চালু আছে সেখানেও বকেয়া মজুরীর কারণে শ্রমিক অসন্তোষসহ বহুবিধ কারণে, উৎপাদন ব্যহত হচ্ছে। বি.জে.এম.সি-র ঢাকা, চট্টগ্রাম সহ খুলনা অঞ্চলের ৯টি জুট মিলের শ্রমিকেরা মজুরী সহ বেশকিছু দাবীতে আন্দোলন অব্যাহত রেখেছে। তাদের জীবন জীবিকা সংকটাপন্ন।

### পাট চাষের ইতিকথা

পৃথিবীর দুই শতাধিক দেশের মধ্যে ১২টি খানেক দেশে বাণিজ্যিকভাবে পাটের আবাদ হয়ে থাকে। পাট উৎপাদনকারী দেশের মধ্যে উল্লেখযোগ্য হচ্ছে বাংলাদেশ, ভারত, চীন, নেপাল, মিয়ানমার, থাইল্যান্ড, ভিয়েতনাম, কম্বোডিয়া ও ব্রাজিল। তবে, এক সময় বাংলাদেশ বাণিজ্যিক দিক থেকে এক্ষেত্রে একচেটিয়া সুবিধাপ্রাপ্ত দেশ হিসেবে বিবেচিত হত। বিশ্ব বাজারের ৮০% পাট আমাদের দেশ থেকে সরবরাহ করা হত। বিগত শতাব্দীর ৭০ এর দশকের দ্বিতীয়ার্ধ পর্যন্ত এক্ষেত্রে বাংলাদেশের অবস্থান ছিল শীর্ষে। ১৯৭৮ সাল নাগাদ ভারত পাট উৎপাদনের ক্ষেত্রে আমাদের দেশকে ছাড়িয়ে যায় এবং প্রথম স্থান দখল করে। আমাদের অবস্থান দ্বিতীয়। বাণিজ্যিকভাবে আমাদের এ অঞ্চলের পাট চাষের সূচনা করে বৃটিশরা। ১৮৭৩ সালে এইচ. সি কারকে চেয়ারম্যান করে পাট বিষয়ক একটি কমিশন গঠন করে বৃটিশ শাসক গোষ্ঠী। এই কমিশন পাট চাষের সূচনা এবং বিস্তৃতি সম্পর্কে জেলা কর্মকর্তাদের কাছে প্রতিবেদন চেয়ে পাঠায়। কমিশন বাংলায় পাটচাষ এবং ব্যবসার উপর প্রতিবেদন শিরোনামে ১৮৭৭ সালে প্রাপ্ত তথ্যাদি প্রকাশ করে। এ প্রতিবেদনের তথ্য থেকে দেখা যায় ঊনবিংশ শতকের ৪ এর দশক ও তার কাছাকাছি সময়ে বাংলাদেশের রংপুরে পাটের আবাদ শুরু হয়। ক্রমশ তা সারাদেশে বিস্তার লাভ করে। এরই ধারাবাহিকতায় পাট চাষের সাথে জড়িয়ে পড়ে এ ভূ-খণ্ডের কৃষক। কৃষি অর্থনীতিতে জায়গা দখল করতে থাকে সোনালী আঁশ। এভাবেই পরবর্তীতে গড়ে ওঠে পাট শিল্প।

### পাট ও পাট শিল্প

বাংলাদেশ বিশ্বের অন্যতম প্রধান পাট উৎপাদনকারী দেশ। এদেশের ২০ লক্ষ একর জমিতে প্রতি বছর প্রায় ৫১ লক্ষ বেল পাট উৎপাদিত হয়। যা পৃথিবীর মোট উৎপাদিত পাটের প্রায় ৭৫%। পাটের উপর দেশের প্রায় তিন কোটি মানুষ বিভিন্নভাবে নির্ভরশীল। তা সত্ত্বেও ১৯৫১ সালের আগে পর্যন্ত এভূখণ্ডে কোন পাট শিল্প গড়ে ওঠেনি। ১৯৫১ সালে প্রথম প্রতিষ্ঠিত হয় পৃথিবীর সর্ববৃহৎ পাট কল আদমজি জুট মিল। ধারাবাহিকভাবে ঢাকা, চট্টগ্রাম, রাজশাহী এবং খুলনা অঞ্চলে পাট কল গড়ে ওঠে। বর্তমানে চালু পাটকলগুলোতে তৈরি প্রায় পাঁচ লক্ষ মে.টন পাটজাত দ্রব্য বিদেশে রপ্তানী করে প্রায় তিনশ মিলিয়ন ডলার আয় হয়। সম্প্রতি আন্তর্জাতিক বাজারে পাট ও পাটজাত পণ্যের চাহিদা ও দাম বেড়েছে। স্বাধীনতাউত্তর রাষ্ট্রায়ত্ব পাটকল ছিল ৭৮টি। ২০০৪ সাল নাগাদ লোকসানের অজুহাতে বিরাস্ত্রীয়করণ করা হয় প্রায় ৬০টি। বর্তমানে বি.জে.এম.সি-র অধীন পাটকলের সংখ্যা ২২টি। গত শতাব্দীর ৬০ এর দশকে গড়ে ওঠা খুলনা/যশোর অঞ্চলের বি.জে.এম.সি-র নিয়ন্ত্রিত ৯টি পাট কলের অবস্থা সংকটাপন্ন। শ্রমিকদের জীবন-জীবিকা দুর্বিসহ।

**খুলনা যশোর অঞ্চলের বি.জে.এম.সি-র নিয়ন্ত্রিত ৯টি জুট মিল ও তার বর্তমান পরিস্থিতি :**

মজুরীর সাথে শ্রমিকের জীবন জীবিকার সম্পর্ক নিবিড়। একজন শ্রমিক তার কায়িক এবং মানসিক শ্রমের যদি যথাযথ মূল্যায়ন থেকে বঞ্চিত হয় তাহলে উৎপাদন যেমন ব্যাহত হবে তার জীবন জীবিকাও দুর্বিসহ হতে বাধ্য। আমরা লক্ষ্য করি বাংলাদেশে শ্রমিক অসন্তোষ একটা মারাত্মক রূপ ধারণ করেছে। বিশেষ করে পাট শিল্পের শ্রমিকেরা মজুরী ও বিভিন্ন দাবিতে উৎপাদন বন্ধ করে আন্দোলনে নেমেছে। এ প্রসঙ্গে খুলনা-যশোর অঞ্চলের রাষ্ট্রায়াত্ন ৯টি জুটমিলের অবস্থা বিশেষণ করা হল।

“বি.জে.এম.সি নিয়ন্ত্রিত খুলনা-যশোর অঞ্চলের পাটকল সমূহের প্রতিষ্ঠা, উৎপাদন শুরু, জাতীকরণ এবং তাঁত সংখ্যা”

প্রতিষ্ঠানের নাম	প্রতিষ্ঠাকাল (সাল)	উৎপাদন শুরু (সাল)	তাঁত সংখ্যা			মোট
			হেসিয়ান	সেকিং	সি.বি.সি	
ক্রিসেন্ট জুট মিলস লিঃ	১৯৫২	১৯৫৪	৬৯৪	৩৩৯	১০৩	১১১৬
প্লাটিনাম জুট মিলস লিঃ	১৯৫৫	১৯৫৮	৬০২	২৭৩	৮২	৯৫৭
পিপলস জুট মিলস লিঃ (খালিশপুর জুট মিল)	১৯৫২	১৯৫৪	৫১৬	৩২৪	৮৩	৯২৩
ইস্টার্ন জুট মিলস লিঃ	১৯৬৪	১৯৬৭	১৫৫	১০১	৩৫	২৯১
আলীম জুট মিলস লিঃ	১৯৬৪	১৯৬৮	১৬২	৮৮	-	২৫০
কার্পেটিং জুট মিলস লিঃ	১৯৬৩	১৯৬৫	-	-	৮৬	৮৬
জে.জে.আই	১৯৬৬	১৯৭০	৩০০	১০০	৫৬	৪৫৬
স্টার জুট মিলস লিঃ	১৯৫৬	১৯৫৮	৫৬০	২০০	-	৭৬০
দৌলতপুর জুট মিলস লিঃ	১৯৫৪	১৯৫৫	১৭০	৮০	-	২৫০

টেবিল-১

\* ১৯৭২ সালে রাষ্ট্রপতির আদেশ ২৭ বলে সংশ্লিষ্ট পাটকল সমূহ জাতীয়করণ করা হয়।

**শ্রমজীবী মানুষের মজুরী ভোগান্তি চলছেই :**

(বকেয়া মজুরী/বেতনের হিসাব- আগস্ট ২০০৬ থেকে ফেব্রুয়ারী ২০০৭ পর্যন্ত বিভিন্ন সময়ের)

প্রতিষ্ঠানের নাম	শ্রমিকদের অপরিশোধিত সাপ্তাহিক মজুরী		কর্মচারীদের অপরিশোধিত বেতন		গত ০৬/০৭ সালের পাওনা ইদুল আযহার উৎসব বোনাস
	সময়	টাকা	সময়	টাকা	
ক্রিসেন্ট জুট মিলস লিঃ	১১ সপ্তাহ	৫ কোটি ৭৯ লক্ষ	৪ মাস	১ কোটি ৮০ লক্ষ	২ কোটি ৩ লক্ষ টাকা
প্লাটিনাম জুট মিলস লিঃ	১৪ সপ্তাহ	৬ কোটি ৭৭ লক্ষ	৫ মাস	১ কোটি ৭৯ লক্ষ	২ কোটি ১০ লক্ষ টাকা
পিপলস জুট মিলস লিঃ (খালিশপুর জুট মিল)	১৬ সপ্তাহ	৬ কোটি ৬ লক্ষ	৬ মাস	২ কোটি ১৫ লক্ষ	১ কোটি ৭০ লক্ষ টাকা
ইস্টার্ন জুট মিলস লিঃ	১৯ সপ্তাহ	২ কোটি ২০ লক্ষ	৫ মাস	৭৫ লক্ষ	৫৬ লক্ষ টাকা
আলীম জুট মিলস লিঃ	২৭ সপ্তাহ	২ কোটি ৫১ লক্ষ	৮ মাস	৮৬ লক্ষ	৫৩ লক্ষ টাকা
কার্পেটিং জুট মিলস লিঃ	১৪ সপ্তাহ	১ কোটি ৪ লক্ষ	৪ মাস	৫২ লক্ষ	৩০ লক্ষ টাকা
জে.জে.আই	১৫ সপ্তাহ	২ কোটি ২৫ লক্ষ	৩ মাস	৬৭ লক্ষ	৯১ লক্ষ টাকা
স্টার জুট মিলস লিঃ	১৪ সপ্তাহ	৫ কোটি ২১ লক্ষ	৪ মাস	১ কোটি ১২ লক্ষ	১ কোটি ২৪ লক্ষ টাকা

টেবিল-২

- ৬/৭ কোথাও ৮ মাস বকেয়া।
- এ সময়ে শ্রমিক কর্মচারীদের পরিবারে চলছিল নিরব দুর্ভিক্ষ।
- প্রতিবাদে খোরা/থালা এবং ঝাড়ু মিছিল হয়েছিল।
- বুভুক্ষ শ্রমিকেরা মহাসড়কে ঈদের নামাজ পড়েছিল।

## বর্তমানে উৎপাদনের প্রত্যাশা আর প্রাপ্তির ব্যবধান অনেক :

(২০ এপ্রিল ২০১৫ এর পরিসংখ্যান)

প্রতিষ্ঠানের নাম	ভাঁত হেসিয়ান, সেফিং, সি.বি.সি		চালু থাকার হার (%)	স্থায়ী শ্রমিক (কর্মরত) জন	উৎপাদনের লক্ষ্যমাত্রা	বাস্তব উৎপাদন	উৎপাদনের হার
	চালু থাকার কথা	চালু ছিল					
ক্রিসেন্ট জুট মিলস লিঃ	১০৬১	৫১৪	৪৮.৪৪%	৩৪৯৬	৮৯.১১ মেঃ টঃ	২৫.০৮ মেঃ টঃ	২৮.১৪%
প্রাটিনাম জুট মিলস লিঃ	৭৮৯	৫৪৬	৬৯.২০%	৩৩৪২	৭১.৫৫ মেঃ টঃ	১২.১০ মেঃ টঃ	১৬.৯১%
পিপলস জুট মিলস লিঃ (খালিশপুর জুট মিল)	৬২০	৪৬৭	৭৫.৭২%	২৭৩৭	৬৫.৯১ মেঃ টঃ	৩১.১২ মেঃ টঃ	৪৭.২১%
ইস্টার্ন জুট মিলস লিঃ	২৩৩	১৪৭	৬৯.০৯%	১০৫৭	২৪.০১ মেঃ টঃ	১২.৩৪ মেঃ টঃ	৫১.৩৯%
আলীম জুট মিলস লিঃ	২০৬	৬০	২৯.১২%	৫৫৩	১৮.৮২ মেঃ টঃ	০৬.০৪ মেঃ টঃ	৩২.০৯%
কার্পেটিং জুট মিলস লিঃ	৬০ (শুধু সি.বি.সি)	৫২ (শুধু সি.বি.সি)	৮৬.৬৬%	৫৯২	৯.৩৫ মেঃ টঃ	০৫.০১ মেঃ টঃ	৫৩.৫৮%
জে.জে.আই	৩৮২	১৯৪	৫০.৭৮%	১২৯৮	৩১.৯৩ মেঃ টঃ	০৭.৭১ মেঃ টঃ	২৪.১৪%
স্টার জুট মিলস লিঃ	৫৫৫	৩৯৫	৭১.১৭%	২১৭৬	৪৫.৪৬ মেঃ টঃ	১২.০৭ মেঃ টঃ	২৬.৫৫%
দৌলতপুর জুট মিলস লিঃ	১৮৫	৬১	৩২.৯৮%	৫১১	১৯.৯২ মেঃ টঃ	০৬.৩৪ মেঃ টঃ	৩১.৮২%

টেবিল-৩

\* উৎপাদনের হার গড়ে ৩৪.৫৫%

## স্থায়ী-অস্থায়ী এবং দৈনিক ভিত্তিক শ্রমিকের কর্মে নিযুক্তির খতিয়ান (২০/০৪/২০১৫ইং)

প্রতিষ্ঠানের নাম	কর্মরত শ্রমিক		মোট (জন)	হার %	মন্তব্য
	স্থায়ী	অস্থায়ী/দৈনিক			
ক্রিসেন্ট জুট মিলস লিঃ	৩১২৯	৩৬৭	৩৪৯৬	৭৫%	
প্রাটিনাম জুট মিলস লিঃ	২৯১৫	৪২৭	৩৩৪২	৮৪%	
পিপলস জুট মিলস লিঃ (খালিশপুর জুট মিল)	-	২৭৩৭	২৭৩৭	১০০%	সব অস্থায়ী এবং যা কর্মে নিযুক্ত তাকে সর্বোচ্চ অর্জন ধরা হয়।
ইস্টার্ন জুট মিলস লিঃ	৯৫৯	৭০	১০২৯	৮৪%	
আলীম জুট মিলস লিঃ	৫৫০	৩৪	৫৮৪	৬৫%	
কার্পেটিং জুট মিলস লিঃ	৩৪৩	২৪৯	৫৯২	৯৬.৮৯%	
জে.জে.আই	১০০৮	২৯০	১২৯৮	৭১%	
স্টার জুট মিলস লিঃ	১৭৮৯	৩৮৭	২১৭৬	৭৪%	
দৌলতপুর জুট মিলস লিঃ	-	৫১১	৫১১	১০০%	সব অস্থায়ী এবং যা কর্মে নিযুক্ত তাকে সর্বোচ্চ অর্জন ধরা হয়।

টেবিল-৪

- এখানে শতকরা হিসাব হলো স্থায়ী, অস্থায়ী/দৈনিক ভিত্তিক যে শ্রমশক্তি কর্মে নিযুক্ত থাকার কথা ছিল বাস্তবে তার কত ভাগ নিযুক্ত ছিল সেই হার। (কাঁচামাল, যন্ত্রাংশ নষ্ট ইত্যাদির কারণে কর্মে নিযুক্ত হতে পারেনি)

**উপকরণ (পাট) মজুদ/ক্রয়ের বাস্তব অবস্থা :**

প্রতিষ্ঠানের নাম	০১/০৭/২০১৪ থেকে ৩০/০৬/২০১৫ পর্যন্ত পাট ক্রয়ের লক্ষ্যমাত্রা	দৈনিক পাটের চাহিদা	আজকের আমদানী (২০/০৪/২০১৫) (কুইন্টাল)	০১/০৭/২০১৪ থেকে ২০/০৪/২০১৪ পর্যন্ত সর্বমোট ক্রয়	অর্জিত হার (ক্রয়ের হার)	২০/০৪/২০১৫ পর্যন্ত মজুত					
						মিল ঘাট		ক্রয় কেন্দ্র		সর্বমোট	
						পরিমাণ (কুইন্টাল)	কভারেজ (কত দিন)	পরিমাণ (কুইন্টাল)	কভারেজ (কত দিন)	পরিমাণ (কুইন্টাল)	কভারেজ (কত দিন)
ক্রিসেন্ট জুট মিলস লিঃ	২৭,৯,৪৫৮ কুইন্টাল	৯৩৬ কুইন্টাল	৮০	৭১,৫৪৩	২৬%	৪,২৩৫	৫	১,২৭৬	১	৫,৫১১	৬
প্রাটিনাম জুট মিলস লিঃ	২১,৭,৪৬৮ কুইন্টাল	৭৫১ কুইন্টাল	-	৫২,০০৫	২৪%	৩,৭৮৫	৫	১,৬৭৯	২	৫,৪৬৪	৭
পিপলস জুট মিলস লিঃ (বাদিশপুর জুট মিল)	১৯,৮,৫২৯ কুইন্টাল	৬৯২ কুইন্টাল	-	৮৬,৩৭৭	৪৩%	১৬,৬৪৫	২৪	৩,০৩৭	৪	১৯,৭১৮	২৮
ইষ্টার্ন জুট মিলস লিঃ	৭১,৩২৭ কুইন্টাল	২৫২ কুইন্টাল	১৬০	২৪,২৭৫	৩৪%	১,৮১১	৭	৭২১	৩	২,৫৩২	১০
আলীম জুট মিলস লিঃ	৫৭,২৯৫ কুইন্টাল	১৯৮ কুইন্টাল	-	১১,৮৩৮	২০%	-	-	-	-	-	-
কার্পেটিং জুট মিলস লিঃ	৩১,৩৭২ কুইন্টাল	১১২ কুইন্টাল	-	২২,২৯০	৭১%	১,৪৭৯	৫	৭৩	১	১,৫৫২	৬
জে.জে.আই	৯৮,৭৬৯ কুইন্টাল	৩৩৫ কুইন্টাল	-	২৬,২০০	২৭%	১,৭৯৭	৫	৪৪০	১	২,২৩৭	৬
স্টার জুট মিলস লিঃ	১,৩৮,০২৬ কুইন্টাল	৪৭৭ কুইন্টাল	-	৩২,০১৯	২৩%	৪,৭৪০	১০	২,৫২৮	৫	৭,২৬৮	১৫
দৌলতপুর জুট মিলস লিঃ	৬১,১৮৯ কুইন্টাল	২০৯ কুইন্টাল	-	১৭,৭৫০	২৯%	৬৪৬	৩	৫৬১	৩	১,২০৭	৬

টেবিল-৫

- খুলনা অঞ্চলের মিলে পাট মজুদের অবস্থা হতাশাব্যাঞ্জক

ঢাকা-চট্টগ্রাম অঞ্চলের বি জে এম সির জুট মিলের পাট মজুত/ক্রয় পরিস্থিতির খতিয়ান (এপ্রিল ২০১৪ সময়ে হিসাব)

অঞ্চল	প্রতিষ্ঠানের নাম	পাট মজুদের পরিমাণ (দিন)
চট্টগ্রাম	আমীন জুট মিলস লিঃ	৫ দিন
চট্টগ্রাম	হাফিজ জুট মিলস লিঃ	৩১ দিন
চট্টগ্রাম	এম. এম জুট মিলস লিঃ	১৭ দিন
চট্টগ্রাম	বি. ডি. সি. এফ লিঃ	৩২ দিন
চট্টগ্রাম	গুল আম্মেদ জুট মিলস লিঃ	১৫ দিন
চট্টগ্রাম	আর আর জুট মিলস লিঃ	৪১ দিন
ঢাকা	বাংলাদেশ জুট মিলস লিঃ	২৮ দিন
ঢাকা	জাতীয় জুট জুট মিলস লিঃ	২২ দিন
ঢাকা	করিম জুট মিলস লিঃ	২২ দিন
ঢাকা	লতিফ বাওয়ানী জুট মিলস লিঃ	৬৪ দিন
ঢাকা	রাজশাহী জুট মিলস লিঃ	৫০ দিন
ঢাকা	ইউ. এম. সি জুট মিলস লিঃ	৪২ দিন

- খুলনা এবং চট্টগ্রামের তুলনায় ঢাকা অঞ্চলের ২/১ টি মিলের পণ্য স্থানীয় বাজারে বিক্রির আয় থেকে কখনো কখনো পাট ক্রয় করেন।

### মজুরী এবং জীবন জীবিকা :

একজন শ্রমিকের মজুরী প্রচলিত বাজার ব্যবস্থা মুদ্রাস্ফীতির সাথে সমন্বয়হীন হলে জীবন-জীবিকা সংকটাপন্ন হয়। মজুরীর সাথে উৎপাদনশীলতা এবং জীবন-জীবিকার সম্পর্ক বিদ্যমান। মজুরী কম হলে জীবন-জীবিকার সংকট বাড়ে। কতগুলো সূচকের সাহায্যে বিষয়টি দেখানো যায়।

মজুরীর অবস্থা	ক্যালরি হিসাবে খাদ্য গ্রহণ	শিক্ষার প্রবণতা	ক্রয় ক্ষমতা	চিকিৎসা সেবা	পোশাক পরিচ্ছদ	জীবন জীবিকার খুঁকি	সঞ্চয় প্রবণতা	ভোগ প্রবণতা	অপরাধ প্রবণতা
মজুরী কম/বকেয়া	নিম্নমুখী	নিম্নমুখী	কমবে	কমবে	কমবে	বাড়বে	নিম্নমুখী	নিম্নমুখী	বাড়বে
সঠিক মজুরী/নিয়মিত মজুরী	স্বাভাবিক	উর্ধ্বমুখী	বাড়বে	স্বাভাবিক	স্বাভাবিক	কমবে	উর্ধ্বমুখী	উর্ধ্বমুখী	কমবে

### মজুরী - উৎপাদনশীলতা- রপ্তানী- জীবন-জীবিকা একটি চক্রাকার প্রবাহ

মিলের শ্রমিকদের মজুরী কম বা না পাওয়া (বকেয়া) থাকার কারণে উৎপাদনশীলতা নিম্নমুখী। উৎপাদন কমার ফলে পাটজাত পণ্যের রপ্তানী কম হবে। রপ্তানী কমে যাওয়ার কারণে রপ্তানী আয় কমবে, মিলের স্বাভাবিক গতি ব্যাহত হবে। শ্রমিকদের জীবন জীবিকা সংকটাপন্ন হবে। শ্রমিকেরা উৎপাদনে আগ্রহ হারাতে এবং উৎপাদন ব্যয় বাড়বে। এটি একটি চক্রাকার প্রবাহের মত আবর্তিত হবে।

বকেয়া মজুরী → শ্রমিক অসন্তোষ → নিম্ন উৎপাদন → কম রপ্তানী → কম আয় → জীবন জীবিকার সংকট → উৎপাদনে অনাগ্রহ → উৎপাদন ব্যয় বৃদ্ধি → বকেয়া মজুরি।

### খুলনা অঞ্চলের রাষ্ট্রীয়াকৃ ৮টি জুট মিলের সংকটের কারণে আর্থ-সামাজিক প্রভাব :

পাট শিল্প এবং কৃষি অর্থনীতি বিশেষ করে, পাট চাষীদের উপর প্রভাব :

মূলত পাট শিল্পের কাটা মাল হলো পাট। এ পাটকে বাংলাদেশের সোনালী আঁশ বলা হত। এখন বলা হয় সোনালী আঁশ কৃষকের গলার ফাঁস। কারণ, পাট শিল্প শ্রমিকদের অসন্তোষসহ অন্যান্য কারণে পাট শিল্প ধ্বংস হচ্ছে। ফলে অভ্যন্তরীণভাবে পাটের চাহিদা কমছে। পাটের উৎপাদনও হ্রাস পাচ্ছে।

পাট চাষীরা পেশা পরিবর্তন করতে বাধ্য হচ্ছে। কৃষি অর্থনীতিতে এর নেতিবাচক প্রভাব পড়ছে। নিম্নে পাট চাষাধীন জমি এবং উৎপাদনের পরিমাণ দেখান হল।

অর্থকরী ফসল	জমির পরিমাণ	উৎপাদনের পরিমাণ
পাট	১১ লক্ষ ২৮ হাজার একর	৮ লক্ষ ৫৯ হাজার মে.টন
চা	১ লক্ষ ২০ হাজার একর	৫৭ হাজার মে.টন
আখ	৪ লক্ষ ২ হাজার একর	৬৫ লক্ষ ২ হাজার মে.টন
তুলা	৫ হাজার একর	৫ হাজার মে.টন
তামাক	৭৫ হাজার একর	৩৮ হাজার মে.টন

### ৯টি পাট কলের শ্রমিকদের মজুরী এবং স্থানীয় বাজারে এর প্রভাব :

প্রকৃতপক্ষে খুলনা অঞ্চলের ৯টি পাট কলের উপর নির্ভর করে এ অঞ্চলে কতগুলো বাজার গড়ে উঠেছে। অর্থাৎ ৯টি পাট কলের সাথে প্রত্যক্ষভাবে শ্রমিকদের জীবন জীবিকা যুক্ত হলেও পরোক্ষভাবে এ অঞ্চলের ব্যবসা বাণিজ্য, পরিবহণ ও সেবা খাত সর্বোপরি, কৃষি পণ্য ও তার বাজার সম্প্রসারিত হয়। শ্রমিকরা মজুরী না পেলে তাদের ক্রয় ক্ষমতা কমে এবং অন্যান্য খাতের উপর নেতিবাচক প্রভাব পড়ে। উল্লেখ্য, শিল্প নগরী খুলনার প্রাণ খালিশপুর এখন এক নিরব নিথর অন্ধকার নগরী।

#### কেস স্টাডিঃ-

শ্রমিকের নামঃ কওসার বিশ্বাস (৪০)

পিতার নামঃ ইব্রাহিম বিশ্বাস

নারায়নপুর, চৌগাছা, যশোর।

কওসার আলীম জুট মিলের একজন স্থায়ী শ্রমিক। ১৯৯৪ সালে এ মিলে বদলি শ্রমিক হিসেবে কাজ শুরু করে এবং তিন বছর পর স্থায়ী হয়। এখন সে চাকুরি হারা। এক ছেলে এবং দুই মেয়ে স্কুলে পড়ে। নিজের বাড়ী না থাকায় ভাড়া বাড়ীতে থাকে। বর্তমানে পেশা পরিবর্তন করে দিন মজুর হিসেবে ১৭০-২০০ টাকা আয় করে। দিনমজুরের কাজও প্রতিদিন জোটে না। মিলের বকেয়া পাওনাও পায়নি। এ অবস্থায় অর্ধাহারে অনাহারে পরিবার-পরিজন নিয়ে দিনাতিপাত করছে।

#### চাকুরিরত ও চাকুরিচ্যুত শ্রমিকদের অবস্থার তুলনা মূলক চিত্র

	খাদ্য গ্রহণ (ক্যালরি)	কাজের নিশ্চয়তা	শিক্ষা	ক্রয় ক্ষমতা	স্বাস্থ্য	সামাজিক মর্যদা	সামাজিক সম্পর্ক	জীবন জীবিকার ঝুঁকি	গ্রামীণ শ্রম বাজারে চাপ	শহরের শ্রম বাজারে চাপ	অপরাধ প্রবণতা	ভোগ প্রবণতা	সম্পন্ন প্রবণতা
চাকুরিরত অবস্থা	১৭০০	৮০%	৯৫%	৮০%	৮০%	৮০%	৯০%	২০%	৬০%	৬২%	৫৫%	৭৫%	১০%
চাকুরিচ্যুত অবস্থা	১৪০০	৫০%	৫০%	৬০%	৪০%	৩০%	৩০%	৮০%	৮০%	৭৮%	৮০%	৫০%	০০%

টেবিল-৬

- মিল বন্ধের পর দেখা যায় খাদ্য গ্রহণ, কাজের নিশ্চয়তা, ক্রয় ক্ষমতা কমেছে। জীবন জীবিকার ঝুঁকি, গ্রামীণ ও শহরে শ্রম বাজারে চাপ, অপরাধ প্রবণতা বেড়েছে।

#### পাটখাতে রাত্নীয় পৃষ্ঠপোষকতা ক্রমহ্রাসমান

স্বাধীনতার পরবর্তীতে ৭৮টি জুটমিল পরিচালনার জন্য বি জে এম সি দায়নেয়। ১৯৭৭ থেকে ১৯৮৬ এর মধ্যে ৪৪টি বেসরকারী খাতে ছেড়ে দেয়া হয় এবং একীভূত করা হয়। ফলে বি জে এম সির অধীন পাটকল দাঁড়াল ৩৮টি। ১৯৯৩ সালে বিশ্বব্যংকের পাটখাতে সংস্কার কর্মসূচীর ফলে ১১ টি বন্ধ/বিক্রি ও একীভূত করা হয়। সংখ্যা দাঁড়ায় ২৭ এ। বর্তমানে চালু আছে ২২টি। অবশ্য, বি জে এম সি নিয়ন্ত্রিত পাট কল এবং সহায়ক কারখানা ঢাকা অঞ্চলে ৬ টি, চট্টগ্রাম অঞ্চলে ১০ টি, খুলনা অঞ্চলে ৯ টি।

রাত্নায়ত্ত্ব পাটকল শ্রমিক/কর্মচারীদের প্রস্তাবিত দাবী, কর্মসূচী ও এর অভিঘাত :

(জুলাই ২০১৪ তে উত্থাপিত-দাবী/সুপারিশ, কর্মসূচী এবং অভিঘাত)



## দাবী সমূহ

১. বাংলাদেশ পাটকল করপোরেশন (বিজেএমসি) কে হোল্ডিং কোম্পানীতে এবং এর অধীনস্থ মিলসমূহকে সাবসিডিয়ারি কোম্পানীতে রূপান্তরের সিদ্ধান্ত বাতিল করতে হবে।
২. সরকারিভাবে পাটকে কৃষি পণ্য হিসেবে অন্তর্ভুক্ত করে শিল্পনীতি ২০১০ প্রণয়ন করা হয়েছে। প্রণীত শিল্পনীতি অনুযায়ী দেশের বৃহত্তম পাটপণ্য উৎপাদনকারী ও রপ্তানীকারক প্রতিষ্ঠান হিসেবে বিজেএমসির ক্ষেত্রে ২০% ভূত্বিক প্রদান বাস্তবায়ন করতে হবে।
৩. বিজেএমসির আর্থিক দৈন্যতা দূর করার লক্ষ্যে পাট পণ্যের বাধ্যতামূলক মোড়কীকরণ আইন ২০১০ অবিলম্বে বাস্তবায়ন করতে হবে।
৪. পঞ্চাশ দশকে স্থাপিত মিলগুলোর উৎপাদন দক্ষতা বৃদ্ধির লক্ষ্যে মিলগুলোকে বিএমআরই করার জন্য জরুরী ভিত্তিতে অর্থায়ন করতে হবে।
৫. সরাসরি বৈদেশিক বিক্রির উপর বিদ্যমান ১০% সাবসিডি আদায়ের ক্ষেত্রে প্রয়োজনীয় সহযোগিতা প্রদানের জন্য সরকার কর্তৃক ব্যাংকগুলোকে নির্দেশনা প্রদান করতে হবে।
৬. সরাসরি বৈদেশিক বিক্রির উপর প্রাপ্য ডিউটি-ড্র ব্যাক বিজেএমসি কর্তৃক আদান সহজীকরণ করার জন্য ডেডো অফিসকে প্রয়োজনীয় নির্দেশনা প্রদান করতে হবে।
৭. ১০০% রপ্তানীকারক প্রতিষ্ঠান হিসেবে বিজেএমসির মিলসমূহকে স্বল্প সুদে ঋণ নেয়ার ব্যবস্থা গ্রহণ করতে হবে।
৮. প্রাইভেটাইজেশন কমিশনের মাধ্যমে সরকার কর্তৃক বিক্রিত মিলগুলোই বিক্রয়লব্ধ অর্থ বিজেএমসিকে ফেরত দিতে হবে।
৯. সরকার কর্তৃক বেপজাকে হস্তান্তরিত আদমজী জুটমিল বাবদ প্রাপ্য অর্থ বিজেএমসিকে ফেরত দিতে হবে।
১০. শ্রমিকদের জন্য সরকার ঘোষিত ২০% মহার্ঘ্য ভাতা অবিলম্বে চালু করতে হবে।

(কর্মসূচী)	(অভিঘাত)
১. ০২/০৭/২০১৪ ইং তারিখ থেকে ০৫/০৭/২০১৪ ইং তারিখ পর্যন্ত প্রতিদিন সকাল ১০.০০ ঘটিকায় গेट সভা করে ২ (দুই) ঘন্টা বিক্ষোভ মিছিল অনুষ্ঠিত হবে।	<ul style="list-style-type: none"> <li>• শ্রমিক অসন্তোষ।</li> <li>• উৎপাদন ব্যাহত।</li> <li>• সামাজিক বিশৃংখলা।</li> <li>• শ্রম অপচয়।</li> <li>• প্রশাসনিক সংকট।</li> <li>• পরিবহন ও যোগাযোগ ব্যবস্থা বাধাগ্রস্ত।</li> <li>• রাজনৈতিক অস্থিতিশীলতা।</li> </ul>
২. ০৬/০৭/২০১৪ ইং তারিখ সকাল ১০.০০ ঘটিকা রাজপথে ১ (এক) ঘন্টা মানব বন্ধন অনুষ্ঠিত হবে।	
৩. ০৭/০৭/২০১৪ ইং তারিখ সকাল ১০.০০ ঘটিকা মিলের প্রধান কার্যালয় ২ (দুই) ঘন্টা ঘেরাও করা হবে।	
৪. ০৮/০৭/২০১৪ ইং তারিখ সকাল ১০.০০ থেকে সকাল ১১.০০ ঘটিকা পর্যন্ত ১ (এক) ঘন্টা রাজপথ অবরোধ করা হবে।	
৫. ০৯/০৭/২০১৪ ইং তারিখ সকাল ১০.০০ থেকে দুপুর ২.০০ ঘটিকা পর্যন্ত মিলের প্রধান কার্যালয়ের সম্মুখে অনশন কর্মসূচী পালন করা হবে।	
এরই মধ্যে ২৫/০৬/২০১৪ ইং তারিখ থেকে ০১/০৭/২০১৪ ইং তারিখ পর্যন্ত প্রত্যেক মিলে দাবী আদায়ের স্বপক্ষে বিক্ষোভ মিছিল অব্যাহত থাকবে এবং ২৬/০৬/২০১৪ ইং তারিখ রাষ্ট্রায়ত্ত্ব পাটকল অবস্থিত এমন জেলাগুলোর ডিসি সাহেবকে স্মারকলিপি প্রদান করা হবে একই সাথে মাননীয় বস্ত্র ও পাট মন্ত্রী মহোদয়কে ফ্যাক্স যোগে স্মারকলিপি প্রদান করা হবে।	

## ২৪ মার্চ ২০১৫ তে উত্থাপিত দাবী/সুপারিশ, কর্মসূচী এবং অভিঘাত

### দাবী সমূহ

১। (ক) পাটের অভাবে প্রত্যেকটি মিলে উৎপাদন সর্বনিম্ন পর্যায়ে ফলে, অবিলম্বে মিলগুলিকে পূর্ণাঙ্গ উৎপাদনমুখী করার জন্য পাটক্রয়ের জন্য প্রয়োজনীয় অর্থ ছাড় নিতে হবে এবং ভবিষ্যতে কৃষক ও পাটকল উভয়ের সুবিধার্থে পাট মৌসুমে বাজার দরে মান সম্পন্ন কাঁচাপাট ক্রয়ের ব্যবস্থা করে; পাট ক্রয় ও পণ্য বিক্রয়ের সর্ব পর্যায়ে দুর্নীতি কঠোর হস্তে দমন করতে হবে। সাথে সাথে খরচ কমানোর লক্ষ্যে অপ্রয়োজনীয় ও ব্যয়বহুল পাটক্রয় কেন্দ্র বাতিল করতে হবে।

(খ) পাট পণ্যের দেশীয় বাজার সুরক্ষা ও সম্প্রসারণের জন্য প্রণীত আইন ২০০২ ও ম্যান্ডেটরী প্যাকেজিং এ্যাক্ট- ২০১০ অবিলম্বে বাস্তবায়ন করতে হবে এবং পাট পণ্য বহুধাকরণ করে; বিদেশী বাজার সম্প্রসারণ করতে হবে।

(গ) সরকারীভাবে পাটকে কৃষিপণ্য হিসাবে অন্তর্ভুক্ত করে শিল্পনীতি ২০১০ প্রণয়ন করা হয়েছে। প্রণীত শিল্পনীতি অনুযায়ী পাটশিল্পকে কৃষিভিত্তিক শিল্প হিসাবে গণ্য করে; ২০% বিশেষ আর্থিক সুবিধা প্রদান করতে হবে।

(ঘ) উৎপাদন বৃদ্ধির লক্ষ্যে অবিলম্বে মিলগুলিকে বিএমআরই করতে হবে।

২। (ক) পে-কমিশন বোর্ড গঠনের ন্যায় অবিলম্বে রাষ্ট্রায়ত্ত্ব শিল্পে শ্রমিকদের জন্য মজুরী কমিশন বোর্ড গঠন করে: একই দিন ও একই তারিখ হতে তা ঘোষণা ও বাস্তবায়ন করতে হবে।

(খ) ১লা জুলাই ২০১৩ তে ঘোষিত ২০% মহার্ঘ্য ভাতা, যা সরকারী কর্মকর্তা কর্মচারীসহ বিভিন্ন সেক্টর কর্পোরেশনে বাস্তবায়িত হয়েছে তা অবিলম্বে ঐ তারিখ হতে রাষ্ট্রায়ত্ত্ব পাটকলের শ্রমিকদের জন্য এরিয়ারসহ বাস্তবায়ন করতে হবে।

(গ) পাট/কাঁচামালসহ অন্যান্য কারণে দীর্ঘদিন যাবত উৎপাদন বিভাগের শ্রমিকদের মজুরী কম দেয়া হচ্ছে যা আইন সিদ্ধ নয়; ফলে আইন অনুযায়ী ঐ সব শ্রমিকদের বকেয়াসহ মিনিমাম ওয়েজ প্রদান করতে হবে।

(ঘ) আলীম জুট মিলকে ব্যক্তি মালিকানায় হস্তান্তর বন্ধ করতে হবে এবং দি ক্রিসেন্ট জুট মিলস্ কোম্পানী লিমিটেডসহ যে সকল মিলে শ্রমিকদের চাকুরীর নথিতে মনগড়া বয়স লেখা হয়েছে তা অবিলম্বে বাতিল করত; ডাক্তারী পরীক্ষার মাধ্যমে বয়স নির্ধারণ করতে হবে।

(ঙ) সরকারের ইতিবাচক সিদ্ধান্তে খালিশপুর, দৌলতপুর, জাতীয় জুট মিল ও কর্ণফুলি জুট মিল বিজেএমসি এর পরিচালনায় চালু হয়েছে। চালুকৃত মিলগুলির শ্রমিকদের বিজেএমসি এর অন্যান্য মিলের শ্রমিকদের মতো জ্যেষ্ঠতার ভিত্তিতে স্থায়ীকরণসহ প্রাপ্যদি প্রদান করতে হবে।

৩। (ক) বিজেএমসির প্রধান ও আঞ্চলিক কার্যালয়ের কর্মকর্তা কর্মচারী ও মিল সমূহের কর্মকর্তাদের মনে মিল গুলোর কর্মচারীদের অর্থ মন্ত্রণালয়ের অর্থ বিভাগ বাস্তবায়ন অনুবিভাগ স্মারক নং- ০৭০০০০০০(১৬১)০৭০০০০০১৩-৩০১, তারিখ: ৩০/১২/১৩ মোতাবেক চজখ ও খটগচ এৎধহঃ সুবিধা অবিলম্বে বাস্তবায়ন করতে হবে।

(খ) গণপ্রজাতন্ত্রী বাংলাদেশ সরকার অর্থ মন্ত্রণালয় অর্থ বিভাগ বাস্তবায়ন ও প্রবিধি অনুলিপি বাস্তবায়ন শাখা-১, সূত্র নং-অর্থ/অধি(বাস্ত-১) বিবিধ ৫৯৫/২৩০ তারিখ ১৯/১১/১৯৯৫ অনুযায়ী প্রাপ্য

আনুতোষিক সুবিধা ২.৮৩ যাহা পরবর্তীতে সুপ্রিম-কোর্টের রায়ের আলোকে বাংলাদেশ চিনি ও খাদ্য শিল্প করপোরেশন সূত্র নং-এডিএম/এস.এফ.৯/(১৫)/১২৭, তারিখ-৭/২/২০১৩ এর মাধ্যমে বাস্তবায়ন হয়েছে। অনুরূপ সুবিধা পাটকল কর্পোরেশনে অবিলম্বে বাস্তবায়ন করতে হবে।

(গ) মিলের যে সব শিক্ষিত শ্রমিক দ্বারা শ্রমিক মজুরীতে কর্মচারীর দায়িত্ব পালন করে হচ্ছে তাদের শিক্ষাগত যোগ্যতার ভিত্তিতে কর্মচারী হিসেবে সমন্বয়/নিয়োগ করে; পূর্বের মতো ৩য় ও ৪র্থ শ্রেণীর কর্মচারী নিয়োগ পদ্ধতি ও ক্ষমতা মিল প্রশাসনের নিকট ন্যস্ত করতে হবে।

৪। (ক) ১লা জুলাই ২০০৯ থেকে চাকুরীচ্যুত শ্রমিক কর্মচারী ও কর্মকর্তাদের ন্যায় সংগত পাওনা পিএফ গ্রাচুয়েটির টাকা না পেয়ে মানবের জীবন যাপন করেছে। অবিলম্বে তাদের পাওনা পরিশোধ করতে হবে।

(খ) যে সব মিল কর্তৃপক্ষ পিএফ থেকে কোটি কোটি টাকা লোন হিসাবে উত্তোলন করেছে/স্বয়ংক্রিয়ভাবে কোটি কোটি টাকা কর্তৃপক্ষের ফান্ডে জমা হয়েছে অবিলম্বে সদস্যদের মধ্যে ঐ সব টাকার লভ্যাংশ প্রদান করে; সমুদয় অর্থ স্ব স্ব ফান্ডে ফেরৎ দিতে হবে।

(গ) মজুরী কমিশন গেজেট ২০১৩ অনুযায়ী শ্রমিকদের পাওনা অবাস্তবায়িত সুবিধাগুলো অবিলম্বে বাস্তবায়ন করতে হবে।

৫। (ক) মিলে কর্মরত অবস্থায় কোন শ্রমিক/কর্মচারী মারা গেলে মৃত্যুবীমা অনুযায়ী ৩৬ মাসের মূল মজুরীর সমপরিমাণ অর্থ পাওয়ার নিয়ম থাকলেও তা বৈষম্য আকারে প্রদান করা হয়। ফলে, এ অনিয়ম দূর করত: সবাইকে প্রাপ্য ৩৬ মাসের মূলমজুরীর সমপরিমাণ অর্থ প্রদান করা এবং টি.বি ছুটি পূর্বের ন্যায় ৯ মাসের স্ব-বেতনে প্রদান করতে হবে।

(খ) মিল সমূহের সেট-আপ সংশোধন করে; জৈষ্ঠতার ভিত্তিতে বদলী শ্রমিক স্থায়ী করতে হবে।

(গ) পাট শিল্পের ভবিষ্যৎ সুরক্ষা দেয়া এবং ব্যাংকিং সর্বোচ্চ সুবিধা পাওয়ার লক্ষ্যে বিজেএমসি এবং এর অধিনস্থ মিলগুলোর সম্পদ ও পরিসম্পদের পূর্ণমূল্যায়ন করতে হবে।

(কর্মসূচী)	(অভিঘাত)
১. ০৫/০৪/২০১৫ ইং রোজ রবিবার সকাল ১০:০০ ঘটিকায় দাবী নামার স্বপক্ষে সব রাষ্ট্রায়ত্ত পাটকলে একযোগে গোট সভা করা হবে।	• শ্রমিক অসন্তোষ।
১. ০৭/০৪/২০১৫ ইং রোজ মঙ্গলবার সকাল ১০:০০ ঘটিকায় রাষ্ট্রায়ত্ত পাটকল অবস্থিত এমন জেলাগুলোর জেলা প্রশাসককে স্মারকলিপি প্রদান করা হবে।	• উৎপাদন ব্যাহত।
২. ০৮/০৪/২০১৫ ইং বুধবার শিফটে শিফটে বিক্ষোভ মিছিল অনুষ্ঠিত হবে।	• সামাজিক বিশৃঙ্খলা।
৩. ১০/০৪/২০১৫ ইং রোজ শুক্রবার বিকাল ৪.০০ ঘটিকায় সব শিল্প এলাকায় পেশাজীবীদের সাথে মত বিনিময় করা হবে।	• শ্রম অপচয়।
৪. ১২/০৪/২০১৫ ইং রোজ রবিবার সকাল ১০ টা থেকে সন্ধ্যা ১১ টা প্রত্যেক মিলের প্রধান কার্যালয়ের সামনে অবস্থান করে: বিক্ষোভ অনুষ্ঠিত হবে	• প্রশাসনিক সংকট।
৫. ১৫/০৪/২০১৫ ইং রোজ মঙ্গলবার সন্ধ্যা ১০.০০ থেকে ১১.০০ টা এক ঘন্টা রাজপথে মানববন্ধন অনুষ্ঠিত হবে।	• পরিবহন ও যোগাযোগ ব্যবস্থা বাধা গ্রস্থ।
৬. ১৭/০৪/২০১৫ ইং রোজ শুক্রবার বিকাল ৪.০০ ঘটিকায় সকল শিল্পাঞ্চলে শ্রমিক জনসভা অনুষ্ঠিত হবে।	• রাজনৈতিক অস্থিতিশীলতা।
৭. ১৯/০৪/২০১৫ ইং রোজ রবিবার সকাল ১০ টা থেকে সন্ধ্যা ১১ টা এক ঘন্টা রাজপথে বুক লাল ব্যাজ ধারণ করে: বিক্ষোভ মিছিল অনুষ্ঠিত হবে।	
৮. ২১/০৪/২০১৫ ও ২২/০৪/২০১৫ ইং রোজ মঙ্গল ও বুধবার শিফটে শিফটে মিছিল অনুষ্ঠিত হবে।	
৯. ২৪/০৪/২০১৫ ইং রোজ শুক্রবার বিকাল ৪.০০ ঘটিকায় বৃহৎ শিল্প এলাকায় জনসভার মাধ্যমে পরবর্তী কর্মসূচী ঘোষণা করা হবে।	

#### পাটকল গুলোর এ অবস্থার কারণ :

- ম্যান্ডেটরি প্যাকেজিং অ্যাক্ট ২০১০ বাস্তবায়ন না হওয়া।
- আন্তর্জাতিক বাজারে পেমেন্ট সিস্টেমের জটিলতা। (বিশেষ করে আফ্রিকার দেশে)
- নাইজেরিয়া, মালি, ঘানা সহ কিছু দেশে চাহিদা থাকলেও মূল্য (টাকা) পাওয়ার ঝুঁকির সম্ভাবনা থাকায় রপ্তানী না করা।
- কখনো কখনো আন্তর্জাতিক বাজারে হঠাৎ চাহিদার তুলনায় যোগান কম হওয়ায় আস্থার সংকট।
- অত্যন্ত নিম্ন মানের পাট ক্রয়।
- সঠিক সময়ে পাট ক্রয়ের টাকা ছাড় না হওয়া।
- প্রায় অনুপায়ুক্ত যন্ত্রপাতি দ্বারা উৎপাদনের চেষ্টা।
- সরকারী পৃষ্ঠপোষকতার অভাব।
- সমন্বিত কৃষি ও শিল্প নীতির অভাব।
- ব্যবস্থাপনার ত্রুটি।
- সঠিক সময়ে উপকরণ সরবরাহের অভাব।
- শক্তি সম্পদের অভাব।

- উৎপাদন ব্যয় বৃদ্ধি।
- শ্রমিক অসন্তোষ।
- উৎপাদিত পণ্যের নিম্নমান।
- বাজার সংকুচিত।
- পাটের বিকল্প পণ্যের ব্যবহার।
- যন্ত্রপাতির আধুনিকায়নের অভাব।
- লুটপাট ও সর্বগ্রাসী দুর্নীতি।

### সৃষ্ট সমস্যা

- রাজস্ব আয় কমেছে।
- বৈদেশিক মুদ্রার উপর নেতিবাচক প্রভাব।
- জীবন-জীবিকার ঝুঁকি বেড়েছে।
- শ্রমিকদের ক্রয় ক্ষমতা কমেছে।
- ব্যবসা বাণিজ্যে মন্দা।
- কর্মের নিশ্চয়তা কমেছে।
- স্বাস্থ্য প্রবণতা কম।
- ভোগ প্রবণতা কম।
- বেকারত্ব বেড়েছে।
- শিক্ষার হার কমেছে।
- পুষ্টি হীনতা।
- কাপড়ের ব্যবহার কমেছে।
- সামাজিক সম্পর্কের অবনতি।
- অপরাধ প্রবণতা বেড়েছে।
- পরনির্ভরশীলতা বেড়েছে।

### সম্ভাবনা

- আন্তর্জাতিক বাজারে পাট পণ্যের চাহিদা বেড়েছে। কার্পেট ব্যাকিং ক্লথ (সি. বি. সি)
- ম্যাগনেটরি প্যাকেজিং অ্যাক্ট ২০১০ বাস্তবায়নের জন্য সরকারী উদ্যোগ শুরু হয়েছে।
- সরকারী খাদ্য গুদাম গুলোতে ধান/চাল সংরক্ষণের জন্য পাটের বস্তার ব্যবহার বেড়েছে। (উল্লেখ্য, গত বছর খাদ্য গুদামগুলো বি. জে. এম. সি থেকে সোয়া ৩ কোটি পাটের বস্তা কিনেছে)।
- হেসিয়ান ক্লাথ যা সাম্প্রতি কনস্ট্রাকশন কাজে নিরাপত্তা উপকরণ হিসাবে ব্যবহার হচ্ছে।
- বুয়েট উদ্ভাবিত প্রযুক্তি “সয়েল সেভার” মাটি ক্ষয় রোধের চটের ব্যবহার বেড়েছে। (সওজ এবং এলজিইডিতে)

- পানি উন্নয়ন বোর্ডের নদী ভাঙ্গন রোধে সয়েল সেভার হিসেবে চটের ব্যবহার।
- পাট শিল্প এখন বস্তা, চট, দড়ি থেকে বেরিয়ে আকর্ষণীয় কার্পেট কারুকার্যসমৃদ্ধ জুট ম্যাট বিশ্বের বাজারে প্রবেশ করেছে।
- নতুন নতুন বাজার সম্প্রসারিত হয়েছে।

### সুপারিশসমূহ

- ম্যানুফেকচারিং প্যাকেজিং অ্যাক্ট ২০১০ কার্যকর করা।
- সরকারী পৃষ্ঠপোষকতায় পাট শিল্পকে বাঁচানোর উদ্যোগ নিতে হবে।
- সমন্বয়পযোগী পাট ও পাট শিল্প নীতি প্রণয়ন ও বাস্তবায়ন।
- ব্যবস্থাপনা কর্তৃপক্ষ ও সি, বি, এ এর দূর্নীতি রোধ।
- শ্রমিকদের স্বার্থ রক্ষা করে শ্রমিক অসন্তোষ কমানো।
- সঠিক সময়ে ভাল মানের উপকরণ সরবরাহ।
- উৎপাদন ব্যয় কমানোর জন্য যন্ত্রপাতি ও উৎপাদন প্রযুক্তির আধুনিকায়ন।
- পণ্যের গুণগত মান বৃদ্ধি।
- আন্তর্জাতিক বাজার অনুসন্ধান
- শক্তি সম্পদ বিশেষ করে, বিদ্যুতের নিশ্চয়তা বিধান
- বেসরকারী চাতাল মালিকদের পাটের বস্তা ব্যবহারে উদ্বুদ্ধ করতে হবে। (এতে প্রতি বছর ৫০ কোটি বস্তা যোগানের প্রয়োজন হবে)।

### উপসংহার

বিগত শতাব্দির ৬০ এর দশকে গড়ে ওঠা পাট শিল্প স্বাধীনতাত্ত্বের জাতীয়করণ করা হয়। প্রত্যাশা ছিল, এ শিল্প বাংলাদেশের আর্থ-সামাজিক পরিকাঠামোকে বিকশিত করবে। ১৯১৩-১৪ অর্থ বছরে ডিসেম্বর ২০১৩ পর্যন্ত বি.জে.এম.সির আওতাভুক্ত পাটজাত পণ্যের রপ্তানীর পরিমাণ ০.৪৫ লক্ষ মেট্রিক টন ও রপ্তানী আয় ৩৩৭.১৪ কোটি টাকা ২০১২-১৩ অর্থ বছরে পাটজাত পণ্যের রপ্তানীর পরিমাণ ও আয় ছিল যথাক্রমে ১.৭৭ লক্ষ মেট্রিক টন ও ১,৩৬৩.১৮ কোটি টাকা। বিগত প্রায় দেড়শ বছর এ শিল্প মৌলিক কতকগুলো সংকটের আবের্ডে নিপাতিত। ফলশ্রুতিতে লেগে আছে শ্রমিক অসন্তোষ আর আন্দোলন। সৃষ্টি হচ্ছে সামাজিক সমস্যা ব্যাহত হচ্ছে উৎপাদন, ক্ষতিগ্রস্ত হচ্ছে জাতীয় অর্থনীতি। এ অবস্থার অবসান জরুরী। রাষ্ট্রকেই এ দায়িত্ব নিতে হবে। জনগণকে উদ্যোগী হতে হবে, সে রাষ্ট্র প্রতিষ্ঠা করবার জন্য। যে রাষ্ট্র শুধু পাট শিল্প নয়, সমস্ত শিল্প পরিকাঠামোকে সামগ্রিকভাবে পৃষ্ঠপোষকতা করবে। যে আকাঙ্ক্ষায় মুক্তিযুদ্ধ হয়েছিল। যে প্রত্যাশায় স্বাধীনতাত্ত্বের এ শিল্পকে জাতীয়করণ করা হয়েছিল। তার জন্য চাই পুনঃভাবনা, পুনঃসংগ্রাম।

তথ্য সূত্র

- বাংলাদেশের প্রধান অর্থকারী ফসল পাটের অতীত বর্তমান ও ভবিষ্যৎ ড. মোয়াজ্জেম হোসেন খান।
- বাংলাদেশ অর্থনৈতিক সমীক্ষা- ২০০৫।
- বাংলাদেশের অর্থনৈতিক শোষণ, মাহফুজ চৌধুরী।
- Golden handshake to Golden fibre- Khalad Rab
- দৈনিক ইত্তেফাক, ২১/০২/০৭
- দৈনিক পূর্বাঞ্চল, ২২/০৩/০৭
- দৈনিক পূর্বাঞ্চল, ১৭/০৪/০৭ এবং ১৮/০৪/০৭
- দৈনিক জনকণ্ঠ, ১৯/০৪/০৭
- বাংলাদেশ পাটকল কর্পোরেশন (বি. জে. এম. সি)
- দৈনিক যুগান্তর, ২৬/০৪/১৪
- বাংলাদেশ প্রতিদিন, ১৮/০৪/১৫
- বাংলাদেশ অর্থনৈতিক সমীক্ষা, ২০১৪
- পাট সুতা ও বস্ত্রকল শ্রমিক কর্মচারী সংগ্রাম পরিষদ।
- পাটকল সংগ্রাম পরিষদ।
- জাতীয় শ্রমিক ফেডারেশন বাংলাদেশ।
- বাংলাদেশ রাষ্ট্রায়ত্ত্ব জুট মিলস্ সি. বি. এ- নন সি বি এ ঐক্য পরিষদ।
- কোষ্টাল ডেভেলপমেন্ট পার্টনারশীপ।
- আই আর ভি খুলনা।

## A Study on the Causes and Consequences of High Caesarean Section (C-section) Incidence Rate in Public, Private and NGO Health Facilities in Bangladesh.

Dr. Md. Rezaul Karim\*

**Abstract:** *The child births by caesarean deliveries across the whole world are increasing over the last decade. According to the World Health Organization (WHO) report 2010, the unnecessary caesarean deliveries in the world were 62 crore in 2008. During this period the caesarean incidence rates were fewer than 10 percent in 52 countries, (10-15) percent in 14 countries and above 15 percent in 69 countries of the world. The caesarean incidence rate was highest in Brazil (about 45.9 percent) and it was 8.5 percent and 7.3 percent in our neighboring countries like India and Pakistan respectively. In Bangladesh, the caesarean incidence rates were 2.6 percent in 2001, 7.5 percent in 2008 and 12.2 percent in 2010 (Bangladesh Maternal Mortality and Health Service Survey, 2010). So the incidence rate has increased 5 times during the last decade. The worldwide increase of the caesarean incidence in progressive rate including Bangladesh is a matter of anxiety for us. This study has been undertaken to justify the reasons behind this high current incidence rate of Caesarean section (C-section) in Bangladesh. We have observed that some socio-economic as well as demographic determinants are mostly responsible for choosing C-section deliveries. It has been possible to identify the number of unnecessary C-section deliveries of the caesarean performed mothers. It is clear to us that the unnecessary C-section deliveries are being happening due to the suppliers induced demand (SID) for the personal gains of the doctors and the hospital providers especially in private hospitals. It is very difficult to estimate the SID effect on caesarean incidence but the combined effect of socio-economic and demographic determinants on C-section delivery support the possible SID existence in caesarean delivery intervention in Bangladesh. Not surprisingly, mothers and babies health have been affected adversely due to the caesarean operations. It has been assessed both the normal and caesarean delivery performed mothers' health states by Euro QoL -5D (European Quality of Life - 5 Dimension) method*

\* Associate Professor of Economics, Dhaka College, Dhaka and Vice President of Bangladesh Economics Teachers' Association and Bangladesh Young Economists' Association



*during the post delivery period and found that the caesarean performed mothers' health states have been deteriorated more than the normal delivery performed mothers' health states. Due to this high C-section incidence rate and it's negative health consequences on caesarean performed mothers and child births incur higher financial burden on their families. This is creating misallocation of scare resources in the poor economy like Bangladesh. So it is need to control such inappropriate practices by the health providers introducing litigation and special guidelines in the health policy.*

## 1. Background

An upward trend in the incidence of C-section deliveries is a well documented stylized fact at the international level. Both developing and developed countries have witnessed a dramatic rise in the rate of caesarianbirths during the last three decades<sup>1</sup>. In the United States, where C- section was rated as the most common hospital surgical procedure<sup>2</sup>, it was estimated that half of the caesareans were medically unnecessary.<sup>3</sup>

In the United States, where C- section was rated as the most common hospital surgical procedure (Burns, Geller & Wholey, 1995, Rutkow, 1986), it was estimated that half of the caesareans were medically unnecessary (Burns et al., 1995).

Similarly in Latin America, it was estimated that over 8,50,000 C- sections were unnecessarily performed on an annual basis (Belizan, Althabe, Barros, and Alexander, 1999). Without doubt this exposes mothers and their infants to unnecessary health risks (Schuitemaker et al., 1997) with drastic implications for the health system and the economy.

Recently it is observed in the health sector that there has been a sudden surge of C-section deliveries in Bangladesh. A remarkable rising trend in the rate of C-sections has also been observed in Bangladesh, where this indicator has more than trebled from 1999 to 2010 (3% to 12.2%)<sup>4</sup>. Not surprisingly, the need to monitor its dynamics has drawn the attention of policymakers.

In fact, a growing body of research suggests that high C- section rates represent increased probability of negative health consequences for mother and child (Hemminki, 1991; Shearer, 1993) with probable adverse psychosocial impacts on the family (Mutryn, 1993). In addition to these negative health consequences, caesarean childbirths incur higher financial burden than vaginal deliveries (Shearer, 1993; Burns et al. 1995). This creates an economic burden not only on developed countries but more acutely on poor developing economies given their everlasting struggle with scarcity of resources

<sup>1</sup> cai et al., 1998 Leung, Lam, Thach, Wan & Ho, 2001; Martin, Hamilton, Ventura, Menacker; & Park, 2002.

<sup>2</sup> Burns, Geller & Wholey, 1995, Rutkow, 1986, <sup>3</sup>Burns et al., 1995, <sup>4</sup>Bangladesh Health and Demographic Survey 2004, 2007

In light of these consequences, it would seem that the global trend toward more caesarean births is in need of thorough scrutiny. In that respect, decision makers have to focus on a wide

array of factors responsible for the increase in caesarean rates. The main explanations proposed by the literature focus on the role of many different factors: from technological changes (affecting for instance the treatment of pain in delivery), to changes in patients' preferences and the physicians/providers behaviors (the latter being also influenced by the remuneration system).

For the lack of information and regulations to the appropriateness of C-section deliveries in Bangladesh, the incidence rate appears to be on the rise. The physicians are often responsible for inducing inappropriate demand for C-section deliveries mainly to maximize the provider's income. On the other hand the patient is faced with high economic costs, including payments to obtain drugs, to improve access and services offered for transport and to cater for care giver's services. So it is now need to take appropriate regulatory measures by the policy makers to control both inappropriate and unnecessary caesarean deliveries in Bangladesh.

## **2. The Objectives of the Study**

The main objective of the study is to determine the causes and consequences of high C-section deliveries in Bangladesh. The specific objectives of the study are as follows:

- ❑ Finding the outcomes in terms of health status of C-section for the patient cohorts (Euro QoL 5D- a generic measure of health status of an individual at a point in time) and assessing the indicators quality of life.
- ❑ Policy implications (suggesting specific guidelines in Health Policy to make C-sections more restrictive and case specific).

## **3. Methodology of the Study**

In the present study the purposive sampling technique has been followed to collect the data for cross-sectional analysis by direct interviews. The study sample comprise 401 randomly selected women from 1,86,79,435 child bearing women who have been undergone C-section and normal deliveries at public, private and NGO health facilities in Bangladesh. The study cohorts are defined as those who have undergone for delivery at the major tertiary care public hospitals, leading private hospitals and NGO hospitals during the period from January 2010 to June 2011. The number of cases among public, private and NGO level hospital facilities are distributed on the basis of the load of getting services from the hospitals. The delivery cohort sizes at the public, private and NGO hospital facility are 120,260 and 21 which are 30 percent, 65 percent and 5 percent of the total collected data respectively. The data are selected randomly by direct interviews using the close-ended questionnaires from the women who have given births under the mentioned

category of hospitals

A comprehensive set of questionnaire is designed to determine socio-economic and reproductive background of the expectant mothers and also mothers and babies health outcomes. The current health state of the woman after delivery is measured by the Euro-QoL- 5D (European Quality of Life- 5 Dimension) indicators also included in the questionnaire. In order to capture the information of the illness of the mother and the baby during the post operative period, a follow up household interview is also conducted. Using the data from primary source, a special database is compiled containing the following information on all 401 mothers and their newborns in Bangladesh. The database is compiled containing the following information.

To explain / examine the determinants of C-section econometric analysis have been made. The Logit Model has been used to evaluate the independent effect of each factor on the mode of delivery. The resulting contribution of each factor on the likelihood of caesarean delivery is expressed in terms of odds ratio (OR). The following model is used for the determinants of C-section delivery.

$$Y = \beta_0 + \beta_1 \text{ Household income (HHY)} + \beta_2 \text{ Mother's education (MED)} \\ + \beta_3 \text{ Husband's education (HED)} + \beta_4 \text{ Desire for C-section delivery} \\ \text{(Dsr)} + \beta_5 \text{ Mother's age (MAG)} + \beta_6 \text{ Birth order (BOR)} + \beta_7 \text{ Previous} \\ \text{mode of delivery (Pmod)}.$$

The above econometric model has been used to analyze relationship between a dependent variable (C-section delivery), Y and independent variables which are closely associated to influence and determine the variable Y (C-section delivery). If the parameters are significant then we can say that how the probability of C-section delivery are affected due to a particular factor.

#### 4. Result analysis

The estimation results of the Logit Model for the full sample of 401 respondents attending private, public and NGO hospital facilities for deliveries.

**Table -1: The estimated results of the Logit Regression Model at all facilities.**

Number of obs. =		401		LR chi <sup>2</sup> (7) =		57.94	
				Prob> chi <sup>2</sup> =		0.0000	
Log likelihood =		-196.25032		Pseudo R <sup>2</sup> =		0.1286	
-----							
MOD	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]		
-----+-----							
HHY	.0001005	.0000211	4.76	<b>0.000</b> *	.0000591	.0001419	
MED	.3953764	.2799871	1.41	0.158***		-1.533882	.944141
HED	-.7311294	.31418	-2.33	<b>0.020</b> **		-1.346911	-.1153479
Dsr	.6383282	.2981105	2.14	<b>0.032</b> **		.0540423	1.222614
Mag	-.0789446	.0355872	-2.22	<b>0.027</b> **		-.1486943	-.009195
BOR	-.1697954	.2471703	-0.69	0.492		-.6542403	.3146496
Pmod	-.7000361	.2706657	-2.59	<b>0.010</b> *		-1.230531	-.1695411
_cons		3.258131	1.496745	2.18	<b>0.029</b> **		.3245638 6.191698

\*Significant at 1%, \*\*Significant at 5%, \*\*\* Significant at 20%

The estimation of the Logit Regression Model (n=401) indicate that there exists significant causal relationship between the probability of happening C-section delivery and the independent variables such as household income (HHY), desire for the mode of delivery(Dsr). The regression coefficients appear to be positive and significant. But the negative coefficients of mother’s age and previous mode of delivery and husband education level suggest that lower aged mothers and no experience of previous delivery, lower level of education influence inversely the probability of the mode of delivery (C-section delivery) significantly.

The survey results support that the C-section is more frequent for the mothers who have minor or no indication, higher education, 1st birth order, lower aged , live in urbane area, high household income, desire for the mode of delivery, lower gestational age, no previous experience of delivery, lack of knowledge about pregnancy related problem. The C-section deliveries have been undergone more where there is no valid reason in favor of this particular mode of delivery. Furthermore the sample data tells us that 20 percent of the babies born by the C-section delivery with the weight less than 2.5 Kg. Babies born under 2.5 Kg (5.5 Pounds) are

considered as low birth weight or underweight. Underweight babies are more susceptible to have health problem, slower development, delayed milestones and low immunity. It has been observed that about 14 percent mothers have been suffering from any or any more complications during the post caesarean delivery period. The health status of the caesarean performed mother is much worse than the health status of the normal delivery performed mother.

## **5. Concluding Remarks**

In this study it has been demonstrated the most crucial socio-economic attributes of the respondents mostly responsible for choosing C-section deliveries. Most of the C-section deliveries have been performed without any valid demographic or medical reason. We have observed from our academic research that there have been some adverse effects on mothers and babies due to caesarean deliveries. About 14 percent of caesarean performed mothers have been suffering from various physiological and also psychological complications the post caesarean period. The health status of mothers during the post caesarean period is much worse than the health status of mother during the post normal delivery period. In our study it has been observed that about 20 percent babies born by caesarean deliveries are underweight who have been suffering from various diseases.

It is clear from the estimated results of the partial correlation and the Logit Model that the contributions of the socio- economic and demographic variables do influence the prevailing high C-section delivery incidence in Bangladesh. So most of the caesareans deliveries have been undergone at private health facilities are inappropriate which can also be treated as unnecessary. The supplier's inducement may be one of the main reasons behind the unnecessary C-section deliveries. The C-section deliveries have been induced probably by the providers for their own financial gains. The doctor's malpractice for C-section delivery is occurring frequently across the whole country for the lack of proper regulation in the health policy.

## **6. Implications for Policy Purposes**

Some suggestive measures may help to reduce the prevailing high C-section incidence rate and costs of this mode of delivery which could substantially reduce the social burden of delivering babies in Bangladesh:

- i) Special guidelines should be implicated in the relevant health policy to make C-sections more restrictive and case specific so that it would be possible to control the unnecessary and inappropriate C-section.
- ii) The information gap between the C-section performed mothers and the doctors about the pregnancy problems must be removed so that the doctors could not influence the patients to stimulate the demand for C-section to increase their level of income by taking the advantages of

the information gap.

- iii) The private practices of the government doctors should be stopped by introducing the regulations in the relevant health policy by which it would be possible to reduce the C-section deliveries substantially at the private hospitals.
- iv) Awareness should be built among general population about the different side-effects of the C-section upon mothers and new born babies.
- v) Introduce litigation and implement it properly in all levels of health facilities to stop the doctor's malpractices for the C-section deliveries.
- vi) Government should initiate the motivation program for the mothers for their anxiety on the fear of labor pain during the delivery period and the mothers of wrong perception about losing their physio-functional capabilities while giving both to babies through normal procedures.
- vii) Like many developed countries (such as UK, Canada, Australia, Germany, Italy, Sweden), Health Ministry could form a panel of qualified specialized doctors to verify the circumstance under which a particular C-section procedure has been performed.

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## Women Entrepreneurship and Its Impact on Empowerment: A Study in the Dhaka City, Bangladesh

Fatema Sarker\*  
M. Mizanul Haque Kazal\*  
Bisakha Dewan\*

**Abstract:** *The entrepreneurship of the women is considered as an effective instrument of the economic development of a country and at the same time empowerment of the women. Grasping this theme in the mind the objective of this paper is to assess the women's economic contribution and their participation for enhancing the empowerment in entrepreneurial activities. The paper makes an attempt to measure women empowerment through entrepreneurship development. The data needed for the paper collected from both primary and secondary sources. The primary data were collected from 105 women entrepreneurs classifying into three groups namely: boutique and handicrafts, foods and catering and beauty parlor of the Dhaka city. Fifteen key indicators of empowerment covering economic, socio-cultural and psychological dimensions were chosen for constructing women empowerment index (WEI). The distribution of the WEI demonstrates that the women entrepreneurs are empowered on an average as much as 4.30 on a scale of 5. The women entrepreneurs of the boutique and handicrafts, food and catering and beauty parlor are empowered 4.51, 4.26 and 4.12 respectively. The logit model and regression analysis show that there were strong positive effects of education of the women, professional training, their husbands' education, occupation on the entrepreneurship development of the women. The study concludes that entrepreneurship of women can enhance the empowerment of the women to a great extent. Therefore it is imperative to take effective initiatives by the concern agencies for women education, post education professional training facilities for the women, easy-term loan facilities, favorable business environment for the women which will boost up the women entrepreneurship. This will in the long run help in achieving greater economic development and women empowerment leading to gender equality and prosperous country.*

**Key words:** Women, Entrepreneurship, Empowerment, Gender equality

\* Lecturer, Department of Development and Poverty Studies, Sher-e-Bangla Agricultural University, Dhaka, Professor, Department of Development and Poverty Studies, Sher-e-Bangla Agricultural University, Dhaka and Lecturer, Department of Agribusiness and Management, Sher-e-Bangla Agricultural University, Dhaka



## 1. Introduction

Bangladesh is a developing nation, rich in human resources where women constitute slightly less than half the population. The majority of them are underprivileged, undernourished, illiterate and poor. They suffer both an unequal legal status with regard to many important rights and an inferior position with regard to cultural beliefs and practices (Huq, 2003). Moreover, there are not enough employment opportunities for women. Although lately, now the importance of the women in the economy and their necessity to take part in the economic development activities have been realized. The empowerment of women is often identified as an important aim of international development policies, and many donor agencies now include women's empowerment in their development strategies (Schuler et al., 2010). In that case women entrepreneurship development as there is lack of employment opportunity paves the quick way of economic development as well as empowerment of them. It is noticeable that entrepreneurship development and empowerment are complementary to each other. Women empowerment depends on taking part in various development activities. In other words, the involvement of women in various entrepreneurial activities has empowered them in social, economic and cultural fields. The power of and access to taking decisions has increased for women in Bangladesh, within as well as outside the family (Nawaz, 2009).

Many national and international efforts are taken to facilitate the entrepreneurship development. Government and private sector interventions have generally accelerated income-generating activities of women both in the urban and rural areas with entrepreneurship development (Bhuiyan and Abdullah., 2007). According to the United Nations (UN), a woman is empowered who has five components namely sense of self-worth, right to have and to determine choices, right to have access to opportunities and resources; right to have the power to control her own lives, both within and outside the home; and ability to influence the direction of social change to create a more just social and economic order, nationally and internationally. In today's competitive world, there are various ways by which women get themselves empowered. The entrepreneurship of women is considered to be an effective instrument to the economic development and empowerment of women (Nachimuthu and Gunatharan, 2012).

The overall objective of the study is to assess the women's economic contribution and their participation for enhancing the empowerment in livelihood activities. The specific objectives of the study are measuring women empowerment through entrepreneurship development finding out the relationship of between empowerment and age, education, income. Finally the study recommends some policy guidelines for sustainable women entrepreneurship development.

The rest of this paper is thus organized as follows: Section II gives a brief review of the literature about this objective, Section III discusses the methodology,

Section IV details the results and discussion and Section V concludes the paper.

## **II. Literature Review**

Upadhye and Madan (2012) conducted a study on 'Entrepreneurship and Women Empowerment: Evidence from Pune City' and showed that women from the lower strata of the society though educated, are unable to find employment in urban India. It is entrepreneurship that paves the path of development of these women in particular and society in general. The study concludes that there is a marked change in the personality, the economic and the social status of these women who take entrepreneurship as their occupation.

Parvin. et.al. (2012) have studied that women who involved in various micro, small and medium enterprises take on the challenge to work in a male-dominated society, competitive and complex economic and business environment with the government policy supports and financial institutions participation became able to improve their living conditions and earned more respect in the family and the society.

Das (2012) has shown in her study that a nation can only be developed if its women are given ample opportunities. Developing entrepreneurship among the women is the right approach for women empowerment. Once a woman feels that she is economically strong she will feel equal to men in all respect.

Nachimuthu and Gunatharan (2012) have conducted a study on 'Empowering Women through Entrepreneurship: A study in Tamil Nadu, India' and argued that economic status, self worth, self confidence and social status of women entrepreneurs are the variables that define empowerment of women. They concluded that entrepreneurship of women has enhanced their economic status and decision making power. Women entrepreneurs are aware of opportunities available to them, but there is scope for improvement in it.

Nawaz (2010) carried out a case study on the 'Nexus between Women Entrepreneurship Development and Empowerment: Bangladesh Context' and in her case study she tried to document a strong relationship between women entrepreneurship and empowerment. She found that being entrepreneurs, women are capable to take their own decisions liberally. It has been found that women are trying to free themselves from male dominance. The women entrepreneurs have the capability to take different decisions. Being entrepreneurs, the women concerned have become aware of the ownership of property and other assets. She concluded that positive changes have taken place in women's attitudes and perceptions of their own role after their involvement, in different entrepreneurial activities. In other words, participation in different entrepreneurial activities has empowered women in the social, economic and cultural fields.

Sathiabama (2010) has found in her study that Entrepreneurship development

among rural women helped to enhance their personal capabilities and increase decision-making status in the family and society as a whole.

### III. Methodology

Dhaka city was selected as the area because most of the successful women entrepreneurs could be found as respondents which made the study more valuable. The sample frame was constructed from the list of women entrepreneurs in the Dhaka city with the help of Bangladesh Women Chamber of Commerce and Industry (BWCCI). The respondents are classified into three groups namely – boutique and handicrafts, food and catering services and beauty parlor. Then 105 respondents were selected by the stratified random sampling technique from sample population.

To what extent the economic activities help woman to be empowered is the prime concern of the present study. For this to see whether entrepreneurship improves women empowerment or not, fifteen variables were selected to develop a women empowerment index (WEI). Each of the fifteen variables can take any of the five attributes for each respondent, which represents the relative position of the respondent in her ability and opportunity to take active part in family's decision making process. The range is discrete and a value close to 5 shows higher empowerment. These attributes are chronologically presented below:

1 = decision is made by other members in husband's absence

2 = by husband without consultation with the wife

3 = by wife in husband's absence

4 = jointly by husband and wife, or with others in husband's absence

5 = by wife even when husband is present

The rating values of the decision-makers have been assigned according to the weight in favor of the female,

Let,  $K_i$  = the values of attributes, (1.....5)

$X_i$  = the indicators or factors, (1.....15)

Here, fifteen intra-household decision-making indicators are denoted as  $X_1$  to  $X_{15}$ ;

$X_1$  = How to use husband's or family income

$X_2$  = What will be the investment source

$X_3$  = What will be the amount of investment

$X_4$  = When will be the investment through own fund or loanable fund

$X_5$  = What will be the business area

- X<sub>6</sub> = How much to sell
- X<sub>7</sub> = Whom to sell at what price
- X<sub>8</sub> = Whether to purchase household equipments
- X<sub>9</sub> = Could you do outside work
- X<sub>10</sub> = How to use your income
- X<sub>11</sub> = Purchasing essential items
- X<sub>12</sub> = Obtaining credit
- X<sub>13</sub> = Children’s education
- X<sub>14</sub> = Marriage decision of the children
- X<sub>15</sub> = Family planning

The above statement can be measured through rating of each decision indicator (X <sub>i</sub> ): X <sub>i</sub> = Decision making indicator	K= any rating value of each				
	Low			High	
X <sub>1</sub>	1	2	3	4	5
.	...	...	...	...	...
.	...	...	...	...	...
.	...	...	...	...	...
X <sub>n</sub>	1	2	3	4	5

So,  $X_i = K_i^-$  .....(i)

i.e. the average scoring value of X<sub>i</sub> (the indicator) for all household will be the average of the value K<sub>i</sub> . (Hossain and Bose, 2004).

The researcher used the given value of fifteen indicators for each household to construct the WEI. At first, the X<sub>i</sub> s are summed and measured individual empowerment index WEI<sub>i</sub> for each respondents by following formula:

$$WEI_i = \sum_{i=1}^{15} Xi/15 \dots\dots\dots(ii)$$

Then the overall WEI stands for an ith household as

$$WEI = \sum_{i=1}^{105} WEI_i/105 \dots\dots\dots(iii)$$

There are three types of entrepreneurs. So the empowerment indexes of the

three groups are–

$$WEIB = \sum_{i=1}^{35} WEI_i / 35 \dots\dots\dots(iv)$$

$$WEIF = \sum_{i=1}^{35} WEI_i / 35 \dots\dots\dots(v)$$

$$\text{and, } WEIP = \sum_{i=1}^{35} WEI_i / 35 \dots\dots\dots(vi)$$

Again, to assess the individual empowerment status and position of all women respondents, three randomly defined ranges are arranged as:

Very much vulnerable = below 3.00

Vulnerable = 3.01 to 3.50

Moderate = 3.51 to 4.00

Quite High = 4.01 to 4.50

High = 4.51 to 5.00

The rationale for selecting the range in this manner is that, first 1,2 and 3 remain scarce for all the respondents. That’s why the researcher selects the above ranges for perfectly reflecting the situations.

**Logit Model**

The data collected from 105 women entrepreneurs classifying into three groups namely boutique and handicrafts, food and catering and beauty parlor on their age, education, income and other aspects described in the above of this chapter. The study uses the logit model for analyzing the relationship among these dependent and independent variables.

Now, let (Y1, X1), ..., (Yn, Xn) be a random sample from the conditional Logit distribution:

$$\Pr [Y_j = 1|X_j] = \frac{1}{1 + \exp(-\alpha_0 - \beta_0 X_j)}$$

$$\Pr [Y_j = 0|X_j] = 1 - \Pr [Y_j = 1|X_j ]$$

$$= \frac{\exp (-\alpha_0 - \beta_0 X_j)}{1 + \exp(-\alpha_0 - \beta_0 X_j)}$$

where the  $X_j$  's are the explanatory variables and  $\alpha_0$  and  $\beta_0$  are unknown parameters to be estimated. This model is called a Logit model, because

$$\Pr [Y_j = 1|X_j] = F (\alpha_0 + \beta_0 X_j)$$

where

$$F(x) = \frac{1}{1 + \exp(-x)}$$

is the distribution function of the logistic (Logit) distribution.

The conditional probability function involved is

$$\begin{aligned} f(y|X_j, \alpha_0, \beta_0) &= \Pr [Y_j = y|X_j ] \\ &= F (\alpha_0 + \beta_0 X_j)^y (1 - F (\alpha_0 + \beta_0 X_j))^{1-y} \\ &= F (\alpha_0 + \beta_0 X_j) \text{ if } y = 1, \end{aligned}$$

Or,

$$= 1 - F (\alpha_0 + \beta_0 X_j) \text{ if } y = 0.$$

#### IV. Result and Discussion

##### The Women Empowerment Index (WEI)

The empowerment index is measured to know the overall empowerment status of all the respondents and for a better understanding of women empowerment through entrepreneurship. To find the status and quality of women entrepreneurs, fifteen variables are selected.

By applying the method to measure the empowerment index, the overall empowerment index is 4.30. The empowerment index for the entrepreneurs of Boutiques and handicrafts is found as 4.51, for the entrepreneurs of food business the empowerment index is 4.26 and for the entrepreneurs of parlor the empowerment index is found to be 4.12

**Table 1: Women Empowerment Index**

Type of the Entrepreneurship	Average Empowerment
Boutique	4.51
Food	4.26
Parlor	4.12
Average	4.30

The results (Table :) clearly indicates the fact that average empowerment of the women entrepreneurs is 4.30 which is quite high than the findings of others' studies, like in a study on 'Role of Women in Community Based Fisheries management in the Sunamgonj haour Area' Rakib, M. (2006) found average empowerment of the participants in the program as 3.78.

One thing should be cleared here that the present study is in the capital of Bangladesh and the women who are operating as entrepreneurs get the highest facilities which may be in terms of communication, availability of bank or other loans, location advantages etc. They are doing business overcoming all kinds of odds and hustles. So this is obvious they are more empowered than other women in the rural areas. But the thing is that in the empowerment scale it is not maximum and it is not enough today's world of hard and tough competition.

For assessing the status and position of the women entrepreneurs, individual index of all respondents is constructed in which lowest score is 3 and highest is 5, that means the index moves between 3 and 5. There are four randomly defined stages – vulnerable, moderate, quite high and high. In the vulnerable stage there are only three respondents out of 105 respondents which is around 3%. In the moderate stage there are 32 respondents around 30%. In the quite high stage there are 29 respondents around 28%. In the highly empowered stage there are 39%. Thus it is seen that large number of the entrepreneurs are in higher empowerment groups. So it is clear that entrepreneurship increased the empowerment of women to a great extent.

Now, among the three types of the entrepreneurs the average empowerment of the Boutique and handicrafts is 4.51 which is the highest and much above the average of all respondents, then following food business which is 4.26 and the lowest is 4.12 scored by parlor.

The average empowerment over whole sample for each of the 15 factors can also be checked.

**Table 2: Weighted Averages of Factors for All Respondents**

Factors	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	X <sub>10</sub>	X <sub>11</sub>	X <sub>12</sub>	X <sub>13</sub>	X <sub>14</sub>	X <sub>15</sub>
E(xi)	3.68	4.34	4.81	4.36	4.53	4.59	4.60	4.02	4.27	4.54	4.10	4.46	4.06	4.04	4.07

As defined earlier the factors X<sub>1</sub> to X<sub>7</sub> are in general associated with economic and professional fields. These activities are more formal are not household activities. These are the factors relating major economic decisions of a family.

The first factor X<sub>1</sub> is concerned with 'the decision taken about how to use husband's or family income' which is really a critical question for the study. The reason of criticality can be explained from our perspective of societal settings.

Firstly, our families in this modern age also carry paternal mentality regarding spending of money. Secondly, majority of the population here is the follower of the religion Islam in which restricts to some extents spending of money by the women themselves. Finally the psychological side, it is deeply rooted both the mentality of male and female that female cannot properly handle the expenditures, she can take wrong decisions regarding this and again as she is not earning, her husband is earning so she has no rights of spending her husband’s income. In this context,  $X_1$  factor carries the value 3.68 which is obviously low than the average empowerment value.

From the factor  $X_2$  to  $X_7$  and  $X_{12}$  are concerned about decision regarding investment source, investment amount, funds of investment, business area, sale of their products and obtaining credit. These factors are closely related with the entrepreneurial activities which score as from 4.34 to as high as 4.81. These indicate that women are almost independent regarding taking their business decisions.

The factor  $X_8$  and  $X_{11}$  are regarding purchase of household equipments essential items respectively which scores 4.02 and 4.10 that means they have quite high independence in spending small purchases needed for household and  $X_9$  is regarding about working outside and scores 4.27 that means that The women entrepreneurs enjoy quite high freedom of mobility.

The factor  $X_{10}$  is concerned with ‘Decision taken about how to use income of her’ which scores 4.54 that means it falls on the highly empowered ranges. The respondents have the freedom to spend their income.

The factors from  $X_{12}$  to  $X_{15}$  are not professional and are directly related to internal decision of the family. These are regarding taking decision about children’s education, their marriage and family planning. These factors score the value as 4.06, 4.04 and 4.07 which are below than the average index of the women empowerment. This means that in the patriarchic society although women are empowered but this is not enough for taking important family decisions.

Now the three types of entrepreneurship are classified by their weighted average for comparing among themselves.

**Table 3: Weighted Average of Factors for Boutique and Handicrafts**

Factors	$X_1$	$X_2$	$X_3$	$X_4$	$X_5$	$X_6$	$X_7$	$X_8$	$X_9$	$X_{10}$	$X_{11}$	$X_{12}$	$X_{13}$	$X_{14}$	$X_{15}$
E(xi)	3.83	4.66	4.94	4.69	4.91	5.00	5.00	4.03	4.57	4.91	4.17	4.77	4.14	4.00	4.09



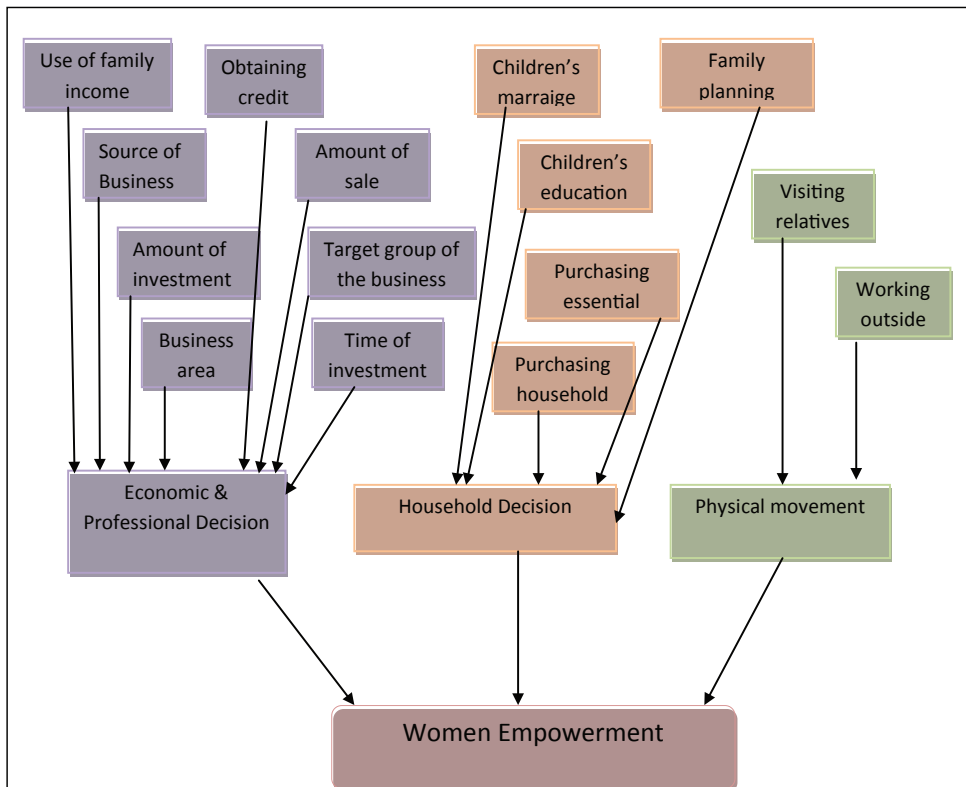
**Table 5: Weighted Average of Factors for Food Business**

Factors	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	X <sub>10</sub>	X <sub>11</sub>	X <sub>12</sub>	X <sub>13</sub>	X <sub>14</sub>	X <sub>15</sub>
E(xi)	3.57	4.31	4.51	4.23	4.60	4.69	4.69	4.00	4.14	4.60	4.00	4.49	3.94	4.00	4.06

**Table 6: Weighted Average of Factors for Parlor**

Factors	X <sub>1</sub>	X <sub>2</sub>	X <sub>3</sub>	X <sub>4</sub>	X <sub>5</sub>	X <sub>6</sub>	X <sub>7</sub>	X <sub>8</sub>	X <sub>9</sub>	X <sub>10</sub>	X <sub>11</sub>	X <sub>12</sub>	X <sub>13</sub>	X <sub>14</sub>	X <sub>15</sub>
E(xi)	3.63	4.06	4.97	4.17	4.09	4.09	4.11	4.03	4.09	4.11	4.14	4.11	4.09	4.11	4.06

The following figure shows the indicators of the empowerment on which the measures of women empowerment through entrepreneurship depend.



**Figure 1: The conceptual framework of indicators of the women empowerment**

**Logit model**

The data collected from 105 women entrepreneurs classifying into three groups namely boutique and handicrafts, food and catering and beauty parlor on their age, education, income and other aspects described in Chapter 3. The study uses the logit model for analyzing the relationship among these dependent and independent variables.

Before running the regression, obtaining a frequency of the type of the entrepreneurship in the data can inform the selection of a reference group. By default, SPSS uses the last category as the reference category.

**Table 7: Type of entrepreneurship**

Type of Entrepreneurship	Frequency	Percent
Boutique & Handicrafts	35	33.3
Food & Catering Services	35	33.3
Beauty Parlor	35	33.3
Total	105	100.0

**Table 8: Coefficient Estimation in the Logit Model**

Type of Entrepreneurship	Estimated coefficient (Ec)	Standard Error	Z	Significance level	Exp (Ec)	Interval	
						Lower Bound	Upper Bound
Boutique & Handicrafts Age group							
1. 20-30 years	-2.235	1.036	-2.158	.031	0.107	-4.265	-.205
2. 31-40 years	-1.965	.800	-2.456	.014	0.140	-3.534	-.397
3. 41-above years	0.00	.	.	.	1	.	.
Food & Catering Services Age Group							
1. 20-30 years	-3.122	1.261	-2.475	.013	0.044	-5.594	-.650
2. 31-40 years	-3.093	1.081	-2.861	.004	0.045	-5.211	-.974
3. 41-above years	0.00	.	.	.	1	.	.
Boutique & Handicrafts Income (Tk)							
1. 3000-20000	-1.908	.976	-1.955	.051	0.1484	-3.821	.005
2. 21000-50000	-.279	1.144	-.244	.807	0.7564	-2.522	1.964
3. 51000-above	0	.	.	.	1	.	.
Food & Catering Services Income (Tk)							
1. 3000-20000	19.633	.933	21.032	.000	336196 676.7	17.804	21.463
2. 21000-50000	.000	.	.	.	1	.	.
3. 51000-above	0	.	.	.	1	.	.
Boutique & Handicrafts Education							
1.Up to primary	-2.764	1.557	-1.775	.076	0.0631	-5.815	.288

2. Up to H.S.C.	-1.187	.736	-1.612	.107	0.3052	-2.630	.256
3. H.S.C. to above	0	.	.	.	1	.	.
Food & Catering Services Education							
1.Up to primary	4.192	1.270	3.301	.001	66.181 2	1.703	6.682
2. Up to H.S.C.	.295	1.021	.289	.773	1.3432	-1.705	2.296
3. H.S.C. to above	0	.	.	.	1	.	.

Always last category is the reference group. In this instance, SPSS is treating Beauty Parlor as the reference group. Therefore, SPSS estimated a model Boutique & Handicrafts relative to Beauty Parlor and a model Food & Catering Services relative to Beauty Parlor. Therefore, since the parameter estimates are relative to the referent group, the standard interpretation of the multinomial logit is that for a unit change in the predictor variable, the logit of outcome *m* relative to the referent group is expected to change by its respective parameter estimate (which is in log-odds units) given the variables in the model are held constant.

### **Boutique & Handicrafts Relative to Beauty Parlor**

**Age group:** This is the multinomial logit estimate for a one unit increase in age group 41 to above for Boutique & Handicrafts relative to Beauty Parlor given the other variables in the model are held constant. If the age of the respondents is from 41 to above, the multinomial logit model preferring boutique and handicrafts to beauty parlor as the age is higher the entrepreneurship is good.

**Income:** This is the multinomial logit estimate for a one unit increase in income for Boutique & Handicrafts relative to Beauty Parlor given the other variables in the model are held constant. If the income is 51000 to above it is much preferable for the Boutique and handicrafts relative to beauty parlor being the other things in the model constant.

**Education:** This is the multinomial logit estimate for a one unit increase in education for Boutique & Handicrafts relative to Beauty Parlor given the other variables in the model are held constant. The education level H.S.C. to above is preferable to the group up to H.S.C. and following up to primary. If the respondent were to increase the education level by one point the multinomial log-odds for preferring boutique and handicrafts relative to beauty parlor would be expected to decrease by 0.3052 for the up to H.S.C. level and up to primary level 0.0631.

### **Food & Catering Services Relative to Beauty Parlor**

**Age group:** This is the multinomial logit estimate for a one unit increase in age group 41 to above for Food & Catering Services relative to Beauty Parlor given the other variables in the model are held constant. If the age of the respondents is from 41 to above, the multinomial logit model preferring Food & Catering Services to beauty parlor as the age is higher the entrepreneurship is good. When the respond-

ents shift ages high then the multinomial logit model prefers higher ages, otherwise with age group 20 to 30 the value is 0.044 and with age group 31 to 40 the value is 0.045 against 1 in the age group 41 to above.

**Income:** This is the multinomial logit estimate for a one unit increase in income for Food & Catering Services relative to Beauty Parlor given the other variables in the model are held constant. If the income is 51000 to above it is much preferable for the Food & Catering Services relative to beauty parlor being the other things in the model constant.

**Education:** This is the multinomial logit estimate for a one unit increase in education for food & catering Services relative to beauty parlor given the other variables in the model are held constant. Here the case is opposite to the previous one. The education level up to primary is preferable to the group up to H.S.C. and following H.S.C and above. If the respondent had the education up to primary level by 66.18 times the multinomial log-odds for preferring food & catering Services relative to beauty parlor would be expected to decrease by 1.3 for the up to H.S.C. level and by 1 for the H.S.C. and above.

So, it can be concluded here that the entrepreneurship of the boutique and handicrafts is more profitable than the Food and catering services and beauty parlor. The women entrepreneurs of the boutique and handicrafts aged higher than others and they income more than the two groups. Moreover, their educational profile is also higher than the other groups.

On the other hand entrepreneurship of the food and catering services is less preferable than boutique and handicrafts and more from the entrepreneurs of beauty parlor. In case of the food and catering services women aged more are seen doing business. But on contrary to boutique and handicrafts, the women with little formal or institutional education are doing business then the educated women.

## **V. Conclusion & Recommendation**

Bangladesh is a country of limited natural resource but rich in human resource. Therefore turning women into entrepreneurship is the most expecting issue from the view point of the policy initiators for the development of the country. In spite of existing higher social stratification, lack of strong financial support and other social barriers, women are now engaging in entrepreneurial activities to be self-reliant. After suffering hundreds years of disgraces by the male counterpart in the families, societies, they felt the need for engaging in economic activities. When they started joining the work force at the beginning it was not easy for them, whose counterparts who compelled them to go outside, were become over-egoistic and did not support them at all moreover tried hard and soul to create obstacles. At the edge of the 21th century the situation seems to be changed through the hard working of the government, foreign donor agencies, working of the NGOs and most importantly the fearless, perseverance, firm attitude of the women of the country.

Entrepreneurship is one of the effective ways of empowering the women. Besides being challenging it offers some advantages also. For example, entrepreneurship can be successful with little formal education, from which girls are deprived of before, other kind of jobs need along with education some preparations after their graduation which is not getting the women because of their marriage and household responsibilities at this stage, so the age criteria of recruitment is already expired. So the entrepreneurship remains as the only way of becoming self-dependent. However there still some problems are faces by the women entrepreneurs which need attention from the government along with various stakeholders of the society. There are some recommendations for improving the women entrepreneurship of Bangladesh.

From the government;

- Favorable rules and regulations for women entrepreneurship development need to be enforced.
- The ministry of women and child affairs and directorates of social affairs have to pay specific attention to this issue.
- Monitoring of the commercial banks dealing with business loans specifically women entrepreneurs should be increased.
- Government should take necessary initiative to improve the infrastructure facilities such as communication electricity, utility services (Fuel, gas and water) etc.
- Trade License requirement and TIN certificate procedure should be simplified.
- Concerned Chamber of Commerce and Industry should be open separate window for facilitating
- Export Promotion Bureau should be so activated that it becomes helpful for women entrepreneurs.
- Government should establish an information centre for women entrepreneur so that they can get easily the needed information related with their business.
- Establishing strong network among different institutions and agencies involved in the development of the women in general and sharing their experiences.
- Government and other local agency should take step to reduce the social constrains like various customs related to women life structure, religious constraints, eve teasing and family torturing.
- Government should ensure the secured environment for women entre-

preneur and for whole female.

From the society;

- Social attitudes towards the women entrepreneurship which sometimes act as barriers in this patriarchic society need to be changed.
- The support needed from the family members should be given to the women entrepreneurs, for this strong social movement is necessary.

From the financial institution and banks;

- Banks and financial institutions can create special package or separate facilities for the women entrepreneurs.
- Women entrepreneur should be provided collateral free loan as they have no ore little assets. The margin of security should also be liberalized.
- The procedures of sanctioning loan should be simplified and loan application must be appraised as early as possible.
- The rate of interest for loans to working capital should be reduced and rebate should be allowed to encourage timely return of loan.
- One stop services should be created in the commerce ministry exclusively for the women entrepreneurs for facilitating investment and business.

From the governmental and non-governmental training institutes;

- Effective Training programs are needed for women entrepreneurs' development. Most of the women entrepreneurs use traditional manual training and skills in their business. Technology based training can play a role in increasing productivity, increasing the quality of output and saving time and money of women entrepreneur. Training should be given to women entrepreneurs so that they can use technology effectively.
- Women entrepreneur need to up-to-date training for new products development, better management of the undertaking and improving the quality of products and services.
- Women entrepreneurs have little designing skills; they need good and marketable designing training, which should be organized by government and others supportive institutions like BWCCI.

These demands from the women entrepreneurs are rational because they constitute almost fifty percent of the population of the country and their past struggle backwardness deserves more.

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## টেকসই উন্নয়নে গণমুখী ব্যাংকিং ব্যবস্থা এবং এর স্বরূপ সন্ধানে কতিপয় সুপারিশ

মুহাম্মদ জসীম উদ্দীন\*

সারকথা: আলোচ্য প্রবন্ধে টেকসই উন্নয়নের হাতিয়ার হিসেবে ব্যাংকিং কার্যক্রমকে গণমানুষের কল্যাণে তথা দরিদ্র শ্রমজীবী মানুষের আর্থ-সামাজিক অবস্থার উন্নয়নে পরিচালিত করার বিষয়ে আলোকপাত করা হয়েছে। প্রবন্ধের শুরুতে লক্ষ্য ও উদ্দেশ্য এবং তথ্য ও পদ্ধতি সম্পর্কে আলোচনা করা হয়েছে। বাংলাদেশের ব্যাংকিং ব্যবস্থার ইতিহাস, ব্যাংকিং ব্যবস্থার বর্তমান চিত্র তুলে ধরে এর মূল্যায়ণ এবং একটি গণমুখী ব্যাংকিং ব্যবস্থার স্বরূপ কেমন হতে পারে এ বিষয়ে আলোচনা করা হয়েছে। বাংলাদেশে প্রকৃত অর্থে টেকসই উন্নয়ন নিশ্চিত করতে গণমুখী ব্যাংকিং ব্যবস্থা প্রণয়ন তথা জনকল্যাণে ব্যাংকিং কার্যক্রম পরিচালনা করতে হবে। প্রবন্ধের শেষাংশে গণমুখী ব্যাংকিং ব্যবস্থা প্রণয়নে কতিপয় সুপারিশ উত্থাপন করা হয়েছে।

### ১. ভূমিকা :

ব্যাংক আধুনিক অর্থনীতির এক অন্যতম গুরুত্বপূর্ণ খাত। ব্যাংকিং খাতের যথাযথ উন্নয়ন ছাড়া একটি সমাজের কাঙ্ক্ষিত উন্নয়ন প্রায় অসম্ভব। অর্থনীতির তিনটি মূল স্তম্ভ কৃষি, শিল্প ও ব্যবসা বাণিজ্যের উন্নয়ন এবং প্রসারে ব্যাংকের কার্যক্রম পরিচালিত হয়। বর্তমান বিশ্ব বাস্তবতার সাথে তাল মিলিয়ে চলতে বাংলাদেশের আপামর জনসাধারণকে ব্যাংকিং কার্যক্রমে সম্পৃক্ত করা অপরিহার্য। আমাদের দেশে ব্যাংকিং খাতের যথাযথ উন্নয়ন নিশ্চিত করতে চাইলে কৃষি, শিল্প ও ব্যবসা বাণিজ্যে অর্থায়নের পাশাপাশি এদেশের দরিদ্র অসহায় জনগোষ্ঠীকে ব্যাংকিং খাতের সাথে সম্পৃক্ত করে তাদের জীবনমান উন্নয়নের কথা ভাবতে হবে। এদেশের দরিদ্র, ক্ষুদ্র ও প্রান্তিক কৃষক, প্রতিবন্ধি, অসহায়, দরিদ্র শ্রমজীবী মানুষের আর্থ-সামাজিক অবস্থার উন্নয়নে ব্যাংকিং কার্যক্রম পরিচালনা করা সময়ের দাবী। আর এ লক্ষ্যে ব্যাংকিং সেবা অধিকতর সুলভ, সহজলভ্য, দরিদ্রমুখী ও কল্যাণধর্মী করা জরুরী। প্রশ্ন হলো, ব্যাংকগুলো সাধারণ মানুষের কল্যাণে কোন কাজ করছে কি না? করলে তার পরিধি কতটুকু? কিংবা দেশ ও মানুষের স্বার্থে ব্যাংকগুলোর অঙ্গীকার ও দায়বদ্ধতা কতটুকু? সাধারণ ভাবে, পর্যালোচনা করলে দেখা যায় এর পরিমাণ একেবারেই নগণ্য। লাগামহীন মুনাফা অর্জন একটি ব্যাংক প্রতিষ্ঠার মূল লক্ষ্য হতে পারে না। দেশ ও মানুষের প্রতি দায়বদ্ধ থেকে জনকল্যাণে তাদের কার্যক্রমের এক বৃহৎ অংশ পরিচালনা করা অপরিহার্য। ব্যাংকগুলো যে কোম্পানী আইনে প্রতিষ্ঠা লাভ করে সে আইনে ত্রুটি-বিচ্যুতি থাকলে তা সংশোধন করে জনস্বার্থে একটি যথাযথ আইনি কাঠামো তৈরী করা যেতে পারে। যেন ব্যাংকগুলোর মুনাফা লাভের পাশাপাশি দেশ ও মানুষের স্বার্থে বিশেষ করে শ্রমজীবী সাধারণ দরিদ্র মানুষের জীবন মান উন্নয়নে ভূমিকা পালনের আইনি বাধ্যবাধকতা থাকে।

\* প্রভাষক, অর্থনীতি বিভাগ, সিলেট ক্যাডেট কলেজ, সিলেট



বর্তমানে তথ্য প্রযুক্তির যুগে ব্যাংকিং খাতে তথ্য প্রযুক্তির ব্যবহার অনেক বেড়ে গেছে। এতে ব্যাংকিং কার্যক্রম সহজতর হয়েছে, মুনাফা অর্জনের পরিমাণও বেড়ে গেছে বহুগুণ। এই তথ্য প্রযুক্তি গণমানুষের কল্যাণে ব্যবহার করে ব্যাংকিং কার্যক্রমকে অরার কার্যকর, বাস্তবসম্মত করার সুযোগ আছে। ‘রূপকল্প ২০২১’ বাস্তবায়নে ডিজিটাল বাংলাদেশ গড়তে গণমানুষের কল্যাণে ব্যাংকিং খাতে তথ্য প্রযুক্তির ব্যবহার বিরাট ভূমিকা রাখতে পারে। প্রশ্ন হলো, আধুনিক ব্যাংকিং ব্যবস্থার কথা যেভাবে বলা হচ্ছে তাতে সেই সুযোগ কাজে লাগানো হচ্ছে কি না? বাংলাদেশের মত দ্রিদি ও জন বহুল দেশে ব্যাংকগুলোকে গণমানুষের কল্যাণে তথা দরিদ্র অসহায় শ্রমজীবী মানুষের ভাগ্য উন্নয়নে কাজে লাগাতে হবে সবার আগে। মানুষের কল্যাণ নিশ্চিত করে তবে মুনাফা লাভের কথা ভাবতে হবে।

সুতরাং, লাগামহীন মুনাফা লাভের সনাতন ও কাঠামোগত চিন্তার খোলস ছেড়ে আমাদের আরও অগ্রসর চিন্তা করতে হবে। একই সাথে জনকল্যাণ ও মুনাফা লাভের কথা ভাবতে হবে। আজকে যে টেকসই উন্নয়নের কথা বলা হচ্ছে তা নিশ্চিত করতে চাইলে এদেশের বিপুল সংখ্যক বঞ্চিত সাধারণ মানুষের আর্থ-সামাজিক উন্নয়নে এদেশের ব্যাংক ব্যবস্থাকে আরও বাস্তবসম্মত ও যুগোপযোগী করে গড়ে তুলতে হবে। আর সে লক্ষ্য পূরণে সকল ব্যাংকে এগিয়ে আসতেই হবে। বাংলাদেশ ব্যাংকের বার্ষিক প্রতিবেদন ২০১২-১৩ এ উল্লেখ করা হয়েছে:

“With a view to maintaining a sound, efficient and stable Financial system; Bangladesh Bank (BB) has initiated a number of policy measures, giving augmented emphasis on risk management in the banks, the periodical review of stability of individual banks as well as the whole banking system, exercise of stress testing, inclusion of underserved/unserved productive economic sectors and population segments in the financial system, etc”.

সুতরাং, এদেশের দরিদ্র অসহায় মানুষের ভাগ্যোন্নয়নে কাজ করে ব্যাংক প্রতিষ্ঠার উদ্দেশ্যকে আর সুসংহত, যুক্তিযুক্ত, দেশ ও মানুষের কল্যাণে গণমুখী করার সুযোগ সৃষ্টি করতে হবে। এতে ব্যাংকের সুনাম ও মর্যাদা বৃদ্ধি পাবে। একই সাথে মানুষের আস্থা ও শ্রদ্ধার কেন্দ্রস্থল হিসেবে প্রতিষ্ঠিত হওয়ার সুযোগ সৃষ্টি হবে। আজকে যে আইনি সংস্কার ও ব্যাংকিং খাত সংস্কারের কথা বলা হচ্ছে সেখানে গণমানুষের কল্যাণের বিষয়টি অগ্রাধিকারের ভিত্তিতে স্থান দিতে হবে।

বাংলাদেশে দারিদ্র বিমোচন এক বিরাট চ্যালেঞ্জ। রাজনীতিবিদ, আমলা, জনপ্রতিনিধি তথা শিক্ষিত অগ্রসর জনগোষ্ঠীর সনাতন দৃষ্টিভঙ্গি, দুর্নীতি, রাজনৈতিক অস্থিতিশীলতা, মিথ্যাচার, দুর্বৃত্তায়ন, লুটপাট, ব্যাপক বেকারত্ব, জনসংখ্যা বৃদ্ধি, আইনের শাসনের অনুপস্থিতি প্রভৃতি কারণে এদেশের দারিদ্র্য পরিস্থিতির কাঙ্ক্ষিত উন্নয়ন হচ্ছে না। নীতি নির্ধারণী মহল থেকে দারিদ্র্যের হার কমে আসছে বলা হলেও বাস্তব পরিস্থিতি সম্পূর্ণ ভিন্ন। সরকারি হিসেবে বর্তমান দারিদ্র্যের হার কমে আসছে দেখতে সক্ষম হলেও ভূমি অধিকারের ভিত্তিতে দারিদ্র্য পরিমাপ করলে দেখা যাবে, দারিদ্র্যের হার বেড়েই চলছে। অর্থাৎ বাস্তব অবস্থা এমন যে, ভূমিহীন মানুষের সংখ্যা বেড়েই চলছে অথচ সরকারি হিসেবে দরিদ্র মানুষের সংখ্যা কমে আসছে বলা হচ্ছে।

ইদানিং টেকসই উন্নয়ন একই সাথে ২০২১ সালের মধ্যে দেশকে মধ্য আয়ের দেশে উন্নীত করার বিষয়টি জোরেসোরে উচ্চারিত হচ্ছে। তা অর্জন করতে প্রয়োজন ব্যাংকিং খাতে আমূল সংস্কার এবং গণমুখী ব্যাংক ব্যবস্থার প্রবর্তন করে এই খাতের ব্যাপক উন্নয়ন। ব্যাংকিং খাতের যথাযথ উন্নয়ন ব্যতীত টেকসই উন্নয়ন হতে পারেনা। এ খাতের দক্ষতা বৃদ্ধিতে ১৯৮৬ সালে একটি জাতীয় কমিটি গঠন করা হয়।

ব্যাংক ও আর্থিক খাত উন্নয়নে ১৯৯১ সালে গঠন করা হয় টার্কফোর্স। এভাবে বিভিন্ন সময়ে এ খাত উন্নয়নের কথা বলা হলেও গণমুখী ব্যাংকিং প্রতিষ্ঠার বিষয়টি উপেক্ষা করা হয়েছে। আলোচ্য প্রবন্ধে দরিদ্র মানুষের ভাগ্যোন্নয়নে আমাদের ভাবনাকে আরও যৌক্তিক ও বাস্তবসম্মত করার বিষয়ে আলোকপাত করা হবে। ব্যাংকিং কার্যক্রমকে দারিদ্র্য বিমোচনে আরও সুলভ, গণমুখী করতে 'জনকল্যাণের জন্যই ব্যাংকিং'- এই ধারণাকে আমাদের সমাজে প্রতিষ্ঠিত করার চেষ্টা করা হবে।

## ২. লক্ষ্য ও উদ্দেশ্য :

আলোচ্য প্রবন্ধের মূল লক্ষ্য বাংলাদেশের আর্থ-সামাজিক প্রেক্ষাপটে দেশের অগণিত দরিদ্র অসহায় মানুষের ভাগ্যোন্নয়নে ব্যাংকিং কার্যক্রমকে আরও যৌক্তিক, গণমুখী ও সুসংহত করা। এ লক্ষ্যকে সামনে রেখে উদ্দেশ্যসমূহ নিম্নে উপস্থাপন করা হলো।

ক. দেশের ব্যাংক ব্যবস্থার ইতিহাস তুলে ধরা।

খ. বাংলাদেশের ব্যাংকিং ব্যবস্থার বর্তমান চিত্র তুলে ধরা এবং মূল্যায়ন করা।

গ. গণমুখী ব্যাংক ব্যবস্থার স্বরূপ উপস্থাপন করা।

ঘ. দেশের দরিদ্র অসহায় মানুষের কল্যাণে গণমুখী ব্যাংক ব্যবস্থার প্রবর্তনে কতিপয় সুপারিশ তুলে ধরা।

## ৩. তথ্য ও পদ্ধতি :

আলোচ্য প্রবন্ধে ব্যবহৃত তথ্যসমূহ মাধ্যমিক উৎস হতে নেয়া হয়েছে। বাংলাদেশ অর্থনৈতিক সমীক্ষার বিভিন্ন গ্রন্থ, বাংলাদেশ অর্থনীতির সমিতিসহ বিভিন্ন সংস্থা কর্তৃক প্রকাশিত বিভিন্ন জার্নাল, বিভিন্ন গ্রন্থ, বাংলাদেশ এশিয়াটিক সোসাইটি কর্তৃক প্রকাশিত বাংলাপিডিয়া, ইন্টারনেট, বিভিন্ন দৈনিকে প্রকাশিত বিভিন্ন প্রতিবেদন ও প্রবন্ধের সহায়তা নেয়া হয়েছে। এ ছাড়া দেশের সামগ্রিক পরিস্থিতির উপর লেখকের অভিজ্ঞতার ভিত্তিতে কতিপয় পর্যবেক্ষণের উপর আলোকপাত করা হয়েছে।

## ৪. বাংলাদেশের ব্যাংকিং ব্যবস্থার ইতিহাস :

ঐতিহাসিক প্রেক্ষাপট পর্যালোচনা করে এদেশের ব্যাংক ব্যবস্থাকে ঔপনিবেশ পূর্ব ব্যাংকিং ব্যবস্থা, ঔপনিবেশ আমলের ব্যাংকিং ব্যবস্থা এবং বাংলাদেশের ব্যাংকিং ব্যবস্থা এই তিনটি পর্বে ভাগ করতে পারি।

### ক. ঔপনিবেশ পূর্ব ব্যাংকিং ব্যবস্থা :

প্রাচীন কাল তথা খ্রিষ্টপূর্ব ১০০০ হতে খ্রিষ্টপূর্ব ৪০০ সময়কালে ভারতীয় উপমহাদেশে ব্যাংকিং কার্যক্রম সম্পর্কিত কোন তথ্য পাওয়া যায়নি। তবে, ব্যবসায়ীদের পরস্পরকে আর্থিক সহায়তা প্রদানের বিষয়ে তথ্য রয়েছে। সে সময়ে ঋণ ও ঋণের অংশের উপর বাড়তি পরিশোধ (সুদ) বিষয়েও জনগণের অভিজ্ঞতা ছিল। ঋণ গ্রহণ ও প্রদানের চর্চা বৈদিক আমলেও চালু ছিল। 'কৌটিল্যের অর্থশাস্ত্র' গ্রন্থে ব্যাংকিং ব্যবসায় এবং সুদের উল্লেখ রয়েছে।

মুগল শাসনামলে প্রবর্তিত অর্থ ব্যবসায় স্থানীয় কিছু পরিবার যথেষ্ট প্রসিদ্ধ লাভ করে। এ সকল পরিবারের মধ্যে জগৎশেঠ পরিবারই ছিল শক্তিশালী। ঢাকা, হুগলী, মুর্শিদাবাদ প্রভৃতি গুরুত্বপূর্ণ ব্যবসায় কেন্দ্রে জগৎশেঠ পরিবারের অর্থ ব্যবসায়ের শাখা ছিল। এ সময়ে বৃহৎ পুঁজিপতি ব্যাংকার হতে শুরু করে ক্ষুদ্র গ্রাম্য মহাজন পর্যন্ত বিভিন্ন স্তরের লোক নিজ নিজ সামর্থ্য অনুযায়ী টাকা পয়সা লেনদেন ব্যবসা

করত। অর্থাৎ মুগল আমলেই ভারতীয় উপমহাদেশের ব্যাংক ব্যবস্থার স্বরূপ প্রকাশিত হয়। ১৭০০ সালে ভারতের কলকাতায় দ্য হিন্দুস্থান ব্যাংক প্রতিষ্ঠিত হয় যা এ অঞ্চলের সর্ব প্রথম আধুনিক ব্যাংক হিসেবে পরিচিতি লাভ করে।

#### খ. ঔপনিবেশিক আমলের ব্যাংকিং ব্যবস্থা :

বৃটিশরা তাদের নিজ দেশের অর্থনীতির বিকাশ ও উন্নয়নের জন্য কলোনী দেশগুলো হতে যে লুণ্ঠনের সংস্কৃতি চালু করে তা সহজতর করার মানসেই বোধ করি এদেশে ব্যাংকিং কার্যক্রম চালু করে। ১৭৮৭ সালে প্রতিষ্ঠিত বেঙ্গল ব্যাংক ছিল বৃটিশ আর্শীবাদপুষ্ট প্রথম আধুনিক ব্যাংক। ঢাকা ব্যাংক বাংলাদেশ অঞ্চলে প্রথম বাণিজ্যিক ব্যাংক যা ১৮০৬ সালে কার্যক্রম শুরু করে। ১৮৬২ সালে ঢাকা ব্যাংক কিনে নিয়ে বেঙ্গল ব্যাংক এ অঞ্চলে তার প্রথম শাখা খোলে।

অবিভক্ত ভারতে ১৮০৬ সালে ব্যাংক অব ক্যালকাটা, ১৮৪০ সালে ব্যাংক অব বোম্বে এবং ১৮৪৩ সালে ব্যাংক অব মাদ্রাজ নামে তিনটি প্রেসিডেন্সি ব্যাংক প্রতিষ্ঠিত হয়। এ সকল ব্যাংকের সমন্বয়ে ১৯২১ সালে দি ইম্পেরিয়াল ব্যাংক অব ইন্ডিয়া প্রতিষ্ঠা করা হয়। ১৯৩৫ সালে ভারতীয় কেন্দ্রীয় ব্যাংক হিসেবে রিজার্ভ ব্যাংক অব ইন্ডিয়া প্রতিষ্ঠিত হয় এবং ১৯৪৭ সালে ভারত বিভক্তির পূর্ব পর্যন্ত এটি বৃটিশ ভারতের কেন্দ্রীয় ব্যাংক হিসেবে কাজ করে। এতদ্ব্যতীত বাংলা অঞ্চল সহ ব্রিটিশ ভারতে অন্যান্য বেশ কিছু ব্যাংক ও আর্থিক প্রতিষ্ঠান কর্মরত ছিল। ব্রিটিশ আমলে বাংলাদেশ এলাকায় লোন অফিস নামে পরিচিত এ সকল আর্থিক প্রতিষ্ঠান সমূহ প্রতিষ্ঠিত ছিল এবং ফরিদপুর (১৮৬৫), বরিশাল (১৮৭৩), ময়মনসিংহ (১৮৭৩), ঢাকা (১৮৭৮), সিলেট (১৮৮১), খুলনা (১৮৮৭) ইত্যাদি এলাকায় তাদের কার্যক্রম ছিল। অপরদিকে এলাকাভিত্তিক কতিপয় ব্যাংক প্রতিষ্ঠিত হয় যা নিচের সারণীর মাধ্যমে তুলে ধরা হলো।

ব্যাংক	প্রতিষ্ঠাকাল
কুড়িগ্রাম ব্যাংক	১৮৮৭
কুমারখালী ব্যাংক	১৮৯৬
মহালক্ষী ব্যাংক, চট্টগ্রাম	১৯১০
দিনাজপুর ব্যাংক	১৯১৪
কুমিল্লা ব্যাংকিং কর্পোরেশন	১৯১৪
কুমিল্লা ইউনিয়ন ব্যাংক	১৯২২

উৎস : বাংলাপিডিয়া, (খন্ড-৭) ২০০৩।

যে সকল ভারতীয় ব্যাংকের এতদ অঞ্চলে শাখা ছিল সেগুলো হচ্ছে : ন্যাশনাল ব্যাংক অব ইন্ডিয়া (১৮৬৪), বেঙ্গল সেন্ট্রাল ব্যাংক (১৯১৮), নিউ স্ট্যান্ডার্ড ব্যাংক (১৯২০), ইম্পেরিয়াল ব্যাংক অব ইন্ডিয়া (১৯২১), হাবিব ব্যাংক (১৯৪১) এবং ইউনাইটেড কমার্শিয়াল ব্যাংক (১৯৪২)।

বৃটিশ আমলে ব্যাংকিং ব্যবসা দ্বারা মূলতঃ ধনী অর্থলক্ষীকারী ব্যবসায়ীদের আর্থিকভাবে প্রতিষ্ঠিত করার চেষ্টা করা হয়েছিল। এছাড়া, মহাজনদের সুদের বেড়া জালে পড়ে এদেশের অগণিত মানুষ ভিটেমাটি ছাড়া হয়ে নিঃশ্ব, অসহায়, বাস্ত্বহারা হয়েছিল। ব্যাংক স্থাপনের নামে এ সকল মহাজনদের অনৈতিক কার্যক্রমকে প্রতিষ্ঠানিক ও আইনি সহায়তা দেয়ার প্রয়াস চালানো হয়। ব্যাংক স্থাপনের মাধ্যমে বৃটিশরা গণমানুষের কল্যাণের বিষয়টি অত্যন্ত সচেতনভাবে এড়িয়ে যায়। ফলে, বৃটিশ প্রবর্তিত ব্যাংকিং ব্যবস্থায় এদেশের সাধারণ কৃষক, দরিদ্র, শ্রমজীবী মানুষের কোন কল্যাণ সাধিত হয়েছে একথা কেউ বলতে পারবে বলে মনে হয়না।

বৃটিশ শাসনামলের ন্যায় পাকিস্তান আমলে ও বৃটিশ আদলে ব্যাংক স্থাপনের উদ্যোগ বাস্তবায়িত হয়।

ভারত বিভিক্তির মাধ্যমে ১৯৪৭ সালে পাকিস্তান রাষ্ট্রের জন্মের পর ১৯৪৮ সালে পাকিস্তানের কেন্দ্রীয় ব্যাংক হিসেবে স্টেট ব্যাংক পাকিস্তান প্রতিষ্ঠিত হয়। পরবর্তীকালে ১৯৪৯ সালে ন্যাশনাল ব্যাংক অব পাকিস্তান নামে একটি বাণিজ্যিক ব্যাংক প্রতিষ্ঠা করা হয়। পাকিস্তানে মোট ৩৬টি বাণিজ্যিক ব্যাংক কর্মরত ছিল যার মধ্যে তৎকালীন পূর্ব পাকিস্তানে শুধু ন্যাশনাল ব্যাংক অব পাকিস্তান, হাবিব ব্যাংক এবং অস্ট্রেলেশিয়া ব্যাংকের একটি করে শাখা ছিল। দি ইউনাইটেড ব্যাংক, ইউনিয়ন ব্যাংক, স্ট্যান্ডার্ড ব্যাংক এবং কমার্স ব্যাংক নামে চারটি পাকিস্তানী ব্যাংক ১৯৫৯-১৯৬৫ সময়কালে বাংলাদেশ অঞ্চলে ব্যাংকিং ব্যবসায় পরিচালনা করে। পূর্ব পাকিস্তানের নাগরিকদের মালিকানাধীন ঢাকায় প্রধান কার্যালয় সমেত মাত্র ২টি ব্যাংক ছিল। ব্যাংক দুটি হচ্ছে ইস্টার্ন রিফাইনারী মার্কেন্টাইল ব্যাংক লিঃ পরবর্তীতে পূবালী ব্যাংক (১৯৫৯) এবং ইস্টার্ন ব্যাংকিং কর্পোরেশন লিঃ পরবর্তীতে উত্তরা ব্যাংক (১৯৬৫)।

সুতরাং, দেশ ও জাতির উন্নয়ন, জাতীয় অর্থনীতিকে সমৃদ্ধশালী ও গতিশীল করা তথা আপামর জনসাধারণের আর্থ-সামাজিক অবস্থার উন্নয়নের ব্রত নিয়ে নয়, লুণ্ঠন, নিজেদের আর্থিক স্বার্থ ও শোষণের পথ সুগম ও সহজতর করতেই ঔপনিবেশিক আমলে ব্যাংক ব্যবস্থা প্রবর্তন করা হয়। সেই সাথে তাদের তাবদারি করে এমন কোন ব্যক্তি, পরিবার, গোষ্ঠী, প্রতিষ্ঠান ও সম্প্রদায়কে সব রকম সুবিধা দিয়ে সমাজে বিভেদ ও বৈষম্য সৃষ্টি করে স্বার্থ উদ্ধারের একটি কৌশল হিসেবে ব্যাংক ব্যবস্থার প্রচলন করা হয়। ফলে, ঔপনিবেশিক আমলে অর্থনীতির কারিগর সাধারণ কৃষক, দরিদ্র, শ্রমজীবী মানুষের কল্যাণে কোন ব্যাংক প্রতিষ্ঠা করা হয়েছে সম্ভবত: এমন নজির একটিও।

### গ. বাংলাদেশের ব্যাংকিং ব্যবস্থা :

বাংলাদেশের ব্যাংকিং ব্যবস্থা পাকিস্তান হতে উত্তরাধিকার সূত্রে প্রাপ্ত ১১৩০টি শাখা নিয়ে এর কার্যক্রম শুরু করে। স্বাধীন বাংলাদেশের সরকার বিদেশী ব্যাংক ব্যতীত বাংলাদেশে কর্মরত সহ পাকিস্তানী মালিকানাধীন ব্যাংক অধিগ্রহণ করে। অতঃপর, ১৯৭২ সালের ব্যাংক জাতীয় করণ আদেশের মাধ্যমে বাংলাদেশী মালিকানাধীন ২টি ব্যাংক সহ অধিকৃত ১০টি পাকিস্তানী ব্যাংকের একত্রীকরণের মাধ্যমে ৬টি স্বতন্ত্র ব্যাংক গঠন করে। নতুন নামকরণকৃত ও পুনর্গঠিত ব্যাংকগুলো হচ্ছে দ্য ন্যাশনাল ব্যাংক পাকিস্তান, দ্য ব্যাংক অব জহওয়ালপুর এবং দ্য প্রিমিয়ার ব্যাংকের সমন্বয়ে সোনালী ব্যাংক, হাবিব ব্যাংক ও কমার্স ব্যাংকের সমন্বয়ে অগ্রণী ব্যাংক, দ্য ইউনাইটেড ব্যাংক ও দ্য ইউনিয়ন ব্যাংকের সমন্বয়ে জনতা ব্যাংক, দ্য মুসলিম কমার্শিয়াল ব্যাংক ও দ্য স্ট্যান্ডার্ড ব্যাংকের সমন্বয়ে রূপালী ব্যাংক, দ্য অস্ট্রেলেশিয়া ব্যাংক, দ্য ইস্টার্ন মার্কেন্টাইল ব্যাংকের সমন্বয়ে পূবালী ব্যাংক এবং ইস্টার্ন ব্যাংকিং কর্পোরেশন উত্তরা ব্যাংক নামে রূপান্তরিত হয়। দেশের কেন্দ্রীয় ব্যাংক হিসেবে ১৯৭২ সালে বাংলাদেশ ব্যাংক অর্ডার দ্বারা বাংলাদেশ ব্যাংক প্রতিষ্ঠিত হয়।

১৯৮০ এর দশকে ব্যক্তি খাতে ব্যাংক প্রতিষ্ঠার ধারা সূচনা করা হয়। এরই ধারাবাহিকতায় উত্তরা ব্যাংক এবং পূবালী ব্যাংকে ১৯৮৩ সালে ব্যক্তি মালিকানায় রূপান্তর করা হয়। দ্বিতীয় ও তৃতীয় প্রজন্মের ব্যাংক হিসেবে ইসলামী ব্যাংক বাংলাদেশ লিঃ (১৯৮৩), ইউনাইটেড কমার্শিয়াল ব্যাংক লিঃ (১৯৮৩), দ্য সিটি ব্যাংক লিঃ (১৯৮৩), আরব বাংলাদেশ ব্যাংক (১৯৮৫), আল-বারাকা ব্যাংক লিঃ (১৯৮৩), প্রাইম ব্যাংক (১৯৮৫), ডাচ-বাংলা ব্যাংক লিঃ (১৯৯৬), ওয়ান ব্যাংক (১৯৯৯), ব্যাংক এশিয়া (১৯৯৯) ইত্যাদি ব্যাংক স্থাপন করা হয়।

চতুর্থ প্রজন্মের ব্যাংক হিসেবে ২০১৩-১৪ অর্থ বছরে বেসরকারি খাতে প্রবাসি বাংলাদেশি মালিকানায় ৩টি সহ মোট ৯টি বাণিজ্যিক ব্যাংক স্থাপনের অনুমোদন দেয়া হয়। সাউথ বাংলা কমার্স এন্ড এগ্রিকালচারাল ব্যাংক লিঃ, ইউনিয়ন ব্যাংক লিঃ, মধুমতি ব্যাংক লিঃ, দ্য ফার্মার্স ব্যাংক লিঃ ইত্যাদি নামে ব্যাংক

গুলো তাদের কার্যক্রম শুরু করেছে।

### ৫. দেশের ব্যাংকিং ব্যবস্থার বর্তমান চিত্র এবং মূল্যায়ণ

বর্তমানে দেশে চার ধরনের তফশীলি ব্যাংক রয়েছে। সরকারি মালিকানাধীন বাণিজ্যিক ব্যাংক, বিশেষায়িত ব্যাংক, স্থানীয় বেসরকারি বাণিজ্যিক ব্যাংক এবং বিদেশি বাণিজ্যিক ব্যাংক। ২০১৩-১৪ অর্থ বছরের ডিসেম্বর পর্যন্ত বাংলাদেশে মোট ৫৬টি তফশীলি ব্যাংক রয়েছে যার মধ্যে ৪টি সরকারি মালিকানাধীন বাণিজ্যিক ব্যাংক, ৪টি বিশেষায়িত ব্যাংক, ৩৯টি স্থানীয় বেসরকারি বাণিজ্যিক ব্যাংক এবং ৯টি বিদেশি বাণিজ্যিক ব্যাংক রয়েছে। এ সকল ব্যাংক ৮৬৮৫ টি শাখার মাধ্যমে তাদের কর্মকান্ড পরিচালনা করছে যার মধ্যে শহরাঞ্চলে ৩৭২৩টি এবং গ্রামাঞ্চলে ৪৯৬২টি অবস্থিত। শতকরা হারে যা যথাক্রমে ৪২.৮৭ ভাগ এবং ৫৭.১৩ ভাগ। মোট রাষ্ট্রীয় মালিকানাধীন বাণিজ্যিক ব্যাংকের শাখার মধ্যে ১২৬৮টি শহরাঞ্চলে এবং ২২৫২টি গ্রামাঞ্চলে অবস্থিত। শতকরা হারে যা ৩৬.০২ ভাগ এবং ৬৩.৯৮ ভাগ স্থানীয় বেসরকারি ব্যাংকের শাখার মধ্যে ২২০৮টি শহরাঞ্চলে ও ১৩৯৪ টি গ্রামাঞ্চলে অবস্থিত শতকরা হারে যা ৬১.৩০ ভাগ এবং ৩৮.৭০ ভাগ। বিশেষায়িত ব্যাংকের শাখার মধ্যে ১৭৮টি শহরাঞ্চলে ১৩১৬টি গ্রামাঞ্চলে অবস্থিত। শতকরা হারে যা ১১.৯১ ভাগ এবং ৮৮.০৯ ভাগ এবং বিদেশি ব্যাংকের ৬৬টি শাখার সবগুলোই শহরাঞ্চলে অবস্থিত। গ্রামাঞ্চলে কোন শাখা নেই। নিম্নে অঞ্চলভিত্তিক ব্যাংক শাখার বিস্তার সারণীর মাধ্যমে দেখানো হলো।

সারণি ৪: অঞ্চলভিত্তিক শাখার বিস্তার

ব্যাংকের ধরণ	ব্যাংকের সংখ্যা	শাখার সংখ্যা			শাখার সংখ্যা ( শতাংশে)		
		শহরাঞ্চলে	গ্রামাঞ্চলে	মোট	শহরাঞ্চলে	গ্রামাঞ্চলে	মোট
রাষ্ট্রীয় মালিকানাধীন বাণিজ্যিক ব্যাংক	৪	১২৬৮	২২৫২	৩৫২০	৩৬.০২	৬৩.৯৮	১০০
বিশেষায়িত ব্যাংক	৪	১৭৮	১৩১৬	১৪৯৪	১১.৯১	৮৮.০৯	১০০
বেসরকারি বাণিজ্যিক ব্যাংক	৩৯	২২০৮	১৩৯৪	৩৬০২	৬১.৩০	৩৮.৭০	১০০
বিদেশি ব্যাংক	৯	৬৯	০	৬৯	১০০	০	১০০
মোট	৫৬	৩৭২৩	৪৯৬২	৮৬৮৫	৪২.৮৭	৫৭.১৩	১০০

উৎস : বাংলাদেশ ব্যাংক, ডিসেম্বর, ২০১৩ পর্যন্ত।

ব্যাংকিং কার্যক্রমের মূল্যায়ণে বলা যায়, এদেশের ব্যাংকিং ব্যবস্থায় সর্বত্রই ঔপনিবেশিকতার ভূত কাঁধে চেপে আছে। ঔপনিবেশিক শাসনের ব্যাংকিং কার্যক্রমের পর্যালোচনা করলে জনকল্যাণে ব্যাংকিং পরিচালিত হয়েছে একথা বলার সুযোগ নেই। একই ভাবে তথ্য প্রযুক্তির এই আধুনিক যুগের এই বাংলাদেশেও জনকল্যাণে ব্যাংকিং কার্যক্রম পরিচালনা করার সংস্কৃতি চালু করা সম্ভব হয়নি। বাংলাদেশের ব্যাংকিং এর বর্তমান অবস্থা দেশের অর্থনৈতিক প্রবৃদ্ধি তথা অর্থনৈতিক কাঠামোগত পরিবর্তনের পথে মারাত্মক বাধা হিসেবে কাজ করছে বলাই বোধ হয় যৌক্তিক হবে। ব্যাংকিং খাতের দুর্বল ব্যবস্থাপনার কথা দীর্ঘদিন ধরে শোনা যায়। দুর্বল ব্যবস্থাপনা, অনিয়ম, দুর্নীতির জন্যই প্রকৃত শিল্প উদ্যোক্তা, কৃষক, ব্যবসায়ী ঋণ প্রাপ্তি হতে বঞ্চিত হয়ে আসছে এবং স্বজনপ্রীতি, আর্থিক অনিয়ম, রাজনৈতিক হস্তক্ষেপ, পেশীশক্তির কাছে নত হয়ে ব্যাংকগুলো ঋণ প্রদান করে যাচ্ছে। ফলে কৃষি, শিল্প, ব্যবসা বাণিজ্যে ঋণের ব্যবহার যথাযথ না হয়ে বরং বিলাস বহুল জীবন যাপন, আরাম আয়েশ, ভোগ বিলাসে ব্যয়িত হচ্ছে। সঙ্গত কারণেই খেলাপি ঋণের পরিমাণ বেড়েই চলছে।

সম্প্রতি দুর্বল ব্যবস্থাপনার পাশাপাশি অসততা, অনৈতিকতা, ব্যক্তিস্বার্থ ব্যাংকিং ব্যবসার সাথে জড়িয়ে গেছে। ব্যাংকিং প্রথার বাইরে ব্যাংকিং কার্যক্রম পরিচালনা করে জনগণের অর্থ হাতিয়ে নিজেদের পকেট ভারী করছে। জন্ম হচ্ছে হলমার্ক কেলেংকারির মত ভয়াবহ কেলেংকারির। সার্বিক বিবেচনায় অর্থনৈতিক উন্নয়নের পথে ব্যাংকিং সেক্টরের ভূমিকা দিনে দিনে গৌণ হয়ে আসছে অথবা যতটুকু ভূমিকা রাখার

সুযোগ আছে তা করছেন।

সুতরাং এটি স্পষ্ট যে, এদেশের সাধারণ মানুষের ব্যাংকিং সেবা পাওয়ার কোন অবস্থা নেই বললেই চলে। বর্তমান ব্যাংকিং ব্যবস্থার পুরো চিত্র পর্যালোচনা করে আমরা এ সত্যটিই খুঁজে পাব। গত ১২ সেপ্টেম্বর ২০১৪ অর্থমন্ত্রী এ.এম.এ. মুহিত বলেছেন, দেশে মোট সোয়া এক কোটি ব্যাংক হিসাবদারী রয়েছেন। তিনি সাবেক শিক্ষামন্ত্রী এএসএইচকে সাদেকের সপ্তম মৃত্যুবার্ষিকী উপলক্ষে আয়োজিত এক স্মরণ সভায় তিনি এ কথা বলেন। তিনি বলেন, শিক্ষাক্ষেত্রে বেতন দেয়ার ক্ষেত্রে বড় ধরনের একটি চুরির জায়গা ছিল। শিক্ষকদের নামে বেতন তোলা হতো। কিন্তু, শিক্ষকরা সেই বেতন পেতেন না। কর্তা ব্যক্তির সেটা নিয়ে যেতেন। এএসএইচকে সাদেক এটা বন্ধ করেন। এখন বিষয়টাকে খুবই সাধারণ ও সহজ মনে হচ্ছে। কিন্তু তিনি যখন করেছেন, তখন সেটা সহজ ও সাধারণ ছিল না। তিনি বললেন, বেতন নিতে হলে সকল শিক্ষককে একটি করে ব্যাংক অ্যাকাউন্ট খুলতে হবে। মানুষের ব্যাপক আকারে ব্যাংক অ্যাকাউন্ট খুলে দেয়ার ক্ষেত্রে সাদেকের পথযাত্রা আমরা এগিয়ে নিয়ে গেছি।

যদি প্রশ্ন করা হয় অর্থমন্ত্রীর ভাষায় এই সোয়া এক কোটি লোক কারা? ব্যবসায়ী শিল্পপতি, সরকারি চাকুরিজীবীর মত কেবল স্বচ্ছল মানুষকেই ব্যাংক হিসাবদারী হিসেবে খুঁজে পাব। এদেশের সাধারণ দরিদ্র শ্রমজীবী মানুষের ব্যাংকিং সেবা লাভের সুযোগ কোথায়?

ব্যাংকের মালিক কারা হয় এ নিয়েও প্রশ্ন আছে। আসলে ব্যাংকের মালিক হয় কারা? অনেকেই রাজনৈতিক পরিচয় বা রাজনৈতিক তদবিবের মাধ্যমে ব্যাংকের মালিক বনে গেছে। প্রকৃত উদ্যোক্তার হাতে ব্যাংকের মালিকানা আছে এদের সংখ্যা নিতান্তই কম বলা চলে। অধিকন্তু, অবৈধ ও অনৈতিক পন্থায় উপার্জনকারী কালো টাকার মালিক এমন অনেককেই এই তালিকায় পাওয়া যাবে। ফলে দেখা যায়, ব্যাংকিং ব্যবসায়কে অযৌক্তিক ভাবে ব্যবহার করে এই মালিকেরা লাভের পরিমাণ বাড়িয়ে তুলতে মরিয়া হয়ে ওঠে। গত ২৯ অক্টোবর, ২০১৪ দৈনিক সমকাল পত্রিকার ডাচ-বাংলায় ৩২৬ কোটি টাকার বেনামি শেয়ার শিরোনামে একটি প্রতিবেদনে উল্লেখ করা হয়, ডাচ-বাংলা ব্যাংকের প্রতিষ্ঠাকালীন উদ্যোক্তা আবেদুর রশিদ খানের বিরুদ্ধে দীর্ঘদিন ধরে নিজের বড় অঙ্কের শেয়ার অন্যের নামে রাখার তথ্য পাওয়া গেছে। যার নামে শেয়ার কেনেন, তিনিও প্রতিষ্ঠাকালীন উদ্যোক্তাদের একজন। তার নাম আবদুস সালাম। এ দু'জনের মধ্যে লেনদেন নিয়ে বিবাদ হওয়ায় বিষয়টি আদালত পর্যন্ত গড়ালে বেনামি শেয়ার রাখার তথ্য উদ্ঘাটন হয়। শেষ পর্যন্ত উভয়েই আদালতে বেনামি শেয়ার রাখার বিষয়টি স্বীকার করেছেন। এ শেয়ারের বর্তমান বাজার মূল্য ৩২৬ কোটি টাকা। ব্যাংক কোম্পানি আইন অনুযায়ী কোনো ব্যক্তি বেনামি শেয়ার ধারণ করতে পারেন না। কেউ তা করলে তার সমুদয় শেয়ার বাজেয়াপ্ত হওয়ার বিধান রয়েছে। এ কারণে আবেদুর রশিদের নামে-বেনামি ব্যাংকের প্রায় ২২ শতাংশ শেয়ার বাজেয়াপ্ত হতে পারে। এর বর্তমান বাজারমূল্য ৪২৯ কোটি টাকা। শেয়ারবাজার নিয়ন্ত্রক সংস্থা বিএসইসি থেকে পাওয়া তথ্য অনুযায়ী, আবেদুর রশিদের নামে ডাচ-বাংলা ব্যাংকের ৫ দশমিক ২৩ শতাংশ শেয়ার রয়েছে। যার বর্তমান বাজার মূল্য ১০৩ কোটি টাকা। আবদুস সালামের নামে রয়েছে ব্যাংকের ১৪ দশমিক ৮৮ শতাংশ শেয়ার। আবদুস সালামের নামে থাকা আরও প্রায় ২ শতাংশ শেয়ার আদালতের নির্দেশ অনুযায়ী ইতিমধ্যে আবেদুর রশিদের স্বার্থ সংশ্লিষ্ট প্রতিষ্ঠান হরাইজন অ্যাসোসিয়েটসের কাছে হস্তান্তর করা হয়েছে।

জানা গেছে, ১৯৯৩ সালে ডাচ-বাংলা ব্যাংক প্রতিষ্ঠার সময় নিজের বিনিয়োগ গোপন রাখতে আবেদুর রশিদ ব্যাংকটির প্রতিষ্ঠাতা চেয়ারম্যান মোহাম্মদ সাহাবুদ্দিন আহমেদের নিকটাত্মীয় আবদুস সালামের সহযোগিতা নেন। তার নামেই সিংহভাগ শেয়ার ক্রয় করেন। পরে ওই শেয়ারের বিপরীতে লভ্যাংশের

পুরোটা ই আবদুস সালামের মাধ্যমে ভোগ করতেন আবেদুর রশিদ খান। ২০০৭ সাল পর্যন্ত ব্যাংকটি থেকে বার্ষিক লভ্যাংশ হিসেবে ৪ কোটি ৮১ লাখ টাকারও বেশি মুনাফা আবদুস সালামের মাধ্যমে নিয়েছেন আবেদুর রশিদ। ২০০৭ সালে ওয়ান-ইলেভেন পরবর্তী রাজনৈতিক পট পরিবর্তনের প্রেক্ষাপটে আবদুস সালাম ওই শেয়ারের মালিকানা নিজের বলে দাবি করেন এবং মূল মালিক আবেদুর রশিদকে লভ্যাংশ প্রদান বন্ধ করে দেন। নিজে লভ্যাংশ ভোগ করার পাশাপাশি এ সময়ে তিন দফায় তৎকালীন ১০০ টাকা অভিজিত মূল্যের ১ লাখ ৪৮ হাজার ৮৯৬টি শেয়ার ২০ কোটি টাকায় বিক্রি করেন আবদুস সালাম। জানা গেছে, এ টাকায় গুলশানে ফ্ল্যাট ও নিজের ব্যবহারের জন্য গাড়ি কেনেন। এক সময়ের স্বল্প বেতনভোগী হয়েও বোনামে পাওয়া শেয়ারের কিছু অংশের বদৌলতে আজ তিনি কোটিপতি। এই ঘটনা প্রমাণ করে প্রকৃত ব্যাংক ব্যবসায়ীদের ব্যাংকের মালিক হওয়ার সুযোগ নেই বললেই চলে। এমনও দেখা যাচ্ছে একটি ব্যাংকের পুরো কতৃত্ব রয়েছে একজন ব্যক্তি, পরিবার, প্রতিষ্ঠান ও পেশাজীবী সম্প্রদায়ের হাতে। ২১ অক্টোবর ২০১৪ তারিখে দৈনিক প্রথম আলোর এক প্রতিবেদনে বাংলাদেশ ব্যাংকের বরাত দিয়ে উল্লেখ করা হয়, সিটি ব্যাংকে দুই পরিবার থেকে নয় জন, ন্যাশনাল ব্যাংকে এক পরিবারের পাঁচ জন ও প্রিমিয়ার ব্যাংকে চার জন পরিচালক রয়েছে। অথচ ব্যাংক কোম্পানি আইন ১৯৯১( সংশোধিত ২০১৩) অনুসারে ব্যাংকে একক পরিবারের পরিচালকের সংখ্যা সর্বোচ্চ দু'জন থাকার কথা। বাংলাদেশ ব্যাংক বারবার তাগাদা দিয়েও চারটি ব্যাংকের পরিচালনা পরিষদে একক পরিবারের পরিচালকের সংখ্যা দু'জনে নামিয়ে আনতে পারেনি বলে প্রতিবেদনে উল্লেখ করা হয়েছে।

সুতরাং, একেবারে সুনির্দিষ্ট করেই বলা যায়, জনস্বার্থে ব্যাংক প্রতিষ্ঠার কোন পটভূমি এদেশে গড়ে ওঠেনি বরং কতিপয় ব্যক্তি, পরিবার, সম্প্রদায়, পেশাজীবিকে পূর্নবাসন করতে এবং তাদের ব্যাংক ব্যবসায়ের মাধ্যমে লাগামহীন মুনাফা লাভের সুযোগ করে দেয়াই যেন এদেশের ব্যাংকিং ব্যবস্থা গড়ে উঠেছে। আর তাই পত্রপত্রিকায় প্রায়ই দেখা যায়, অধিক হারে সার্ভিস চার্জ, সুদের হার নির্ধারণে অনৈতিক ও অযৌক্তিক ভাবে ব্যাংক ব্যবসায়কে ব্যবহার করা হয়েছে। এমনকি ব্যাংকিং কার্যক্রমের ওপর মালিকদের নিরঙ্কুশ কর্তৃত্ব স্থাপন করে অনেক বড় বড় আর্থিক কেলেঙ্কারী সম্পাদন করছে। একই পরিবারের একাধিক সদস্য একটি ব্যাংকের ওপর পারিবারিক কর্তৃত্ব স্থাপন করে চলছে যা কোনভাবেই কাম্য হতে পারে না। গত ৮ নভেম্বর, ২০১৪ দৈনিক মানব জমিন পত্রিকায় ব্যাংকিং খাতে উদ্বেগ বাড়ছে শিরোনামে এক প্রতিবেদনে উল্লেখ করা হয়, একের পর এক আর্থিক কেলেঙ্কারির ঘটনায় ব্যাংকিং খাতে উদ্বেগ সৃষ্টি হয়েছে। ইতিমধ্যে ধাপে ধাপে প্রায় ৬টি ব্যাংকে পর্যবেক্ষক বসানো হয়েছে। এর মধ্যে বেশি আলোচিত ন্যাশনাল ও মার্কেন্টাইল ব্যাংক। ব্যাংক দু'টিতে মাত্র এক মাসের ব্যবধানে পর্যবেক্ষক বসিয়েছে কেন্দ্রীয় ব্যাংক। সব মিলিয়ে এবার ব্যাংকিং খাতের বাস্তব চিত্র জানতে চায় বাংলাদেশ ব্যাংকের পরিচালনা পর্ষদ। এ লক্ষ্যে সম্প্রতি পরিচালনা পর্ষদের একটি বৈঠক অনুষ্ঠিত হয়েছে। যদিও বৈঠকটি নিয়মিত বৈঠকের অংশ ছিল। তবুও এ বৈঠকজুড়ে স্থান পেয়েছে ব্যাংকিং খাতের নানা অনিয়ম। পর্যালোচনা করা হয় রাষ্ট্রায়ত্ত সোনালী, জনতা, অগ্রণী, রূপালী ও বেসিক ব্যাংকের আর্থিক পরিস্থিতি নিয়ে। চাওয়া হয়েছে ব্যাংকগুলোর আর্থিক পূর্ণাঙ্গ প্রতিবেদন। এ প্রতিবেদন জমা দেয়ার ক্ষেত্রেও কড়াকড়ি আরোপ করা হয়। চলতি সপ্তাহের প্রথম কর্মদিবসে প্রতিবেদনটি জমা দেয়ার নির্দেশনা রয়েছে। সূত্র জানিয়েছে, আর্থিক সূচকের ওপর ভিত্তি করে প্রতি বছর ব্যাংকগুলোর মানদণ্ড নির্ণয় (ক্যামেলস রেটিং) করে বাংলাদেশ ব্যাংক। ব্যাংকগুলোর ওপর একটি মেমো তৈরি করে পরিচালনা পর্ষদে উত্থাপন করা হয়। বৈঠকে ব্যাংকগুলোর খেলাপি ঋণ বেড়ে যাওয়ায় অসন্তোষ প্রকাশ করা হয়।

কেন্দ্রীয় ব্যাংকের সর্বশেষ পরিসংখ্যান অনুযায়ী, গত জুন প্রান্তিকে রাষ্ট্রায়ত্ত সোনালী, জনতা, অগ্রণী ও রূপালী ব্যাংকে মোট খেলাপি ঋণ বেড়ে হয়েছে ১৯ হাজার ৭১৯ কোটি টাকা, যা গত মার্চ প্রান্তিকে ছিল

১৮ হাজার ৬৮৮ কোটি টাকা। খেলাপি ঋণ বেড়ে যাওয়ায় পাশাপাশি ব্যাংক চারটির মন্দ ঋণও বেড়েছে প্রায় এক হাজার কোটি টাকা। গত মার্চ প্রান্তিকে চার ব্যাংকের মন্দ ঋণ ছিল ১৫ হাজার ৯২৪ কোটি টাকা, যা জুন শেষে বেড়ে হয়েছে ১৬ হাজার ৬৪৭ কোটি টাকা। অর্থাৎ মোট খেলাপি ঋণের ৮৫ শতাংশই মন্দ ঋণ। এ মন্দ ঋণের কারণে কাজিহত হারে প্রতিশন সংরক্ষণ করতে পারছে না। শুধু সোনালী ও রূপালী ব্যাংকেরই প্রতিশন ঘাটতি হয়েছে এক হাজার ৩৫৬ কোটি টাকা। মন্দ ঋণ বেড়ে যাওয়ায় সোনালী ও রূপালী ব্যাংকের মূলধন ঘাটতি দেখা দিয়েছে। এর মধ্যে সোনালী ব্যাংকের মূলধন ঘাটতি দেখা দিয়েছে এক হাজার ৫১১ কোটি টাকা ও রূপালী ব্যাংকের ২১৭ কোটি টাকা।

সহজ কথায় এদেশের ব্যাংকিং কাঠামো এমনভাবে দাঁড় করানো যে, তা জনগণের কাছ থেকে অনেক দূরে অবস্থান করে যা কতিপয় ব্যক্তি, পরিবার, প্রতিষ্ঠান, সম্প্রদায়ের ফুলে ফেঁপে উঠতে সহায়ক ভূমিকা পালন করছে। ফলে বৈষম্য, ভেদাভেদ, হিংসা, বিদ্বেষ, বেড়েই চলছে। এদেশের ব্যাংকিং ব্যবস্থায় জনস্বার্থ উপেক্ষিত হলেও ব্যাংকগুলোর লক্ষ্য ও উদ্দেশ্য কাগজে কলমে কোন ঘাটতি আছে বলে মনে হয়না। গত ৭ নভেম্বর, ২০১৪ তারিখে ইসলামী ব্যাংক বাংলাদেশ লিমিটেড গ্রাম ও শহরের বৈষম্য কমিয়ে বিনিয়োগ সম্প্রসারণের মাধ্যমে গ্রামীণ অর্থনীতি শক্তিশালী করতে কাজ করছে বলে এক বিজ্ঞপ্তি প্রকাশ করে যা পরের দিন একটি পত্রিকা প্রতিবেদন প্রকাশ করে। চতুর্থ প্রজন্মের একটি ব্যাংকের অফিসিয়াল ওয়েবসাইটে ব্যাংকের Mission এর প্রথমই উল্লেখ করা হয়েছে, Emancipate our poor people from abject poverty by empowering them with smooth Banking service.

আসলেই কি তাই? একথা সত্য যে, বাণিজ্যিক ব্যাংকগুলো তাদের কার্যক্রম সাধারণ মানুষের কাছাকাছি নিয়ে যাওয়ার সুযোগ আছে। আর এলক্ষ্যে নতুন নতুন অনেক ক্ষেত্র তৈরী করে দরিদ্র শ্রমজীবী মানুষের সঞ্চয় প্রবণতা সৃষ্টি, শিক্ষা, স্বাস্থ্য তথা জীবনমান উন্নয়নে কার্যকর ভূমিকা রাখার সুযোগ আছে। প্রকৃত বিবেচনায় ব্যাংকগুলো সেরকম কোন কাজ করে যাচ্ছে কী? সত্যিকার গ্রামীণ জীবন মান উন্নয়নে ব্যাংক গুলো কতটুকু কাজ করছে? সামগ্রিক বিবেচনায় দেশের ৯০ শতাংশ ঋণই ঘুরপাক খাচ্ছে শহরের মধ্যে। আমানত সংগ্রহে ৮২ শতাংশ আসছে শহরাঞ্চলের শাখাগুলো হতে। বাকী ১৮ শতাংশ আসে গ্রাম থেকে। ব্যাংকের মোট বিনিয়োগের একটি বিরাট অংশ বিনিয়োগ করা হয় ঢাকা ও চট্টগ্রামের দুটি এলাকা হতে। এ থেকেই বোঝা যায়, গ্রাম উন্নয়নে ব্যাংক গুলোর কতটুকু ভূমিকা রাখে।

দেশের উন্নয়ন, দারিদ্র বিমোচন সত্যিই কি ব্যাংকগুলো উৎসর্গীকৃত? এক কথায় উত্তর না। বাস্তবে ব্যাংকের শাখা স্থাপনে শহরে ও গ্রামে ১:১ যে অনুপাত আছে তা যথাযথ অর্থে মানা হচ্ছে না। কতিপয় ডেইরী ফার্ম, পোল্ট্রি ফার্মে অর্থায়ন করে কিংবা ব্যবসায়ীদেরকে অর্থ ঋণ দিয়ে, কাগজে কলমে কৃষি ক্ষেত্রে ঋণ প্রদান করে দেখানো হচ্ছে কৃষি উন্নয়নে এক উল্লেখযোগ্য পরিমাণ অর্থ বিনিয়োগ করা হচ্ছে।

বিশেষ উদ্দেশ্য সাধনে কতগুলো বিশেষায়িত ব্যাংক স্থাপন করা হয়েছে। যেমন- বাংলাদেশ কৃষি ব্যাংক, রাজশাহী কৃষি উন্নয়ন ব্যাংক, গ্রামীণ ব্যাংক ইত্যাদি। এদের কার্যক্রম পর্যালোচনা করলেও আমরা মোটামুটি গতানুগতিক চিত্রই পাবো। কেবল গ্রামীণ ব্যাংকের কতগুলো বিষয় বিবেচনা করলেই এই বিশেষায়িত ব্যাংকগুলোর মূল্যায়ন চিত্র পাওয়া যাবে। গ্রামীণ দরিদ্র মানুষের বিশেষ করে দরিদ্র মহিলাদের সঞ্চয় প্রবণতা সৃষ্টি, ক্ষমতায়ন, উৎপাদনশীল কর্মকাণ্ডে নারীদের অংশীদারিত্ব নিশ্চিত করার লক্ষ্য নিয়ে গ্রামীণ ব্যাংক প্রতিষ্ঠা করা হয় এবং গ্রামীণ দরিদ্র, ভূমিহীন দরিদ্র মহিলাদের অর্থায়ন করে থাকে। দরিদ্র মহিলা নির্বাচনে যে মানদণ্ড নির্বাচন করা হয়েছে অর্থায়নে তা যথাযথ মানা হয় কিনা? নিয়মিত কিস্তি পরিশোধে করতে ব্যর্থ হলে গ্রামীণ ব্যাংকের অনেক সদস্য তাদের সদস্য পদ হারায়। প্রশ্ন হলো, দারিদ্র্য বিমোচন যদিই মূখ্য বিষয় হয়, আর দারিদ্র্যের জন্যই নিয়মিত কিস্তি পরিশোধ করতে



সক্ষম না হলে কোন সদস্যের সদস্য পদ বাতিল করার কাজটি কতটুকু যৌক্তিক? বস্তুত, দরিদ্র মহিলাদের নয় কত দ্রুত ও নিশ্চিত ভাবে রিটার্ন আসবে এই দিক বিবেচনা করেই গ্রামীণ ব্যাংক ঋণ প্রদান করে থাকে।

মোবাইল ব্যাংকিং ধারণাটি বাস্তব সম্মত উপায়ে ব্যবহার করে ব্যাংকিং ব্যবসায়কে গণমানুষের কাছে নিয়ে যাওয়ার সহজতম কাজটি করা হচ্ছেনা। বিভিন্ন কারণে মোবাইল ব্যাংকিং দেশে জনপ্রিয় উঠছে। এখন প্রতি মাসে শত কোটি টাকার লেনদেন মোবাইল ব্যাংকিং এর মাধ্যমে সম্পাদিত হয়ে আসছে। কেন্দ্রীয় ব্যাংক মোট ২৮ টি ব্যাংককে মোবাইল ব্যাংকিং করার জন্য অনুমোদন দিয়েছে যার মধ্যে ১৯ টি ব্যাংক এ সেবা চালু করেছে। প্রতি দিন গড়ে ২৫০ কোটি টাকা মোবাইল ব্যাংকিং এর মাধ্যমে লেনদেন হচ্ছে। মোবাইল ব্যাংকিং এর মাধ্যমে তথ্য প্রযুক্তির সাথে সাথে ব্যাংকিং কার্যক্রমকে গণমানুষের ব্যবহার সুযোগ রয়েছে। মোবাইল ব্যাংকিং বর্তমান চিত্র পর্যালোচনা করলে দেখা যায় লেনদেন প্রতি যে ফি আদায় করা হয় তাতে গণমানুষের কল্যাণের বিষয়টি সমর্থন করেনা।

আর সবচেয়ে বড় বিষয় দুর্নীতি, অনিয়ম, অবস্থাপনায় ব্যাংকিং খাত আজ ডুবতে বসেছে। গত ১৬ জুন, ২০১৪ তারিখে প্রথম আলো পত্রিকায় দুর্নীতি সর্বত্র, ব্যাংক খাত ভেঙ্গে পড়েছে শিরোনামে একটি বিশেষ প্রতিবেদন প্রকাশ করা হয়। তাতে উল্লেখ করা হয়, চলতি ২০১৩-১৪ অর্থ বছরের সম্পূরক বাজেটের ওপর আলোচনা করতে গিয়ে গত ৯ জুন, ২০১৪ বিরোধী দলের সাংসদ কাজী ফিরোজ রশীদ জাতীয় সংসদে বলেন, ব্যাংকিং খাতের দক্ষতা বৃদ্ধির কথা বলেছেন অর্থমন্ত্রী তার বাজেটে। কিন্তু, ব্যাংক খাতে নৈরাজ্য চলছে। দুর্নীতি সর্বত্র ছেয়ে গেছে। ব্যাংক খাত আজ তছনছ হয়ে ভেঙ্গে পড়েছে। বাংলাদেশ ব্যাংক, যাদের দায়িত্ব ব্যাংক খাত তদারক করা, তারা আজ দুর্নীতিতে ডুবে আছে। এক শ্রেণির কর্মকর্তারা দুর্নীতিতে যুক্ত হয়ে পড়ার কারণে কারোর বিরুদ্ধে কোনো ব্যবস্থা নেয়া হচ্ছেনা। সোনালী ব্যাংকে লুটপাট হয়েছে। জনতা ব্যাংক লুটপাট হয়েছে। বেসিক ব্যাংককে ধ্বংস করা হয়েছে। ভারতের সোমনাথ মন্দিরের পর এত বড় দুর্নীতি আর কোথাও হয়নি। সোনালী, জনতা, বেসিকে এত লুটপাট হওয়ার পরও দেখার কেউ নেই।

সুতরাং, আজকের বাস্তবতায় দেশের পুরো ব্যাংক ব্যবস্থাকে চেলে সাজাতে হবে। ব্যাংকিং আইনকে সংস্কার করে যুগোপযুগি ও বাস্তব সম্পন্ন করে পুরো ব্যাংকিং কাঠামোতে নতুন রূপ দান করতে হবে যাতে দারিদ্র বিমোচন করে দেশের কাজিত উন্নয়ন সাধন করা যায়। জাতীয় অর্থনীতির প্রাণকেন্দ্র হলো ব্যাংকিং খাত। আর্থিক অন্তর্ভুক্তিকরণ (Financial Inclusion) কর্মসূচির আওতায় গত কয়েক বছরে দেশের অনেক সাধারণ মানুষ ব্যাংক হিসাব খোলার সুযোগ পেয়েছে। তাদের মধ্যে গ্রামের সাধারণ দরিদ্র, কৃষক, বিত্তহীন ও স্কুলের ছাত্র-ছাত্রী ব্যাংক হিসাব খোলার মাধ্যমে আর্থিক লেনদেন করতে হচ্ছে। ক্ষুদ্র ঋণদাতা প্রতিষ্ঠানগুলোর কার্যক্রম ও মোবাইল ব্যাংকিং সেবার মধ্য দিয়ে আর্থিক অন্তর্ভুক্তিকরণে অনেক দূর এগিয়ে এসেছে বাংলাদেশ। বিশেষ করে, দরিদ্র মানুষকে এর আওতায় আনার ক্ষেত্রে সাফল্য এসেছে। সম্প্রতি 'বৈশ্বিক মাইক্রোস্কোপ ২০১৪ : আর্থিক অন্তর্ভুক্তিকরণ পরিবেশ সক্ষমতা' প্রতিবেদন প্রকাশ করে ইকোনমিস্ট ইন্টেলিজেন্স ইউনিট (ইআইইউ)। এতে বিশ্বের ৫৫ দেশের মধ্যে বাংলাদেশের অবস্থান ২৯তম এবং প্রাপ্ত স্কোর ১০০-এর মধ্যে ৪৫। ইআইইউর মূল্যায়ন অনুযায়ী আর্থিক অন্তর্ভুক্তিকরণ সক্ষমতায় বাংলাদেশ মাঝের সারিতে রয়েছে। কিন্তু, তার পরেও দেশের মোট জনসংখ্যার বিরাট অংশ ব্যাংকিং সেবার আওতার বাইরে রয়ে গেছে। সরকারি ব্যাংকগুলো দেশের প্রত্যন্ত এলাকায় সাধারণ মানুষকে ব্যাংকিং সেবা দিতে সচেষ্ট থাকলেও সবার জন্য উন্নত ব্যাংকিং সেবা নিশ্চিত করা যায়নি। অর্থনীতিতে স্থিতিশীলতা আনতে তথা টেকসই উন্নয়নে ব্যাংকিং খাতে দক্ষ ব্যবস্থাপনা, কঠোর নজরদারি, শক্তিশালী আইন, প্রযুক্তির যথাযথ ব্যবহার সবই দরিদ্র সাধারণ মানুষের কল্যাণে তথা

জনস্বার্থে পরিচালনা হওয়া জরুরী। দরিদ্র মানুষের কল্যাণে প্রয়োজন দরিদ্র মানুষ সম্পর্কে দৃষ্টিভঙ্গির পরিবর্তন। অপ্রত্যাশিত হলেও সত্য যে, দরিদ্র মানুষ সম্পর্কে আমাদের নেতিবাচক দৃষ্টিভঙ্গির পরিবর্তন করতে পারছিলা বা করার চেষ্টা করছিলা। একজন দরিদ্র মানুষের প্রতি যে দরদ, মমতা, প্রতিশ্রুতি থাকা বাঞ্ছনীয় অনাকাঙ্ক্ষিত হলেও আমাদের তা নেই।

## ৬. গণমুখী ব্যাংকিং ব্যবস্থার স্বরূপ :

কর্মসংস্থান, নগদ সহায়তা, সঞ্চয় প্রবণতা সৃষ্টি, মালিকানা প্রদান করে দারিদ্র বিমোচনে মূলত: বাংলাদেশ ব্যাংককেই পথ প্রদর্শকের ভূমিকা রাখতে হবে। প্রয়োজনে গণমুখী ব্যাংক ব্যবস্থার প্রবর্তন করে কাঙ্ক্ষিত উন্নয়ন সাধনে দেশ ও জনগণের স্বার্থে প্রয়োজনে ব্যাংক গুলোকে অলাভজনক প্রতিষ্ঠান হিসেবে গড়ে তোলা যেতে পারে।

সরকারি হিসেবে দেশের মোট জনসংখ্যা ১৫ কোটি ৫৮ লক্ষ এবং দারিদ্র্যের হার ৩১.৫ শতাংশ। সে হিসেবে দরিদ্র মানুষের মোট সংখ্যা ৪ কোটি ৯০ লক্ষ ৭৭ হাজার (প্রায় ৫ কোটি)। গণমুখী ব্যাংকিং প্রতিষ্ঠার প্রথম পদক্ষেপ হবে এই ৫ কোটি দরিদ্র মানুষকে ব্যাংকিং নেটওয়ার্কের এনে এসকল পরিবারের জন্য শতভাগ আর্থিক নিরাপত্তা বলয় তৈরী করা। কাজটি নিখুঁত ও পরিচ্ছন্নভাবে সম্পাদন করতে একটি দারিদ্র্য শুমারি সম্পন্ন করা যেতে পারে। একটি ডিজিটাল তথ্য ভান্ডার তৈরী করে দরিদ্র মানুষ নির্বাচন কাজটি সহজতর, শতভাগ স্বচ্ছ এবং দুর্নীতিমুক্ত করা যায়। দরিদ্র মানুষ হিসেবে ভূমিহীন, বাস্তুহারা, দরিদ্র, প্রান্তিক কৃষক, প্রতিবন্ধি, বিধবা, অনাথ, বৃদ্ধ, শ্রমজীবী মানুষসহ সকল অসহায় মানুষকে বিবেচনা করতে হবে। সকল দরিদ্র মানুষকে ব্যাংকিং নেটওয়ার্কের আওতায় নিয়ে আসার কাজটি সহজ নয়। একই সাথে এক বা দুই বছরে সকল দরিদ্র মানুষের জন্য এই সুযোগ নিশ্চিত করা সম্ভব নয়। এ সত্যটি উপলব্ধি করে প্রথমেই একটি বাস্তব সম্মত, কার্যকর কর্মপরিকল্পনা সম্পাদন করতে হবে।

দেশের সামগ্রিক উন্নয়নে ব্যাংকের ভূমিকা অনস্বীকার্য। দরিদ্র ও প্রান্তিক কৃষক, শোষিত বঞ্চিত শ্রমজীবী মানুষের উন্নয়ন ব্যতীত দেশের কাঙ্ক্ষিত উন্নয়ন সম্ভব নয়। এ সত্য মেনে নিয়ে ব্যাংকিং সেবাকে আরো প্রসার, যৌক্তিক, আধুনিক ও সুসংহত করা জরুরী। বিদ্যমান ব্যাংকিং কাঠামোতে আমূল সংস্কার সাধন করে ব্যাংকিং সেবাকে মানুষের দোর-গোড়ায় পৌঁছাতে হবে। বাণিজ্যিক কার্যক্রমের পাশাপাশি মানুষের কল্যাণ সাধনের বিষয়টি বিবেচনায় নিয়ে ব্যাংকিং সেবাকে গণ মানুষের কল্যাণে ব্যয় করতে হবে। সকল মানুষকে ব্যাংকিং নেটওয়ার্কের আওতায় আনার জন্য স্বপ্রণোদিত হয়ে ব্যাংক গুলোকে এগিয়ে আসতে হবে। গ্রামাঞ্চলের নাম ধরে প্রকৃত অর্থে শহরাঞ্চলে শাখা স্থাপনের পথ সম্পূর্ণ রূপে বন্ধ করতে হবে। দেশের অগণিত বঞ্চিত, দরিদ্র মানুষের জীবনমান উন্নয়নে শুধু অর্থায়ন করে নয়, কর্মসংস্থান, নগদ সহায়তা, শিক্ষা সহায়তা, মালিকানা অংশীদারিত্ব ইত্যাদি বিষয় নিশ্চিত করতে হবে।

একটি ব্যাংক বছরে যে পরিমাণ অর্থায়ন করে তার ন্যূনতম ৪০ শতাংশ দরিদ্র মানুষকে অর্থায়ন করার বাধ্যবাধকতা আরোপ করতে হবে। গণমানুষের কল্যাণ নিশ্চিত করতে গ্রামাঞ্চলে অর্থায়নের পরিমাণ আরো বাড়াতে হবে। ব্যাংকিং কার্যক্রম গণমুখী করতে শহরাঞ্চল ও গ্রামাঞ্চল ধারণা দুটি নতুন করে সংজ্ঞায়িত করতে হবে। এতে শহরাঞ্চল বলতে জেলা ও উপজেলা শহর গুলোকে এবং গ্রামাঞ্চল বলতে জেলা, উপজেলা শহরের নির্ধারিত সীমানার বাইরের এলাকাকে বিবেচনা করা যেতে পারে। ব্যাংকিং সেবা প্রসারে এই সীমানার বাইরে গ্রাম্য বাজার বা গ্রামের শাখা স্থাপন করলেই কেবল গ্রামাঞ্চলে শাখা হিসেবে গণ্য করা যেতে পারে যাতে গ্রামাঞ্চলে শাখা স্থাপনের নামে প্রকৃত অর্থে শহরাঞ্চলে শাখা স্থাপনের পথ সম্পূর্ণ বন্ধ হয়। দরিদ্র কৃষক ও শ্রমজীবী মানুষের জন্য প্রদান করতে ৪০ শতাংশ ঋণকে বিশেষ ঋণ সুবিধা হিসেবে বিবেচনা করতে হবে। জামানত, ঋণ পরিশোধের সময়, কিস্তি প্রদান, ঋণের

আকার, সুদের পরিমাণ ইত্যাদি বিষয়ে অগ্রাধিকার দিতে হবে। এ লক্ষ্যে জামানত- বিহীন ব্যাংক রেট বা তার সামান্য কিছু বেশি সুদের হারে, তিন বছর সময়ে পরিশোধ যোগ্য, জনপ্রতি ন্যূনতম ৫০ হাজার থেকে এক লক্ষ টাকা ঋণ প্রদানের কথা ভাবা যেতে পারে।

কর্মসংস্থানের ক্ষেত্রে দরিদ্র জনগোষ্ঠীকে প্রাধান্য দিয়ে ব্যাংকগুলো এদেশের দারিদ্র্য বিমোচনে গুরুত্বপূর্ণ অবদান রাখতে পারে। এ লক্ষ্য পূরণে নিরাপত্তা কর্মী, পিয়ন ও অন্যান্য কর্মচারী নিয়োগের ক্ষেত্রে দরিদ্র জনগোষ্ঠীর ছেলে- মেয়েকে প্রাধান্য দেয়া যেতে পারে। বর্তমানে অনেক দরিদ্র ঘরের ছেলে মেয়ে উচ্চ শিক্ষা গ্রহণ করে বেকারত্বের অভিশাপ বয়ে বেড়াচ্ছে। ব্যাংকের কর্মকর্তা নিয়োগের ক্ষেত্রে অগ্রাধিকারের ভিত্তিতে তাদের নিয়োগ দেয়া যেতে পারে।

দরিদ্র মানুষের আর্থ-সামাজিক উন্নয়নে ব্যাংকগুলো কর্তৃক পরিচালিত Corporate Social Responsibility (CSR) কার্যক্রম ঢেলে সাজানো যায়। বর্তমান অবস্থা বিবেচনায় বাণিজ্যিক ব্যাংক গুলো বছরে ৬০০ থেকে ১০০০ কোটি টাকা CSR বাবদ ব্যয় করার সুযোগ রয়েছে। বিভিন্ন কার্যক্রমে এ সকল ব্যয় করে থাকে। গণমুখী ব্যাংকিং ধারণা প্রতিষ্ঠিত করতে CSR খাতের ব্যয়ের ক্ষেত্রে যে অনিয়ম হয় তা দূর করে দেশের দরিদ্র অসহায় মানুষকে নগদ সহায়তা হিসেবে প্রদান করার কথা ভাবতে হবে।

প্রতি শাখার জন্য ১০ জন দরিদ্র মানুষকে বিশেষ সম্মানী সদস্য হিসেবে সদস্য নির্বাচিত করার বিধান চালু করতে হবে এবং প্রতিটি সদস্য প্রতি মাসে সম্মানী হিসেবে নির্ধারিত পরিমাণ টাকা প্রদান করা যেতে পারে। বিশেষ সম্মানী সদস্যদের বছরে যে পরিমাণ সম্মানী দেয়া যায় তা হবে দু'জন কর্মকর্তার বেতনের সম পরিমাণ অর্থ প্রদান করেই উল্লেখযোগ্য পরিমাণ দরিদ্র মানুষকে ব্যাংকিং নেটওয়ার্কের আওতায় আনা যায়। প্রতিটি শাখায় বিভিন্ন পদে জনবলের অভাব থাকতে দেখা যায়। শূন্য পদের দৈনিন্দিন কাজ অন্যান্য কর্মকর্তা কর্মচারীদের মাধ্যমে করানো হয়। প্রতিদিনের কাজ সম্পাদন করা হলেও এসকল শূন্য পদের বেতন প্রদান করতে হয়না। ফলে, বিপুল পরিমাণ অর্থ সঞ্চিত থেকে যায়। বিকল্প হিসেবে এই সঞ্চিত অর্থও সম্মানি হিসেবে প্রদান করার কথা ভাবা যেতে পারে।

দরিদ্র ঘরের অনেক মেধাবী ছেলে মেয়ে অর্থের অভাবে পড়াশুনা করতে পারেনা অথবা মান সম্পন্ন শিক্ষা লাভের অধিকার থেকে বঞ্চিত হচ্ছে। শৈশবেই উপার্জনে বাধ্য হওয়া, পিতা-মাতার অসচেতনতা, অনিশ্চয়তা, সামাজিক বঞ্চনা প্রভৃতি কারণে দরিদ্র ঘরের অসংখ্য মেধাবী ছেলে মেয়ে শিক্ষা লাভের অধিকার থেকে বঞ্চিত হচ্ছে। ঝরে পড়া এসকল ছেলে মেয়েদের চিহ্নিত করে তাদের শিক্ষার লাভের অধিকার সুগম করতে প্রাথমিক সমাপনী পরীক্ষার ফলাফলের ভিত্তিতেই বৃত্তি প্রদান এবং সহজ শর্তে শিক্ষা ঋণ চালু করার বাধ্যবাধকতা চালু করতে হবে।

মোবাইল ব্যাংকিং সেবাকে দরিদ্র মানুষের কল্যাণে ব্যয় করার সুযোগ রয়েছে। দরিদ্র মানুষের কল্যাণে মোবাইল ব্যাংকিংকে আরও যৌক্তিক করা যেতে পারে। এলক্ষ্যে প্রাথমিক অবস্থায় পাঁচ কোটি দরিদ্র মানুষের জন্য মোবাইল ব্যাংকিং আওতায় আনতে একটি নির্দিষ্ট পরিমাণ হিসাব খোলত হবে যে হিসাবগুলোতে ন্যূনতম রেটে টাকা স্থানান্তরের সুযোগ দিয়ে তাদের আয়ের একটি সুযোগ দেয়া যেতে পারে। ন্যূনতম রেটে অর্থ স্থানান্তরের সুযোগ প্রদানে ব্যাংক ও মোবাইল অপারেটর গুলো একযোগে এগিয়ে আসতে পারে।

বিশেষায়িত ব্যাংকগুলোকে কেবল দরিদ্র মানুষের কল্যাণে ব্যাংকিং কার্যক্রম পরিচালনার নিশ্চয়তা নিশ্চিত করতে হবে। এলক্ষ্যে কর্মসংস্থান থেকে শুরু করে ব্যাংকিং কার্যক্রমের সকল পর্যায়ে প্রকৃত দরিদ্রদের অংশীদারিত্ব নিশ্চিত করতে হবে। বিশেষায়িত ব্যাংক গুলোকে বাণিজ্যিক কার্যক্রম পরিচালনা

এবং অদরিদ্রদের অর্থায়নের সুযোগ সম্পূর্ণরূপে বন্ধ করতে হবে। বিশেষ উদ্দেশ্য সাধনে প্রতিষ্ঠিত এসকল ব্যাংকের ব্যাংকিং কার্যক্রমের ১০০ শতাংশ ব্যাংকিং দরিদ্র মানুষের জন্য এবং মোট শাখার ৯৫ শতাংশ গ্রামে এবং ৫ শতাংশ শহরে স্থাপন করতে হবে।

ব্যাংকিং খাত দরিদ্র মানুষের জন্য আলাদা কর্মসংস্থান সৃষ্টি করে ৩০ থেকে ৪০ হাজার মানুষকে দারিদ্র্যের বলয় থেকে বের করে আনতে পারে। পথ প্রদর্শক হিসেবে বাংলাদেশ ব্যাংক কেবল দরিদ্র মানুষের কর্মসংস্থান হিসেবে ৫ হাজার মানুষকে এবং বাণিজ্যিক ব্যাংকগুলো প্রতি শাখার জন্য ন্যূনতম ৩ জনের কর্মসংস্থানের সুযোগ সৃষ্টি করে প্রায় ৩০ হাজার দরিদ্র মানুষের কর্ম সংস্থানের জন্য এগিয়ে আসতে হবে। অন্যান্য আর্থিক প্রতিষ্ঠান এ প্রক্রিয়ায় অংশ গ্রহণ করে কর্মসংস্থানের মাধ্যমে দারিদ্র্য বিমোচনের পথকে আরো সুসংহত ও অর্থবহ করতে পারে।

সঞ্চয় প্রবণতা দরিদ্রদের জন্য বাধ্যতামূলক করে দিতে হবে। সঞ্চয় অর্থের ওপর প্রচলিত হারের চেয়ে অধিক সুদ প্রদান করে দরিদ্র মানুষকে সঞ্চয় করার উৎসাহ সৃষ্টি করতে হবে। যে কোন সরকারি সুযোগ লাভ করতে ব্যাংকে হিসাব খোলা এবং একই সাথে সঞ্চয় করার বিষয়টি বাধ্যতামূলক করতে হবে।

৪০ শতাংশ ব্যাংকিং দরিদ্র মানুষের জন্য নিশ্চিত করে ন্যূনতম ১০ থেকে ১৫ লাখ মানুষকে অর্থায়ন করা সম্ভব। ২০১২-১৩ অর্থ বছরে মোট বিনিয়োগ হয়েছে ৩ লাখ ৪০ হাজার ৩৭০ কোটি টাকা এবং ২০১৩-১৪ অর্থ বছরের জন্য প্রাক্কলন করা হয়েছে ৩ লাখ ৮৭ হাজার ৫১৪ কোটি টাকা। ৪০ শতাংশ হিসেবে ১ লাখ ৪০ হাজার কোটি টাকা অর্থায়নে জনপ্রতি ৫০ হাজার থেকে ১ লাখ টাকা দরিদ্র মানুষের জন্য নিশ্চিত করে ১০ থেকে ১৫ লাখ মানুষকে অর্থায়ন করা যায় অনায়াসেই।

ব্যাংকের CSR বাবদ যে খরচ করে দরিদ্র মানুষকে সরাসরি আর্থিক সহায়তার মাধ্যমে বছরে ১ লাখ মানুষকে পুনর্বাসিত করতে পারে। গত সাড়ে ছয় বছরে এই খাতে ব্যাংকগুলো ১৩০০ কোটি টাকা ব্যয় করেছে। বাংলাদেশ ব্যাংকের Review of CSR Initiatives of Banks 2011 প্রতিবেদন অনুযায়ী ২০১১ সালে বাণিজ্যিক ব্যাংকগুলো CSR বাবদ ২১৮ কোটি ৮৩ লাখ টাকা ব্যয় করেছে। বর্তমানে ৫০০ কোটি টাকার উপরে ব্যয় করার সুযোগ রয়েছে। এই টাকা দারিদ্র্য বিমোচনে ব্যয় করতে প্রতিজনকে মাসে ৫০০০ টাকা সরাসরি প্রদান করে ১ লাখ মানুষকে সহায়তা করা যায়। আর যদি ব্যাংকে নীট লভ্যাংশের ৩০ শতাংশ এই খাতে ব্যয় করার বাধ্যবাধকতা আরোপ করা যায় তাহলে তা ৩ থেকে ৪ লাখ মানুষকে পুনর্বাসিত করা যায়।

গ্রামাঞ্চলের শাখা স্থাপন দরিদ্র মানুষের জায়গায় নিজ অর্থায়নে ঘর করে ব্যাংকগুলো তাদের গ্রামীণ শাখা স্থাপনে আগ্রহী হতে হবে। এতে ভূমি মালিককে নির্ধারিত হারে ভাড়া প্রদান করতে হবে।

প্রতিটি ব্যাংকের প্রিন্ট ও ইলেকট্রনিক মিডিয়ায় ভার্চুয়াল বিজ্ঞাপন নিরুক্তসাহিত করতে হবে। দরিদ্র মানুষের স্বার্থে দরিদ্র পরিবারের শিক্ষিত ছেলে মেয়েদের মডেল করে বিজ্ঞাপন প্রচারে বাধ্য করা যেতে পারে। এ লক্ষ্যে প্রতিটি ব্যাংকে ন্যূনতম পাঁচটি বিজ্ঞাপন এবং প্রতিটি বিজ্ঞাপনে তিনজন মডেল নির্ধারণ করে তাদের প্রচলিত হারে সম্মানি প্রদান করে।

এভাবে দরিদ্র মানুষের বাধ্যতামূলক সঞ্চয় সৃষ্টি, শিক্ষা সহায়তা সহ বিভিন্ন উপায়ে ৫ থেকে ১০ লাখ দরিদ্র মানুষকে ব্যাংকিং সেবায় সম্পৃক্ত করার একটি স্বল্প মেয়াদি কর্মপরিকল্পনা প্রণয়ন করা যেতে পারে।

সুতরাং, ব্যাংকিং কার্যক্রমকে গণমুখী করতে একটি বাস্তব সম্মত কর্ম পরিকল্পনা দাঁড় করাতে হবে যাতে করে ৩ থেকে ৫ বছরের মধ্যে সকল দরিদ্র মানুষকে ব্যাংকিং নেটওয়ার্কের আওতায় আনা এবং ৫ থেকে ১০ বছরের মধ্যে দেশকে শতভাগ দারিদ্র্য মুক্ত করতে ব্যাংকিং খাত মুখ্য ভূমিকা রাখতে পারে।

কর্মসংস্থানের ক্ষেত্রে দরিদ্র ঘরের শিক্ষিত ও যোগ্য বেকার যুবক, অর্থায়নের ক্ষেত্রে কর্মক্ষম দরিদ্র কৃষক, অর্ধ শিক্ষিত যুবক, বর্গাচাষী, প্রান্তিক কৃষক, ক্ষুদ্র ব্যবসায়ী, নগদ সহায়তার ক্ষেত্রে বৃদ্ধ, অসহায়, প্রতিবন্ধি, অনাথ শিশু ও নারীদের প্রধান্য দিতে হবে।

## ৭. সুপারিশমালা

দেশের প্রতিটি মানুষকে ব্যাংকিং কার্যক্রমের আওতায় আনতে গণমুখী ব্যাংকিং প্রতিষ্ঠা করতে হবে। আর তার মধ্যে প্রথম অগ্রাধিকার হবে দ্রুততম সময়ে দেশের ৫ কোটি দরিদ্র মানুষকে ব্যাংকিং কার্যক্রমের সাথে সম্পৃক্ত করা। আর তা করতে কতগুলো ব্যাংক স্থাপন করা দরকার, কতগুলো শাখা স্থাপন করতে হবে, কতগুলো শাখা শহরে, কতগুলো গ্রামে স্থাপন করতে হবে, শাখা স্থাপনে কোন কোন এলাকাকে প্রধান্য দিতে হবে? - সে বিষয়ে একটি সুন্দর, সুনির্দিষ্ট কর্মপরিকল্পনা প্রণয়ন করতে হবে। এটি সত্য যে, দেশের উন্নয়ন সাধন করতে সংকচিত ব্যাংকিং নয়, প্রয়োজন সম্প্রসারণশীল ব্যাংকিং ব্যবস্থা। একটি সত্যিকার গণমুখী ব্যাংকিং ব্যবস্থা প্রতিষ্ঠিত করতে কতিপয় সুপারিশমূলক প্রস্তাব নিম্নে উপস্থাপন করা হলো।

i. প্রতিটি ব্যাংকের ব্যাংকিং কার্যক্রমের ন্যূনতম ৪০ শতাংশ এবং লভ্যাংশের ন্যূনতম ৩০ শতাংশ দরিদ্র জনগোষ্ঠীর ভাগ্যে-ন্নেয়নে ব্যয় করতে হবে।

ii. Corporate Social Responsibility বা CSR কার্যক্রমকে শতভাগ দরিদ্র মানুষের কল্যাণে ব্যয় করতে হবে। এই কার্যক্রমকে সুনির্দিষ্ট ও স্পষ্ট করতে সরাসরি নগদ সহায়তা করে দরিদ্র মানুষের জীবন-মান উন্নয়নে অবদান রাখতে হবে।

iii. প্রতি বছর ব্যাংকগুলো তাদের লভ্যাংশের একটি নির্ধারিত অংশ প্রদান করে পাঁচ বা দশ বছরের একটি বড় ফান্ড গঠন করতে পারে, যে ফান্ড দরিদ্র মানুষের কল্যাণে ব্যয় করা যেতে পারে।

iv. ১ : ৩ হারে শহর গ্রামাঞ্চলে শাখা স্থাপনে দেশী, বিদেশী সকল ব্যাংকে বাধ্য করা যেতে পারে। এ লক্ষ্যে প্রতিটি ব্যাংকে এক বছরের মধ্যে এই অনুপাতে গ্রামাঞ্চলে শাখা স্থাপন নিশ্চিত করতে হবে।

v. দারিদ্র্য বিমোচনের সকল কার্যক্রম তথা সামাজিক নিরাপত্তা বেটনী, উন্নয়ন প্রকল্পের শ্রমিকের মুজুরী প্রদান, শিক্ষা লাভ, দক্ষ জনশক্তি গঠন, বিদেশ গমন প্রভৃতিতে সহায়তা করার জন্য বাণিজ্যিক ব্যাংকগুলোকে এগিয়ে আসতে হবে। দরিদ্র মানুষের ছেলে মেয়েদের উচ্চ শিক্ষা নিশ্চিত ও নিরাপদ করতে শিক্ষা বৃত্তি, স্বল্প সুদে দীর্ঘ মেয়াদী ও যৌক্তিক পরিমাণ শিক্ষা ঋণ প্রদানের ব্যবস্থা করতে হবে।

vi. প্রতিটি দরিদ্র মানুষের অংশীদারিত্ব নিশ্চিত করে উন্নয়ন ব্যাংকে নামে একটি বিশেষায়িত ব্যাংক স্থাপন করা যেতে পারে। অথবা পল্লী সঞ্চয় ব্যাংক কাঠামোকে এমনভাবে দাঁড় করাতে হবে যাতে দেশের প্রতিটি দরিদ্র মানুষ এ ব্যাংকের সদস্য হয় এবং ব্যাংকের সহায়তায় আর্থ-সামাজিক অবস্থার উন্নয়নের সুযোগ লাভ করে। এই ব্যাংক সকল দরিদ্র মানুষকে সম্পৃক্ত করে একাধারে বিশেষায়িত ব্যাংক, বাণিজ্যিক ব্যাংক, মোবাইল ব্যাংক, গবেষণা, প্রশিক্ষণ, দক্ষতা বৃদ্ধি, মানব সম্পদ উন্নয়নসহ দরিদ্র জনগোষ্ঠীর সমস্যা নির্ধারণ ও সমাধানে কাজ করে যাবে। দরিদ্র মানুষের আর্থিক নিরাপত্তা বলয় হিসেবে এই ব্যাংক অভিভাবক হিসেবে কাজ করবে। একই সাথে গ্রীণ ব্যাংকিং, স্কুল ব্যাংকিং ইত্যাদি কার্যক্রমকে আরো কার্যকর করে দরিদ্র মানুষের স্বার্থে ব্যবহার করতে হবে।

vii. দারিদ্র- বিমোচনের স্বার্থে ব্যাংকিং আইনে ত্রুটি থাকলে তা দূর করে বিদ্যমান আইনকে সংস্কার করে বাস্তব সম্মত, যৌক্তিক ও গণমুখী করা যেতে পারে।

viii. ভূমিহীন, বাস্তুহারা দরিদ্র মানুষের ভূমি অধিকার নিশ্চিত করতে ব্যাংকগুলো এগিয়ে আসতে পারে। ভূমি অধিকার মানুষের জন্মগত অধিকার- অথচ, এদেশের অগণিত মানুষ ভূমিহীন, বাস্তুহারা। এসকল মানুষের ভূমির অধিকার নিশ্চিত করেই তবে দারিদ্র্য বিমোচনের কথা ভাবতে হবে। তাদের সে অধিকার প্রতিষ্ঠিত করতে নগদ সহায়তা, মামলা খরচ, সচেতনতা বৃদ্ধি করতে ব্যাংকগুলো এগিয়ে আসতে পারে।

ix. গণমুখী ব্যাংকিং কার্যক্রম তদারকি করতে বাংলাদেশ ব্যাংকের আলাদা সেল থাকতে হবে। এই সেল অত্যন্ত দক্ষতা ও স্বচ্ছতার সাথে তাদের তদারকি করবে যাতে কোন অবস্থাতেই একটি ব্যাংক তাদের কাজে ন্যূনতম ফাঁকি দেওয়ার সুযোগ না পায়।

x. ব্যাংকিং কার্যক্রম সম্পাদন করে অনেক ব্যাংক জাতীয় আন্তর্জাতিক পর্যায়ে পুরস্কার লাভ করেছে। বিভিন্ন মানদণ্ড বিবেচনায় এ সকল পুরস্কার লাভ করে। এখানে একটি বিষয় লক্ষ্যণীয়, জনগণ থেকে বিচ্ছিন্ন থেকেও এ সকল ব্যাংক বিভিন্ন পুরস্কারে ভূষিত করে। এই সংস্কৃতির পরিবর্তন জরুরী। পুরস্কার লাভে প্রথম মানদণ্ড হবে জনসম্পৃক্ততা। সাধারণ জনগণ থেকে বিচ্ছিন্ন থেকে অন্য যে কোন পর্যায়ে দক্ষতা দেখিয়ে পুরস্কার লাভ করা সম্পূর্ণ বন্ধ করতে হবে।

xi. ১০ থেকে ২০ জন উদ্যোক্তা পরিচালকের হাতে একটি ব্যাংকের মালিকানা প্রদানের সংস্কৃতি সম্পূর্ণ বন্ধ করতে হবে। একই সাথে একই পরিবারের একাধিক সদস্য উদ্যোক্তা পরিচালক হওয়া, একই ব্যক্তি বা প্রতিষ্ঠান একাধিক ব্যাংকের মালিক হওয়ার সুযোগও বন্ধ করতে হবে।

xii. প্রতিটি ব্যাংকের প্রতিটি শাখাকে নির্দিষ্ট পরিমাণ দরিদ্র মানুষের জন্য ব্যাংকিং পরিচালনার বাধ্যবাধকতা আরোপ করতে হবে।

xiii. গণমুখী ব্যাংকিং ব্যবস্থা প্রতিষ্ঠায় মিডিয়া একটি গুরুত্বপূর্ণ ভূমিকা রাখতে পারে। ব্যাংকিং কার্যক্রমকে গণমুখী করতে কি কি ব্যবস্থা গ্রহণ করা যেতে পারে, কোন কোন ব্যাংক এ কার্যক্রমে এগিয়ে আসছে বা পিছিয়ে যাচ্ছে ইত্যাদি বিষয় গুলো জনসমক্ষে তুলে ধরতে মিডিয়া অগ্রণী ভূমিকা রাখতে পারে।

এভাবে বিভিন্ন উপায়ে দরিদ্র মানুষের ভাগ্যে উন্নয়নে ব্যাংকগুলো কাজ করতে পারে। ব্যাংকগুলোকে গতানুগতিক কার্যক্রম হতে বের হয়ে দরিদ্র মানুষের কল্যাণে কাজ করে কর্মসংস্থানের মাধ্যমে, ঈর্ষাজ এর মাধ্যমে, বিশেষ সম্মানী সদস্য নির্ধারণের মাধ্যমে, বিজ্ঞাপন চিত্র নির্মাণ, ভাড়া প্রদানের মাধ্যমে বিপুল পরিমাণ দরিদ্র মানুষকে দারিদ্র্যের অভিশাপ হতে মুক্ত করতে পারে। আর বিশেষ ঋণ, শিক্ষা ঋণ প্রভৃতি সুযোগ সৃষ্টি করে দারিদ্র্য বিমোচনের পথকে সহজতর করতে পারে। ব্যাংকিং কার্যক্রমকে গণমুখী, কল্যাণমুখী করে স্বল্প সময়ে দেশের দারিদ্র্য-বিমোচনে কার্যকর ভূমিকা রাখতে পারে।

## ৮. শেষ কথা :

ব্যাংকগুলোকে গণমুখী করতে আমাদেরকে প্রথমেই যথাযথ উদ্যোগ নিতে হবে, পরিবর্তন করতে হবে মন-মানসিকতার। সনাতনী ও পশ্চাদগামী দৃষ্টিভঙ্গির পরিবর্তন তথা ঔপনিবেশিক ধ্যান-ধারণা থেকে বেরিয়ে আসতে হবে। ব্যাংকিং খাতের অনেক উন্নয়ন হয়েছে বলা হচ্ছে, এখনো হচ্ছে। প্রশ্ন হলো, সাধারণ দরিদ্র জনগোষ্ঠীর জীবনমান উন্নয়নে ব্যাংকিং খাত কি করেছে? উন্নয়ন একটি চলমান প্রক্রিয়া বিধায় এখাতের আরো অনেক উন্নয়ন হবে। বাস্তব সত্য হলো, ব্যাংকিং সেবা সাধারণ জনগণের জন্য নিশ্চিত না করে এই খাতের উন্নয়ন পরিপূর্ণতা পেতে পারেনা। রূপকল্প ২০২১ বাস্তবায়ন, দারিদ্র্য বিমোচন বা টেকসই উন্নয়ন যাই বলি না কেন গণমুখী ব্যাংকিং ব্যবস্থা প্রবর্তন একটি মৌলিক বিষয়।

উন্নত দেশগুলোর অর্থনৈতিক ইতিহাস পর্যালোচনা করে এই সত্যটিই খুঁজে পাব। রূপকল্প ২০২১ বাস্তবায়নের কথা বলা হলেও গণমুখী ব্যাংকিং ব্যবস্থা প্রবর্তনের বিষয়টি কোথাও উচ্চারিত হচ্ছে বলে মনে হয়না- অথচ, বাস্তব সত্য হলো গণমুখী ব্যাংকিং ব্যবস্থা নিশ্চিত করেই তবে টেকসই উন্নয়নের কথা ভাবতে হবে। এলক্ষ্যে রাজনীতিবিদ, সুশীল সমাজ, অর্থনীতিবিদ, জনপ্রশাসন, মিডিয়া, ব্যাংক মালিক, ব্যাংকারসহ সকল সচেতন মানুষকে এ বিষয়ে সোচ্চার হতে হবে।

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## **Black Money: A Curse of the Nation**

**Paresh Chandra Modak\***

### **1. Introduction**

Ever since the Second World War, a perceptible decline in ethical and moral values has been occurred all over our planet. The results are soaring crime, dishonesty, drug addiction and corruption. While these ills afflict the entire globe, they are particularly virulent in the Third World; their economic consequences are also destructive in a developing country.

The developed world indeed suffers from some corruption, but in the underdeveloped world the degradation is beyond description. One measure of this corruption is popularly known as black money, which is a misnomer because money earned is neither black nor white. It is either earned honestly or dishonestly. Dishonest income or wealth is what popularly called black money, black income, unaccounted income, dirty money, underground wealth, parallel economy, shadow economy, unofficial economy, and black wealth; in reality it is corrupt money.

The phenomenon of corrupt money is a curse on the Third World. It effectively destroys all efforts and planning designed to eradicate poverty. A simple example will tell us how.

Since the end of Second World War, the Third World has received billions of dollars of loans and aid money from the developed world. If this money has been properly utilized, much of the poverty would have been vanished by now. Instead, so much of this money went into pockets of the officials and political leaders, who became rich enough to open Swiss bank accounts that the underdeveloped world is now stuck with a trillion dollar debt, and its citizens are living in hopeless conditions. Such are the conditions of the corrupt money syndrome. We observed the same syndromes in Bangladesh since liberation in 1971.

Government of Bangladesh have regularly condemned the corrupt money, perhaps because the problem is among the worst in the country and is growing first; but it should be remembered that black money infects the entire Third World and to

\* Professor and Dean, Faculty of Agricultural Economics & Rural Sociology, Bangladesh Agricultural University, Mymensingh.



some extent, the developed world.

The corrupt money i.e. shadow economy or parallel economy which may be defined in terms of all transactions intentionally left undocumented. Intentional undocumented is important here, because thousands of transactions go unreported in the normal course of business. But only those willfully unreported, either to avoid taxes or to hide the sources of income and wealth, constitute the shadow money.

The term 'Shadow' does not imply that this alternative economy operates independently of its regular counterpart. On the contrary, the two are closely meshed. Whenever the paying party uses legally earned, properly documented money and receiving party fails to record its receipt in any transaction, the shadow economy swells by that amount. Of course, the reverse scenario results in a corresponding shrinkage of the shadow money. Incidentally, this suggests that the growth of the parallel economy can be estimated simply from the discrepancy between expenditure and income figures in national accounts.

## ***2. Review of Estimates of the Corrupt Money***

Since our concern is primarily with the size of the black economy, we would like to have an estimate of the amount of corrupt wealth outstanding at a point in time. However, it is very hard to measure. Therefore, almost all estimates of the shadow economy focus on black incomes are actually measures of the growth of the shadow economy rather than of its absolute size at any time.

Even this modest endeavor seems condemn from the start. The shadow economy is a hidden arena whose operation is completely undocumented. A direct and accurate measurement of this problem is clearly impossible. Missing data is a common feature. Consequently, the estimate is always an approximation to the actual value. That's why, in all cases of estimation at some stage of computation, missing data is replaced by conjecture. Clearly, the quality of these estimates rests on the validity of these conjectures.

Nicholas Kaldor (1954) was the first who reported on Indian Tax Reform that the transactions are suppressed primarily for the purpose of tax evasion. He assumed that most of the earnings are corrupt money due to inclusion of non-salaried incomes (profit, interest, rent, and self-employed income) that was above the tax-exemption limit whereas salaried incomes would have already been taxed at source. Using these assumptions i.e. excluding salaries and wages, he estimated what should be the taxable non-salaried income. He then compared this estimate with the non-salaried income actually assessed to tax. The difference was his measure of corrupt income for that year.

This method was accepted by the Direct Taxes Enquiry Committee (also known as Wanchoo Committee) with some structural changes. However, the Committee

computed black income only for the year 1961-62 and 1965-66 and the figures were Rs. 811 crore and 1000 crore respectively on which tax was evaded. Projecting this estimate further to 1968-69, he estimated black income amounting Rs. 1800 crore over the income which escaped income tax.

Rangnekar argued that the structural changes made by WC's methodology had led to an underestimation of black incomes and offered an alternative estimates that were on the average about 3% higher than those of the committee. According to him, tax-evaded income for 1961-62 was Rs. 1150 crore as compared to WC's estimate of Rs. 811 crore. For 1965-66, it was 2,350 crore against 1000 crore estimated by the WC. The projections for 1968-69 and 1969-70 were 2833 crore and 3080 crore respectively.

O. P. Chopra used the Wanchoo method with some modifications to estimate unaccounted incomes for a period of 18 years, i.e. 1961-62 to 1977-78. Chopra's methodology marked a significant departure from the WC. The crucial finding of his study was that the ratio of uncounted income to GNP went up, whereas the WC assumes this ratio to have remained constant. As a consequence, after 1973-74, there was wide divergence between the estimates of the WC and those of Chopra. According to Chopra, tax evasion is more at high rate of tax. He also observed that increase in price lead to an increase in unaccounted income. Further, he gave a significant finding that funds were diverted to non-taxable agricultural sector to convert black income into legal (white) income. However, Chopra's estimates were unexpectedly pleasant. As a fraction of GNP, black income grew by only 4.4% over the 18 year period from 6.1% in 1961-67 to 10.5% in 1977-78.

It is noted that Kaldor's method is the basis of all these estimates. But the conjecture involved in each case is quite different. For setting the conjecture, the analyst requires a large leap of imagination, explaining the significant difference in estimates generated by this method.

In 1979, Feige proposed an alternative estimation technique that is not only theoretically much sounder than Kaldor's but also less demanding on the analyst's imagination. The technique is based on two relationships, the first was an identity and the second was a behavioral specification.

If all transactions are paid for by cash or check ( collectively called MI) are added up, their sum should equal to the nominal value of total economic activities, both legal and illegal. If we hypothesize that the turnover rate of money remains roughly unchanged over time, the ratio of total transactions to actual GNP must remain more or less constant. Therefore, if the ratio of MI to reported GNP were to increase significantly over time, it must mean that the reported GNP is falling below actual GNP, i.e. the black economy is expanding.

For this technique to become operational, two informational requirements have to be met. First, it is essential to have data on the total volume of transactions for the

year under study. Second, one needs an estimate of the true ratio of the money supply to actual GNP. This is where the analyst's conjecture comes in. The analyst should select a bench mark where the black activity was low i.e. the reported GNP reflected the true GNP against which to measure future ratios. This is the hypothesis in the model.

This technique was first applied to Indian data in 1982 by P. Gupta and S. Gupta. They selected the years 1949-50, 1950-51 and 1951-52 to provide them with a reference ratio because of their conjecture that in these years, following the black market era of WWII and preceding the planning era starting in 1952, the black economy was at its weakest. Using the average ratio for these three years, they proceeded to compute black incomes for the period 1967-68 to 1978-79. The results were frightening. By their computations, black incomes had grown over this period from a mere 9.5% of GNP to an astonishing 48.8% of GNP. Over a corresponding period, Chopra's estimates using the modified WC method showed an increase from 5.7% to only 10.5%.

National Institute of Public Finance and Policy (NIPFP) conducted a study on black economy in India under the guidance of S. Achaya (1985). The study defined black money as the aggregate of incomes i.e. unaccounted incomes which were taxable but not reported to the tax authority. As there was lack of sufficient data, the NIPFP study abandoned any attempt at providing exact estimates of black income, followed "the minimum estimate approach". In particular, it completely ignored incomes generated in illegal activities like smuggling and bribery despite their obvious significance, because of the difficulties in measuring them. The study considered six well known and easily quantified sources of black income, such as production of goods and services, gains from the sale of assets, export-import activity, and fixed capital formation in the public and private corporate sectors. The study concluded that black income in India was at least 15-18% of GNP in 1975-76, and was 18-21% in 1980-81 as well as in 1983-84. It is interesting to note that this "at least" estimate for 1975-76 is greater than the corresponding estimate based on the WC methodology (10% of GNP).

Besides, Individual methods uses input/output ratio along with the input to calculate the true output. It estimates black money as the difference between the declared output and the output expected on the basis of the input/output ratio. Though this method is simple but useful if applied to a uniform industry or a specific sector of the economy. The assumption is that input/output ratio remains stable in a uniform sector but changes according to its nature. It ignores the structural changes in the economy including those related to technology. So, changing the input/output ratio according to the nature of the sector, this method is likely to be of much helpful.

Another method of estimation of black money is the survey approach wherein

sample surveys are carried out. They may be on the consumption pattern of a representative population sample, which is then compared to the total consumption of the country. In this method, problems consist in getting a truly representative sample, unambiguous set of questions and the willingness of persons in the sample size to reveal true facts. But the people in the sample are generally unwilling to admit any illegality before the interviewers.

There is also the “fiscal approach” method for estimating black money. The underlying basis of this approach is to view the economy as comprising several sectors. Black money generation from each sector when added would give the size of the black economy. However, identifying the black component in different sectors is not uniform. It is continuously changing due to change in technology.

It is a fact that money is needed to circulate incomes in both the black and accounted economies. But underground (or hidden) transactions are undertaken only in the form of cash payment, so as to leave no traces for the authorities. Consequently, it increases circulation of money i.e. velocity of money. As the official economy is known, the difference between that amount and the money in circulation could be assumed to be the circulating “black money”. Using this currency demand approach i. e. velocity of money, Tanzi (1983) developed a model for estimating underground economy. However, the assumption that National Accounting System (NAS) represent accounted incomes accurately is not always true. Large proportion of income, such as those falling in the unorganized sector, are not accurately captured in NAS, thus there may be upward bias in the estimate of black money. Using this model, Haque (2013) estimated underground economy of Bangladesh was only 7% of GDP in 1973. In 2010 it stood at 62.75% of GDP.

Corruption is a form of taxation and regulation. Because, it can employ manpower independently for their own purpose or introduce them in the public institutions like that of the official procedures. It increases the underground economy. As a consequence, the size of official market decreases and drives the entrepreneurs underground. Some may believe that underground economy should sustain because it increases standard of living of a group of people in the society, provides jobs for the unskilled persons in the public sectors! But it will reduce the quality and quantity of publicly provided goods and services lower than the average. Where underground activities are high, revenue generation will be low. It increases income inequality and poverty. Friedman et al. (1999) believe that institutional aspects are more important than taxes in promoting underground economies. He reported that when regulations are lax and rule of law is weak, bureaucrats make decisions on individual cases without supervision. This creates corruption, which causes firms to become unofficial.

Tanzi observed that an increase in the size of underground economy will therefore increase the demand for currency. It imposes a burden on the economy, and results

in tax distortions and erroneous measurement of macroeconomic variables.

The Economic Times of India (June 29, 2011) writes that only an estimated one million out of 150 million populations of Bangladesh pay any taxes. Finance ministry accounted black money up to 80% of GDP. In recent years, the government has offered tax evaders to declare their black money on payment of minimal tax. Economists hold the view that this decision becomes a major factor behind the persistent inflation through shifting of resources to profligate consumption. This slows down infrastructure developments and anti-poverty programmes. It also creates great inequalities between the honest tax payers and the tax evaders. This increases poverty and corruption rather than alleviate them. This, in fact, really influences the growth of black money with no hope of its end. The remedial measures are nothing but enameling the extreme danger by the so-called boosting the state's income from revenue collection. These are mostly abortive like operation, chemotherapy or radio-therapy practiced in the treatment of cancer which can do nothing but increases sufferings both physical and mental.

### **3. Conclusion.**

The problem of corruption is not with intentions but with their implementation. But no rules and regulations that now prevail in the economy of Bangladesh were capable to control the bureaucratic parasitic monopolies those hinder the development. Those stifling rules and regulations must have to go. New economic policies with new priorities and investment pattern must replace them. The abject poverty of general masses should not be blamed on growing population. For its development, the country should be free from the curse of black money.

Finally, there is an element that is not entirely within government control. That is the revival of moral strength and values. The importance of this factor cannot be overstated. Unless people turn to loftier aspirations of spirit, and recognize the baseness of a cultural ethos that condones the marketing of integrity and trust, the allure of illicit wealth will continue to play upon their minds. The government can, however, play a significant role in this moral transformation. Since much of the fatalism regarding morality is inspired by the blatant greed of those in political and bureaucratic power, a new standard of official honesty should set the tone for the new morality. This transformation must spring not from fewer opportunities, but from a genuine desire of the mass people to be the honest.

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## “ভবদহের জলাবদ্ধতা, বাস্তুবতা ও করণীয়”

মোঃ জাহাঙ্গীর আলম\*

সারকথা: ভবদহ বাংলাদেশের দক্ষিণ-পশ্চিমাঞ্চলের এক অভিশপ্ত জলাবদ্ধ এলাকার নাম। এলাকাটি যশোর-খুলনা এবং সাতক্ষীরার মিলন স্থলে। জলাবদ্ধতা এবং লবণাক্ততার প্রভাব থেকে উপকূলের জনপদ, ফসলের উৎপাদন এবং ফসল রক্ষার প্রয়োজনে গত শতাব্দীতে গ্রহণ করা হয় উপকূলীয় বাঁধ প্রকল্প। প্রকল্পের শুরুতে ভালো ফসল ফলে এবং চাষাধীন জমির পরিমাণও বৃদ্ধি পায়। প্রকৃত অর্থে প্রাকৃতিক নিয়মে ভূমিগঠনের পূর্বেই উপকূলীয় বাঁধ এবং বিশেষ করে ভবদহে (১৯৬১ সালে) ২১ ভেন্ট এবং পরে ৯ ভেন্ট সম্বলিত স্লুইচ গেট নির্মাণ করা হয়। গত শতাব্দীর ৮০ এর দশকে এক নাগাড়ে কিছুদিন এবং অন্য সময়ে মাঝে মাঝে এই গেট বন্ধ থাকে। ফলশ্রুতিতে উজানের জলপ্রবাহ বাঁধাধ্বংস হয়। অন্যদিকে জোয়ারের পলিয়ুক্ত পানি উপকূলীয় বাঁধ এবং স্লুইচগেট-এ বাঁধাখাণ্ড হয় আর ভরাট হতে থাকে দক্ষিণ-পশ্চিমাঞ্চলের নদীর তলদেশ। নদীহারায় তার নাব্যতা। পরবর্তীতে অতিবৃষ্টি বা বিভিন্ন কারণে উজান থেকে আসা জলপ্রবাহ নদী পথে আশানুরূপ নিষ্কাশনের সক্ষমতা হারায়, জল উপচেপড়ে নদীর তীরবর্তী জনপদে, সৃষ্টি হয় জলাবদ্ধতা। স্থায়ী-অস্থায়ী জলাবদ্ধতার কবলে পড়ে ক্ষতিগ্রস্ত হয় মাঠ, ফসল, গবাদীপশু, পরিবেশ, শিক্ষা প্রতিষ্ঠানসহ সংশ্লিষ্ট জনপদের প্রায় সবকিছু। জলাবদ্ধতার অস্থায়ী এবং স্থায়ী সমাধানের দাবীতে গড়ে উঠেছে আন্দোলন। সমাধানে (স্থায়ী, অস্থায়ী) সরকারী এবং বেসরকারী উদ্যোগ গ্রহণ করা হয়েছে। সমস্ত উদ্যোগের মধ্যে কিছু দূর্নীতির ছাপ স্পষ্ট। স্থায়ী সমাধানের সূত্র T.R.M (Tidal River Management)। প্রকৃত অর্থে প্রাকৃতিক নিয়মে ভূমিগঠন এবং নদী/খাল সমূহের আন্তঃসংযোগ এবং অবাধ প্রবাহ সৃষ্টি এ সমস্যা সমাধানের একমাত্র পথ। অবশ্য জলাবদ্ধতার উৎস, কারণ, অভিঘাত, সমাধান কৌশল এখানে আলোচনা করা হয়েছে। স্থায়ী সমাধানের জন্য দরকার শেষ বিচারের রাষ্ট্রীয় উদ্যোগ। সংশ্লিষ্ট বিশ্লেষণের সামগ্রিকদিক এ প্রবন্ধে উপস্থাপনের উদ্যোগ গ্রহণ করা হয়েছে।

১. পটভূমি :- বিশ্ব মানচিত্রে, দক্ষিণ পূর্ব এশিয়ার ১,৪৭,৫৭০ বর্গকি:মি: আয়তনের নদী মার্ভুক ছোট দেশ, আমাদের ভূখন্ড এ বাংলাদেশ। সুদূর অতীত ইতিহাস বিশ্লেষণে দেখা যায় এ অঞ্চল প্রধানত পলিমাটি- গঠিত ভূভাগ আর এর গঠন প্রক্রিয়া এখনও শেষ হয়নি এবং প্রকৃতি নির্ভর। এ কথাও স্মরণযোগ্য যে, বাংলাদেশের দক্ষিণ পশ্চিমাঞ্চল যেখানে আজ আমাদের অবস্থান, যা এক সময় সমুদ্র গর্ভে বিলীন ছিল। প্রতিবছর বর্ষা মৌসুমে উজান থেকে আসা (বিধৌত) পলি মাটি বঙ্গোপসাগর অভিমুখে প্রবহমান, আবার জোয়ারকালীন এর উথিত গতির মিথস্ক্রিয়ায় (জোয়ার-ভাটার চক্রাবর্তনে) নিপতিত পলি এ ভূ-খন্ড সৃষ্টির ইতিকথা। উল্লেখ্য প্রতি বছর শুধুমাত্র সুন্দরবনের জৈববর্জ্য থেকে ৩৫ লক্ষ মেট্রিক টন পলি তৈরি হয়ে এ অঞ্চলের নদ-নদী ও নদীতীরবর্তী ভূমিতে অবক্ষিপিত হয়। খুলনা, যশোর,

\* সহযোগী অধ্যাপক, অর্থনীতি বিভাগ, নড়াইল সরকারী ভিক্টোরিয়া কলেজ



সাতক্ষীরা, বাগেরহাট, নড়াইল, ঝিনাইদহ, চুয়াডাঙ্গা, কুষ্টিয়া, মাগুরা, জেলা নিয়ে দক্ষিণ-পশ্চিমাঞ্চল গঠিত। (অবশ্য ফরিদপুর এবং বরিশালকে যুক্তকরে যে গঙ্গেয় ব-দ্বীপ অঞ্চল যা গঙ্গাবিধৌত পলিদ্বারা গঠিত। প্রকৃত অর্থে নদী সমূহের পলিবাহিত জোয়ার ভাটা, লবণাক্ততা এবং স্বাদু পানি সমন্বিত এ অঞ্চল পৃথিবীর উর্বরতম অঞ্চল হিসেবে খ্যাত। ভৌগোলিক অবস্থান বিশ্লেষণে দেখা যায় ভারতের গঙ্গা, সে দেশের নদীয়া জেলার করিমপুর হয়ে বাংলাদেশের মেহেরপুরে প্রবেশ করে। গতিপথে মেহেরপুরের শোলমারী থেকে বাংলাদেশের দক্ষিণ-পূর্বে প্রবাহমান। চলমান ধারায় পদ্মার শাখা ভৈরব-মাথাভাঙ্গা মুক্তেশ্বরী, টেকা, শ্রী, হরি, তেলিগাতী নদী, গ্যাংরাইল ও শিবসা হয়ে কাংগার সাথে বঙ্গোপসাগরে মিশেছে। এখানে দুটো বিষয় সহজে জানা দরকার (এক) গঙ্গা থেকে বঙ্গোপসাগরের এধারা এক সময় বাঁধাহীন ছিল জলাবদ্ধতা ছিলনা। (দুই) এই ধারারপ্রবাহ বাঁধাঘস্তা হওয়ায় (যা পরের আলোচনায় সন্নিবেশিত) মুক্তেশ্বরী-টেকা-শ্রী হরী নদীর সংশ্লিষ্ট এলাকায় বর্তমানে সমস্যাগ্রস্ত ভবদহের জলাবদ্ধ অঞ্চল। মূলত ৬০ এর দশকে মার্কিন যুক্তরাষ্ট্রীয় পারামর্শ-উদ্বুদ্ধ সবুজ বিপ্লব কর্মসূচীর আওতার অধীক ফসল ফলানোর কৌশলের অংশ হিসেবে ইউ,এস,এ,আই,ডি'র সহায়তায় এবং এডিবি'র ঋণ এর মাধ্যমে গ্রহণ করা হয় উপকূলীয় বাঁধ প্রকল্প। এ প্রকল্পের অংশ হিসেবে ৩৯টি পোল্ডার, ১৫৬৬ কিলোমিটার ভেড়িবাঁধ এবং ২৮২টি স্লুস্ গেট দিয়ে ফসলের প্রলোভনে এ অঞ্চলের মানুষ ও তার প্রকৃতি পরিবেশকে দীর্ঘ মেয়াদী সংকটের যাতাকলে ফেলে দেয়া হয়। অবশ্য উপকূল রক্ষা বাঁধ দেওয়ার উদ্যোগে কয়েক বছর বাম্পার ফলন হয়। স্থানীয় কৃষকদের ভাষ্যমতে এ জন্য তারা তৎকালীন পূর্ব পাকিস্তানের গভর্নর মোনায়েম খানকে সোনার কাচি উপহার দিয়ে ছিল। এরই মধ্যে প্রকৃতি প্রতিশোধ নিতে শুরু করে। বাঁধ দেওয়ার ফলে পলি অবক্ষেপনের প্লাবন ভূমি আটকা পড়ল, ভূমি গঠন বাঁধা গ্রস্থ হলো। একদিকে কৃষি জমি হারাতে থাকল পলি অন্য দিকে জোয়ারে আসা এ পলি নদী তীর এবং তলদেশে জমা হতে থাকল। ফলশ্রুতিতে নদীর বুক উঁচু এবং বিলের তলদেশ সে তুলনায় নিচু থেকে গেল। বিলসমূহ পরিণত হলো পানির পকেটে। যার প্রেক্ষিতে গত শতাব্দীর ৮০ এর দশকে মূলত ১৯৮২ সাল নাগাদ দক্ষিণ পশ্চিমাঞ্চলের আড়াই লক্ষ হেক্টর কৃষি জমি স্থায়ী ভাবে জলাবদ্ধতাররূপ নেয়। ভবদহ অঞ্চলের ২৭টির অধিক বিল এবং প্রায় ১০ লক্ষ মানুষ পড়ে ভয়াবহ বিপর্যয়ের মধ্যে। এখানে উল্লেখ্য অভয়নগর, কেশবপুর, মনিরামপুরের কৃষি জমির সঙ্গে সংলগ্ন শ্রী-হরি নদীকে দুই ভাগ করে, ভবদহ নামক স্থানে ২১ ভেন্ট ও ৯ ভেন্টের দুইটি স্লুইস গেট দেওয়া হয়। এর মাধ্যমে মুক্তেশ্বরী, হরিহর, ভদ্রা ও কপোতাক্ষ নদীর জল অপসারিত হয়। বিলের হিসাব বিশ্লেষণ করলে প্রত্যক্ষ ভাবে ২৭টি এবং পরোক্ষ ভাবে আরো ২৬টি বিলের পানি নিষ্কাশিত হতো এ ভবদহ স্লুস্ গেট দিয়ে। প্রকৃতির নিয়মে স্লুইস গেটের ভাটিতে পলি জমতে থাকে সর্বোপরি ২০০৫ সালে টানা ৪৮দিন ভবদহ স্লুস্গেট বন্ধ থাকে, সংকট আরো ঘনিভূত হয়। আসলে প্রকৃতির স্বাভাবিক গতিকে বাঁধাদিলে প্রকৃতি প্রতিশোধ নেয়। ভাটিতে পোল্ডার স্লুইস গেট ও বাঁধ নির্মাণ, উজানে নদীর প্রবাহ ক্ষীণ করা কোথাও কোথাও অবকাঠামো নির্মাণ দ্বারা নদীর গতি বন্ধকরা হয়েছে। প্রকৃতির গতিকে রোধ করা হয়েছে। আর প্রকৃতির প্রতিশোধই হচ্ছে ভবদহের বর্তমানের দীর্ঘস্থায়ী ও ভয়াবহ জলাবদ্ধতা।

**২. ভবদহ সংশ্লিষ্ট নদীপ্রবাহ (গঙ্গা থেকে বঙ্গোপসাগর):-** মুক্তেশ্বরী নদীভৈরবের দক্ষিণ মুখী শাখাগঙ্গা বিধৌত ব-দ্বীপের এই প্রধান প্রবাহ ভৈরব নদীয়া জেলার করিমপুর থানা দিয়ে মেহের পুরের শোলমারী থেকে বাংলাদেশের দক্ষিণ পূর্বে প্রবাহমান। গঙ্গানদীর এর প্রধান উৎস। ৫০-এর দশকে বাংলাদেশ থেকে ৩কি.মি দূরে ভারতের অভ্যন্তরে হাগনা গাড়ি নামক স্থানে বাঁধ দিয়ে এই নদীর প্রবাহ স্থায়ী ভাবে বন্ধ করা হয়। চূর্ণী নদীর সাথে এই প্রবাহের সংযোগ।

পদ্মার শাখা মাথাভাঙ্গা ভৈরবের আর এক প্রবাহ মুখ। উল্লেখ্য ইংরেজরা মাথাভাঙ্গা নদীর উৎপত্তি

স্থলে মাটি বোঝাই নৌকা ডুবিয়ে মাটি ভরাট করায় এর শ্রোত অনেকাটা ক্ষীণমাথা ভাঙ্গা সুবলপুর-রঘুনাথপুরে ভৈরবের সাথে মিশে বুড়ি ভৈরব নামে গতিশীল গভীর নদী। কোট চাঁদপুরের তাহেরপুর-হাকিমপুর থেকে কপোতাক্ষ ভাগ হলে ভৈরব আবার ক্ষীণ হয়ে পড়ে। বুক ভরা বাওড় থেকে হালসার খাল কেটেহরিহরে মিশালে ভৈরব ও মুক্তেশ্বরীতে এর নেতি বাচক প্রভাব পড়ে।

মুক্তেশ্বরীর উৎপত্তি ভৈরব থেকে। যশোর কালীগঞ্জ চৌগাছার বিস্তৃত এলাকার বিশাল বাওড় মজ্জাতের বাওড়ের বিপরীত পাশে মুক্তাধা নামক স্থান থেকে প্রবাহমান ভৈরবের দক্ষিণ পাশ থেকে মুক্তেশ্বরীর উৎপত্তি। সুদীর্ঘ ও এককালের খরশ্রোতা এখন মৃত প্রায়। যশোর শহর ও ক্যান্টনমেন্টের দক্ষিণপাশ দিয়ে সতীঘাটা মনিরামপুর উপজেলায় প্রবেশ করে। ঢাকুরিয়া পার হয়ে ডুমুর বিলের ভিতর দিয়ে সম্মন ডাঙ্গা বিলের পাশ দিয়ে পাঁচবাড়িয়া মুক্তেশ্বরী কলেজ ও হাজির হাটের বাজারের উত্তর পাশ দিয়ে লেবুগাতী হয়ে বিল বোকড়ে প্রবেশ করে অভয়নগর ও মনিরামপুরের সীমানা বরাবর মশিয়াহাটী, কুল্টিয়া ও লখাইডাঙ্গার পাশ দিয়ে বিল কেদারিয়ায় প্রবেশ করে। হেলার ঘাট ও লখাইডাঙ্গার ব্রিজের নিচ দিয়ে এর অবস্থান। টেকার ব্রিজ পেরিয়ে ভবদহ স্নুস্জ গেটে টেকা নদী নামে এসে মিশেছে শ্রী ও হরি নদীর সাথে। অতীতে ভৈরব, হরিহর ও কপোতাক্ষের বহু মিলন ধারার অস্তিত্ব থাকলেও বর্তমানে আমডাঙ্গার খাল (২০০৬ এ নতুন করে স্বেচ্ছাশ্রমে কাটা) ছাড়া তার কোনো সংযোগ নেই।

ভবদহের ভাটিতে মুক্তেশ্বরী হরি নদী নামে খুলনা ডুমুরিয়া ও যশোর কেশবপুরের সীমানা বরাবর প্রবাহমান। নিচের অংশে তেলিগাতী নদী, গ্যাংরাইল ও শিবসা হয়ে কাংগার সাথে সাগরে মিলেছে। হরিহরের নিম্নমুখি অন্য ধারাটি আপার সালতা হয়ে ঝপঝপিয়া ও কাকবাছা নদীর দুই ধারা নিয়ে পশুর নদীর সাথে মিশে মালঞ্চের সাথে সাগরে মিলেছে।

মুক্তেশ্বরীর দুই পাড়ে অসংখ্য গ্রাম ও হাট-বাজার। যশোর শহরের পর (যশোর শহর মূলত ভৈরবের দুই পাড়) সতীঘাটা, ঢাকুরিয়া, উত্তরপাড়া, বারপাড়া, সুবলাকাঠি, ভোমরদহ, কাটাখালি, হাজরাইল, পাচবাড়িয়া, পাচকাটিয়া, কুমারসীমা, লেবুগাতী, ১৮ পাকিয়া, সুন্দলী, পোড়াডাঙ্গা, মশিয়াহাটী, কুলাটিয়া, লখাইডাঙ্গা, বালিধা, পাচকড়ি, বারান্দী, দামুখালী, দত্তগাতি, ভবদহের পরে কপালিয়া, মান্দা, দহাকুলা, শোলগাতিয়া, আগরহাটি, ভায়না, খর্ণিয়া, শোভনা প্রভৃতি।

ভবদহের জলাবদ্ধতা আর সংশ্লিষ্ট নদীসমূহের গতি :

আমাদের একটা বিষয় খুব পরিষ্কার বোঝা দরকার, আমাদের উজানে হিমালয় আর ভাটিতে বঙ্গোপসাগর। দক্ষিণ-পশ্চিমাঞ্চলতো বটেই এর মাঝখানের প্রায় সমগ্র ভূভাগ জলরাশি / নিম্নভূমি থেকে নদী বাহিত পলি দ্বারা গঠিত। বলা যায় নদীর বুক থেকে এবং নদী বাহিত পলি দ্বারা এ ভূখন্ডের জন্ম, আর এ অর্থে নদী হলো জননী। তাইতো বলি আমরা নদীমার্ভুক বাংলাদেশের মানুষ নদী সমূহের নিরবিচ্ছিন্ন প্রবাহ ভূমিগঠন এবং প্রকৃতির নিয়মে জলাবদ্ধতা নিরসনে ভূমিকা রাখে। এর ব্যত্যয় মানুষ এবং প্রকৃতিতে বিরূপ প্রভাব পড়ে। এ প্রেক্ষিতে সংশ্লিষ্ট নদী সমূহের উৎপত্তি ও গতিপথ বিশ্লেষণ দরকার। আমরা বিভিন্ন তথ্য বিশ্লেষণে দেখি দক্ষিণ-পশ্চিমাঞ্চলের নদী সমূহ মূলত ভৈরব- মাথাভাংগা নদীকাঠামোরই অংশ।

উৎপত্তিস্থল	নদ-নদী/নদ-নদী সমূহ
ভৈরব এবং মাথাভাঙ্গা	ইছামতি, বেত্রাবতী (বেতনা), কপোতাক্ষ, হরিহর, মুক্তেশ্বরী, ভদ্রা, চিত্রা, বেগবতী, ফটকী, কাজলা, নবগঙ্গা।
তাহিরপুর, চৌগাছা, যশোর।	কপোতাক্ষ-ভৈরবের শাখা।
ঝিকরগাছা, যশোর।	হরিহর-কপোতাক্ষের শাখা
ত্রিমোহিনী, কেশবপুর, যশোর	ভদ্রা-কপোতাক্ষের শাখা
মহেশপুর, বিনাইদহ	বেত্রাবতী-ভৈরবের শাখা।
কালিগঞ্জ, বিনাইদহ, যশোর সদর ও চৌগাছা উপজেলা সংলগ্ন মজ্জাতের বাওড়ের দক্ষিণ প্রান্ত	মুক্তেশ্বরী-ভৈরবের শাখা।
দর্শনা	চিত্রা ভৈরবের শাখা।
মথুরাপুর, বিনাইদহ	বেগবতী/ফটকী নদী, নবগঙ্গার শাখা।
চুয়াডাঙ্গা শহরের পাশে মাথাভাঙ্গা	নবগঙ্গা।
ভৈরব, কপোতাক্ষ, মুক্তেশ্বরী ইত্যাদির নিম্নপ্রবাহ।	খোল পেটুয়া, আড়পাঙ্গাসিয়া, শিবসা, মরিচ, হরি, শ্রী, গ্যাংরাইল, শোলমারী, ময়ূর।

মূলতঃ উপরিউক্ত নদী সমূহের জল প্রবাহ যদি বাঁধাহীন থাকে তাহলে ভবদহ সহ পান্সবতী অঞ্চলে জলাবদ্ধতা সৃষ্টি হবে না। নদী সমূহের প্রবাহ হীনতাই আজকের জলাবদ্ধতার মৌলিক বিষয়।

### ৩. জলাবদ্ধতার কারণ :-

ক) জলাবদ্ধতার জনক উপকূলীয় বাঁধ প্রকল্প :- দ্বিতীয় বিশ্বযুদ্ধোত্তর সাম্রাজ্যবাদীদের মধ্যে বিশ্ববাজার ভাগাভাগীর পরিপ্রেক্ষিতে বহুবিধ ঘাত প্রতিঘাতের ফলশ্রুতিতে ট্রেডমিশনের রিপোর্ট স্থগিত হয়। পূর্ব বাংলায় বন্যা সমস্যার সমাধানের দায়িত্বে নিযুক্ত হয় ওয়াপদা সংস্থা। ওয়াপদা পূর্ব বাংলার বন্যা সমস্যা তদন্তপূর্বক লবণাক্ত পানির অনুপ্রবেশকে অন্যতম প্রধান সমস্যা হিসেবে চিহ্নিত করে। সর্বোপরি, গত শতাব্দীর ষাটের দশকে সাম্রাজ্যবাদীরা সেচ, সার, বীজ, কীটনাশক বিক্রিতে বিশ্ববাজার সৃষ্টির লক্ষে, সবুজ বিপ্লবের নামে অধিক শস্য ফলাও শ্লোগানকে সামনে নিয়ে আসে। জোয়ারের লবণ পানি প্রতিরোধে উপকূল জুড়ে বেড়ী-বাঁধ এবং স্লুজগেট প্রকল্পের ফর্মুলা উপস্থিত করে। এই ফর্মুলার প্রেক্ষিতে ১৯৬০-৬৭ সালের মধ্যে শুধু খুলনা অঞ্চলে ৩৪টি পোল্ডার ১৫৬৬ কি.মি. বেড়ী-বাঁধ ও ২৮২টি স্লুজগেট নির্মাণ করা হয়। উপকূল জুড়ে এ পোল্ডার ভেড়ীবাঁধ আর স্লুজগেট নির্মাণের ফলে বিল অভ্যন্তরে লোনা পানি প্রবেশ বন্ধ হয়। সবুজ বিপ্লবের শ্লোগানে কৃষি উৎপাদন কিছুটা বাড়ে। শুরু হয় পার্শ্ব প্রতিক্রিয়া। জোয়ারের পানির সাথে সাথে আগত পলিও বিলের ভিতর প্রবেশে বাঁধাধস্ত হয়। বন্ধ হয়ে যায় পোল্ডারের ভিতরের নিচু জমির ভূমি গঠন প্রক্রিয়া। এ পলি প্লাবনভূমি না পেয়ে জমা হতে থাকে নদীর তলদেশে। অপর দিকে উজানের জল প্রবাহ বাঁধাধস্ত হওয়ার প্রেক্ষিতে উজান থেকে প্রবহমান নদীসমূহ প্রবাহহীন হয়ে পড়ে। ফলশ্রুতিতে লবণ পানির প্রবাহ এবং পলিপ্রবাহ উজানে অনেক দূরপর্যন্ত চুকে পড়ে, শুরু হয় পরিবেশ বিপর্যয় এবং দক্ষিণ-পশ্চিমাঞ্চলের অনেক নদীর তলদেশ, বিলের তলদেশের তুলনায় উঁচু হয়ে যায় নিক্ষাষণ পথ বন্দ এবং নেতিবাচক পথ ধরে সমায়াস্তে জলাবদ্ধতার কবলে পড়ে ভবদহ সহ তৎসংলগ্ন অঞ্চল।

খ) বাঁধা গ্রস্ত উজানের প্রবাহ :

এক : গঙ্গা বিধৌত ব-দ্বীপের এ অংশের প্রধান প্রবাহ ভৈরব। যা ভারতের নদীয়া জেলার করিমপুর থানা দিয়ে মেহেরপুরের শোলমারী থেকে বাংলাদেশের দক্ষিণ পূর্বে প্রবহমান। মূলত গঙ্গা নদীই এর প্রধান উৎস। গত শতাব্দীর ৫০ এর দশকে বাংলাদেশ থেকে ৩ কিলোমিটার দূরে ভারতের অভ্যন্তরে হাগনাগ-

িড়ি নামক স্থানে বাঁধ দিয়ে এই নদীর প্রবাহ স্থায়ী ভাবে বন্ধ করা হয়। চূর্ণী নদীর সাথে এই প্রবাহের সংযোগ।

পদ্মার শাখা, মাথা ভাংগা ভৈরবের আর এক প্রবাহ মুখ। ইংরেজরা মাথা ভাংগা নদীর উৎপত্তি স্থলে মাটি বোঝাই নৌকা ডুবিয়ে মাটি ভরাট করার ফলে এর শ্রোত কিছুটা ক্ষীণ হয়। মাথা ভাংগা সুবলপুর রঘুনাথপুরে ভৈরবের সাথে মিশে বুড়ি ভৈরব নামে গতিশীল গভীর নদী। কোট চাঁদপুরের তাহেরপুর হাকিমপুর থেকে কপোতাক্ষে ভাগ হলে ভৈরব আবার ক্ষীণ হয়েপড়ে। ফলে এর ভাটিতে মুক্তেশ্বরী তার দুর্বল প্রবাহ নিয়ে টেকা শ্রী-হরি গ্যাংরাইল নামে বঙ্গোপসাগরের অভিমুখে প্রবাহিত। এর দুর্বল প্রবাহ ভবদহ অঞ্চলের পানি প্রবাহের ক্ষেত্রে তেমন ইতিবাচক ভূমিকা রাখতে সমর্থ নয়।

দুই : অবকাঠামো নির্মাণে নদীর উপর হস্তক্ষেপ:- ১৮৫৯ সালে আসাম-বাংলা রেললাইনের কাজ শুরু হয়। ১৮৬১ সালে কোলকাতা থেকে কুষ্টিয়ার জগতি পর্যন্ত ১৭০ কিলোমিটার রেললাইন স্থাপনের কাজ শেষ হয়। রেললাইনটি স্থাপন করা হয় চিত্রা নদীর পূর্ব তীর বরাবর। এ সময় চুয়াডাঙ্গার দর্শনায় ভৈরব নদের ওপর একটি সংকীর্ণ রেলসেতু নির্মাণ করা হয়। এরপর ১৯৩৮ সালে চিত্রার খাত পুরোপুরি ভরাট করে কেরা অ্যান্ড কোম্পানী চিনিকল নির্মাণ করা হয়। ফলে দক্ষিণ-পশ্চিমাঞ্চলের সব নদ-নদীতে গঙ্গার প্রবাহ বন্ধ হয়ে যায়। এরপরও দর্শনার রেলসেতুর নিচ দিয়ে সামান্য পরিমাণ পানি আসতো। কিন্তু ১৯৬০ সালে জিকে প্রকল্প বাস্তবায়ন এবং মাগুরায় নবগঙ্গা নদীর ওপর একটি স্লুস্‌সগেট নির্মাণের কারণে তাও বন্ধ হয়ে যায়।

সমস্যা যেভাবে শুরু : আশির দশকের শুরুতে স্লুস্‌সগেটের বাইরে পলি জমে বাঁধের বাইরের নদী, ভেতরের নদী ও ভূমি থেকে উঁচু হয়ে যায়। নাব্যতা হারায় মুক্তেশ্বরী, টেকা, শ্রী ও হরি নদী। অবরুদ্ধ হয়ে পড়ে পানি নিষ্কাশনের পথ। বৃষ্টির পানি আটকা পড়ে সৃষ্টি হয় জলাবদ্ধতা। ১৯৮৪ সাল থেকে এই জলাবদ্ধতা প্রকট আকার ধারণ করে। বৃষ্টির পানি বিলে আটকা পড়ে পরে তা উপচিয়ে বিল সংলগ্ন গ্রামগুলো প্লাবিত হয়। পানিবন্দী হয়ে পড়েন মানুষ। পানি সরানোর দাবিতে আন্দোলন শুরু করেন ভুক্তভোগী মানুষ। আন্দোলনের মুখে তৎকালিন সরকার ১৯৯৪ সালে এশীয় উন্নয়ন ব্যাংকের (এডিবি) ২৫৭ কোটি আর্থিক সহায়তায় শুরু করে খুলনা-যশোর নিষ্কাশন পুনর্বাসন প্রকল্প (কেজেডিআরপি)। ২০০২ সালে প্রকল্পের কাজ শেষ হয়। শ্রী, হরি ও টেকা নদীর পলি অপসারণ, খাল খনন এবং বিল কেদারিয়ায় জোয়ারাধার নির্মাণ করা হয় এই প্রকল্পের আওতায়। আপাত অবসান হয় জলাবদ্ধতার।

২০০৫ সালের ফেব্রুয়ারি মাসে স্থানীয় বিএনপি নেতা বর্তমানে মনিরামপুর উপজেলার নেহালপুর ইউনিয়নের চেয়ারম্যান নজমুস সাদাতসহ আরও ৪৮৩ ব্যক্তি বিল কেদারিয়ায় জোয়ারাধার বন্ধের জন্য জেলা প্রশাসকের নিকট আবেদন করেন। আবেদনের পরিপ্রেক্ষিতে জেলা প্রশাসকের নির্দেশে পানি উন্নয়ন বোর্ড মার্চ মাস থেকে ৪৮ দিন ভবদহ স্লুস্‌সগেট বন্ধ রাখে। এতে পলি জমে নদীর বুক উঁচু হয়ে পড়ে। ওই বছরের অক্টোবর মাসের টানা বর্ষণে পুনরায় পানি জমে জলাবদ্ধতা দেখা দেয়। এরপর ২০০৬ সালের চারদফা অতিবর্ষণে অভয়নগর, মনিরামপুর, কেশবপুর ও যশোর সদর উপজেলার ২১টি ইউনিয়নের ১৮৪টি গ্রাম তলিয়ে যায়। পানিবন্দী হয়ে পড়েন চার লক্ষাধিক মানুষ। পানি সরানোর দাবিতে 'ভবদহ পানি নিষ্কাশন সংগ্রাম কমিটির' নেতৃত্বে শুরু হয় দুর্বীর আন্দোলন। তীব্র আন্দোলনের মুখে সেনাবাহিনীর তত্ত্বাবধানে ওই বছর ৬৯ কোটি টাকা ব্যয়ে শ্রী, হরি ও টেকা নদী পুনর্খনন করা হয়। কেশবপুর উপজেলার বিল খুকশিয়ায় জোয়ারাধার চালু এবং অভয়নগর উপজেলার আমডাঙ্গা খাল সংস্কার করা হয়। শুরু হয় পানি নিষ্কাশন। দূর হয় জলাবদ্ধতার।

## ৪. ভবদহ সহ সংশ্লিষ্ট এলাকার জলাবদ্ধতা নিরসনে টি, আর, এম :-

T.R.M ( Tidal River Management) মূলত: মূল নদী সংলগ্ন যে কোন একটি নির্বাচিত (একাধিকও হতে পারে) বিলের তিন দিকে পেরিফেরিয়াল বাঁধ নির্মাণ করে (উন্মুক্তও হতে পারে) অবশিষ্ট দিকের ভেড়িবাঁধের একটি অংশ উন্মুক্ত করে পরিকল্পিত ভাবে বিলে জোয়ার ভাটা চালু করা হয়। এটাই টি, আর, এম বা জোয়ারধার নামে পরিচিত। এ পদ্ধতিতে সাগর থেকে জোয়ারের সাথে আসা পলি বিলে থেকে যায়। পরে স্বচ্ছ পানি ভাটি আকারে ফিরে যায়। ফলশ্রুতিতে জোয়ারে আসা পলি বিল/নিম্নভূমি উঁচু করে আর ফিরে যাওয়া স্বচ্ছ পানির প্রবাহ নদীর নাব্যতা বৃদ্ধি করে প্রকৃতির নিয়মে নদী খনন কাজ চলে। এভাবে ভূমিগঠন জলাবদ্ধতা নিরসন এবং নদী খনন কাজ সম্পন্ন হয়।

### অধ্যাপক প্রশান্ত মহলানবীশ এর সমীক্ষা :-

ইতিহাস পর্যালোচনা হতে দেখা যায় ১৯২২ সালে উত্তরবঙ্গে বিপর্যয়কারী বন্যা কবলিত হয়। সেই সময়ের বিদ্যমান বাস্তবতার প্রেক্ষিতে কলকাতার প্রেসিডেন্সি কলেজের স্বনামধন্য অধ্যাপক প্রশান্ত মহলানবীশ একটি সমীক্ষা প্রকাশ করেন। তার সেই সমীক্ষায় বন্যার কারণ ও প্রকৃতি বিশ্লেষণ করা হয়। এ সমীক্ষা ঐ বন্যার প্রবণতা, বন্যা প্রতিরোধের ক্ষেত্রে বাঁধের কার্যকারিতা সম্পর্কেও দিক নির্দেশনা ছিল। প্রায় ১০০ বছর আগে ১৯২৭ সালে তিনি বললেন, “উত্তরবঙ্গের বন্যার প্রধান কারণ হচ্ছে সেখানকার বিল সহ নিচু এলাকায় পানি ঢুকলে সহজে বের হতে পারে না। বন্যার প্রবাহকে দ্রুত বেরিয়ে যাওয়ার পথ করে দেওয়াটাই হচ্ছে সবচেয়ে গ্রহণযোগ্য পন্থা।” প্রশান্ত মহলানবীশ তার বিশ্লেষণে আরো বলেন পলিযুক্ত পানি অবাধে চলতে দিলে পলির স্তর পড়ে নিচু ভূমি ক্রমাংশ উঁচু হয়ে উঠবে, বন্যার প্রকোপ কমবে। এ প্রক্রিয়া সময় সাপেক্ষ, সেকারণে নিকট ভবিষ্যতে বন্যা হতে থাকবে। সমাধান সূত্রে তিনি বললেন, নদীর তীরে বাঁধ তৈরি করে বন্যাকে ঠেকানোর প্রচেষ্টা কোন স্থায়ী সমাধান নয়। কারণ তাতে আবদ্ধ বন্যার জলে সঞ্চিত পলিমাটি পড়ে নদীতল ক্রমাংশ ভরাট ও উঁচু হয়ে যাবে। অর্থাৎ নিচু এলাকায় চারিদিকে বাঁধ নির্মাণ দীর্ঘমেয়াদী সমাধান নয়, বরং দীর্ঘমেয়াদে জল নিষ্কাশনের পথে বাঁধা সৃষ্টি করবে। উল্লেখ্য, অধ্যাপক প্রশান্ত মহলানবীশ এর তথ্য (উত্তরবঙ্গে বন্যা সম্পর্কিত) আমাদের দক্ষিণ-পশ্চিমাঞ্চলের জলাবদ্ধতার কারণ ও সমাধানের সাথে অনেকটা সংগতিপূর্ণ।

### টি, আর, এম এর স্বীকৃতি :

আসলে অতি প্রাচীন লোকজ জ্ঞানের প্রতিষ্ঠানিক রূপ টি, আর, এম। হ্যাঁ গত শতাব্দীর ৮০ দশকের শুরুর দিকে দক্ষিণ-পশ্চিমাঞ্চলের জলাবদ্ধতা শুরু হলে, তা নিরসনের লক্ষে ভিন্ন ভিন্ন নামে আন্দোলন কারী সংগঠন সমূহ (এ আন্দোলনের প্রায় সবগুলোর পুরধায় ছিল বাম প্রগতিশীল সংগঠন ও ব্যক্তি) বাঁধ কাটা, গেট ভাংগা অবাধ পানি প্রবাহের জন্য বিভিন্ন উদ্যোগ নেয়। এ প্রেক্ষিতে ১৯৯৪-৯৫ সালে এ ডি বি/ইউ এন ডি পি এবং বাংলাদেশ সরকারের অর্থায়নে (২২,৮৬৮,১৬ লক্ষ টাকা) কে.জি.ডি.আর.পি (Khulna Jessor Drainage and Rehabilitation Project) এর অধীন হ্যাসকোনিং ও হেলক্রো সামগ্রীক নিষ্কাশন পরিকল্পনা প্রস্তুত করে। এ কর্মসূচীর আলোকে পানি উন্নয়ন বোর্ড সাবেক উপকূলীয় বাঁধের সম্প্রসারণ করতে চাইলে গণ প্রতিরোধে তা বাস্তবায়ন অসম্ভব হয়ে পড়ে। ১৯৯৭ সালের ৯ সেপ্টেম্বর যশোর জেলা পরিষদ মিলনায়তনে ইজি আই এস এর জাতীয় কর্মশালায় পানি বিশেষজ্ঞ ও রাজনৈতিক নেতৃত্বসহ সকল স্তরের জনগণ গবেষণালব্ধ ৪টি বিকল্পের মধ্যে ৪র্থ নম্বরের নদীর পরিকল্পিত জোয়ার ভাটা ব্যবস্থাপনা যা বর্তমানে টিআরএম এর স্বীকৃতি দেয়।

**পরিশিষ্ট সারনি ১: টিআরএম পূর্ব বাঁধকাটা/ভাঙ্গা কার্যক্রম (বিষ্ফুর্ত জনতা/আন্দোলনকারী সংগঠন)**

সময়	বিল	কার্যক্রম
১৯৮৩	ভর্তের বিল/ সিস্টিয়ার বিল	বাঁধ ভাঙ্গা
২২ জুলাই, ১৯৮৮	ডছুরী	বাঁধ কাটা
১৮ সেপ্টেম্বর, ১৯৯০	বিল ডাকাতিয়া	বাঁধ কাটা
২৯ অক্টোবর, ১৯৯৭	ভরত-ভায়না	বাঁধ কাটা

**পরিশিষ্ট সারনি ২:**

বিলের নাম	সংশ্লিষ্ট নদ-নদী	ধরণ (মুক্ত/পরিষ্কৃত)	সময়কাল	কততম	উদ্যোক্তা	ক্ষতিপূরণ	প্রধান অন্তরায়/ পরিবেশের উপর প্রভাব	মূল্যায়ন
ভরত ভায়না	হরিনদী	অপরিষ্কৃত, উন্মুক্ত	১৯৯৭, ২৯ অক্টোবর থেকে ২০০১	১ম	আন্দোলনকারী স্থানীয় জনগন	ব্যবস্থা ছিল না।	গাছপালা, মাছ, প্রকৃতির ক্ষয়ক্ষতি। লবণাক্ততার ফলে গো-খাদ্যের সংকট	বিলের তলদেশে ৫-৬ ফুট ভরাট, ৭৫% হরিনদীর নাব্যতা বৃদ্ধি পায়।
বিল কেন্দারিয়া (৬০০ হেক্টর)	হরিনদী	পরিষ্কৃত (৬০০ হেক্টর জমির চারিদিকে পরিষ্কৃত বাঁধ ছিল)	জামুয়ারী ২০০২ থেকে জুন ২০০৪ পর্যন্ত	২য়	পানি উন্নয়ন বোর্ড	ব্যবস্থা ছিল না।	পরিবেশের উপর তেমন বিরূপ প্রভাব ছিল না। ২০০৫ সালে উচ্চ অংশের জমির মালিকেরা জমির চাষ করে, নিচ অংশ নিচু থেকে যায়। আরও কিছুদিন টিআরএম দরকার ছিল। কিন্তু হয়নি। ২/৩ অংশ ভরাট হয়। অভ্যন্তরীণ দমন শুরু হয়। সামগ্রিক ক্ষতি ভবদহ অঞ্চলের নদী ১৭ কিলোমিঃ পলি দ্বারা ভরাট হয়। ফলে ২০০৫ সালে জলাবদ্ধতা হয়।	হরি নদীর নাব্যতা বজায় ছিল।
পূর্ব বিল মুকশিয়াম (৮৪৬ হেক্টর)	হরিনদী	পরিষ্কৃত	২৭ এপ্রিল ২০০৬ থেকে ২০১০+	৩য়	পানি উন্নয়ন বোর্ড	ব্যবস্থা ছিল।	ক্ষতি পূরণের ব্যবস্থা ছিল কিন্তু সবাই পায়নি। ১০৮২ জন জমির মালিকের মধ্যে ৪৪৬ জন ক্ষতি পূরণ পেয়েছে। ক্ষতিপূরণ বাবদ ১,৮৫,২৩,৩৩২/- (এক কোটি পঁচাত্তর লক্ষ তেইশ হাজার তিনশত বত্রিশ) টাকা মাত্র। (পানি উন্নয়ন বোর্ড ফসলের ক্ষতিপূরণ বাবদ ৩,৪০,০০,০০০/- (তিন কোটি চল্লিশ লক্ষ) টাকা বরাদ্দ করেন।	নির্ধারিত সময়ে টি, আর, এম কার্যক্রম শেষ না হওয়ায় জনমনোনা প্রশ্নের জন্ম হয়। টি, আর, এমকারা কালীন সংশ্লিষ্ট বিলে সমবায় ভিত্তিক কার্যক্রমের উদ্যোগ নেওয়া দরকার।

**টিআরএম এর ব্যর্থতার কারণ-**

- ১। রাজনৈতিক হীন স্বার্থ (টিআরএম এর পক্ষে বিপক্ষে পাল্টা-পাল্টা অবস্থান)
- ২। খাস জমি ও পরিত্যক্ত সম্পত্তি সংক্রান্ত জটিলতা।

৩। টিআরএম এর বিরুদ্ধে ঘের মালিক ও লীজ গ্রহীতাদের অবস্থান।

৪। পানি উন্নয়ন বোর্ডের দায়িত্ব হীনতা দুর্নীতি এবং বোর্ডের প্রতি জনগণের অনাস্থা।

৫। পানি উন্নয়ন বোর্ডের দক্ষতা এবং আন্তরিকতার অভাব।

৬। পেরিফেরিয়াল এবং গ্রাম রক্ষা বাঁধ সংক্রান্ত প্রশ্ন ইত্যাদি।

৭। ক্ষতি পূরণের অর্থ প্রাপ্তিতে ব্যাপক হয়রানি অব্যবস্থাপনা এবং সীমাহীন দুর্নীতি।

পরিশিষ্ট সারণি ৩: ভবদহের চলতি জলাবদ্ধতায় ক্ষয়ক্ষতির হিসাব :

উপজেলার নাম	মোট ইউপির সংখ্যা	অধিক ক্ষতিগ্রস্ত ইউনিয়নের নাম ও সংখ্যা	ক্ষতিগ্রস্ত গ্রামের সংখ্যা	ক্ষতিগ্রস্ত এলাকা (বর্গকিলোমিঃ)	ক্ষতিগ্রস্ত পরিবার	ক্ষতিগ্রস্ত লোকসংখ্যা	ক্ষতিগ্রস্ত ঘর বাড়ি (সম্পূর্ণ/আংশিক)
মনিরামপুর	১৭টি	ঢাকুরিয়া, হরিদাসকাঠি, খোদাপাড়া, হরিহরনগর, বাপা, মশ্বিনগর, চালুয়াহাটি, শ্যামকুড়, খানপুর, দুর্বাডাসা, কুলাটিয়া, নেহালপুর, মনোহরপুর = ১৩টি	১২০টি	২০৬.০০	৩০,০০০	১,২০,০০০	১,৫০০
অভয়নগর	০৮টি	শ্রেমবাগ, সুন্দলী, চলশিয়া, পায়রা = ৪টি পৌর = ১টি	৫৫টি	১২০.০০	১৪,৮৯৫	৬৫,০০০	১৪,৮৯৫
কেশবপুর	১১টি	কেশবপুর সদর = ১টি পৌর = ১টি	৮৫টি	১২১.৯০	১৭,৩৪৯	৮২,৫১১	১৭,৩৪৯

অস্থায়ী/স্থায়ী আশ্রয় কেন্দ্রের সংখ্যা	আশ্রয় কেন্দ্রে আশ্রিত পরিবার	ফসলের ক্ষয়ক্ষতি			ক্ষতিগ্রস্ত মৎস্য সম্পদ		ক্ষতিগ্রস্ত ধর্মীয় প্রতিষ্ঠান		ক্ষতিগ্রস্ত সড়ক (পাকা/কাঁচা)
		সম্পূর্ণ (হেক্টর)	আংশিক (হেক্টর)	টাকায় ক্ষতি	হেক্টর	টাকায় ক্ষতি	মসজিদ	মন্দির/শ্মশান	
৪২টি	৪০০০টি	৪১৫২.০০	৬৫৩৭.০০	৬৭৬.৩৫ কোটি	৭০১৩	১৯৪.০০ কোটি	২৪টি	০৮টি	৪৫কিঃ মিঃ
২৬টি	৭২০টি	৫৭৫৩.০০	-	৬০.৬৫ কোটি	৩৫০০	১২৪.০০ কোটি	১১টি	২০টি	৩৩কিঃ মিঃ
২০টি	২৩২৯টি	৫,৩০০	৩৯৪				৩০টি	১০টি	৪৪.৪৬কিঃ মিঃ

ক্ষতিগ্রস্ত বাধ	ক্ষতিগ্রস্ত শিক্ষাপ্রতিষ্ঠান				ক্ষতিগ্রস্ত মোট শিক্ষাপ্রতিষ্ঠান	ক্ষতিগ্রস্ত নলকূপ (গভীর/অগভীর)	ক্ষতিগ্রস্ত স্বাস্থ্যসম্মত ল্যাট্রিন	ক্ষতিগ্রস্ত জলাধার		ক্ষতিগ্রস্ত কমিউনিটি ক্লিনিক	মৃতের সংখ্যা
	প্রাথমিক	মাধ্যমিক	মাদ্রাসা	কলেজ				পুকুর	ঘের/ বাওড়/ হ্যাচারী (হেক্টর)		
০১ কিঃ মিঃ	৫১টি	৩৬টি	০৮টি	০৬টি	১০১টি	১২০টি	১৮০০০	৬০০০	২৫০০	০৮টি	০৭জন
-	২৭টি	০৮টি	০৩টি	০২টি	৪০টি	৫০টি	৪০০০	৪৫০০	৩৫০০	-	১২জন
	৭০টি	৪০টি	৩০টি	৮টি	১৪৮টি	২০৮টি	৯৮৩	১,১১৩	২,৯৪৭		৩জন

**পরিশিষ্ট সারণি ৪: জলাবদ্ধ এলাকায় চলমান আর্থ-সামাজিক সংকট ও অভিঘাত :**

সংকট	অভিঘাত
স্যানিটেশন ব্যবস্থা নষ্ট	দূষণের বিস্তার
পচনশীল জল	চর্মরোগের প্রাদূর্ভাব
জলাবদ্ধ বসতভিটা	সাপসহ বিষাক্ত পোকামাকড়ের আক্রমণ
ক্ষতিগ্রস্থ নলকূপ	পানীয় জলের সংকট
গো-খাদ্যের অভাব	গবাদি পশু কমমূল্যে বিক্রি/স্থানান্তর
জলাবদ্ধ কমিউনিটি ক্লিনিক	চিকিৎসার সমস্যা
বন্ধ স্কুল, কলেজ শিক্ষাপ্রতিষ্ঠান	ঝরে পড়ার আশংকা
দীর্ঘমেয়াদী জল	ইরি-বোর চাষের অনিশ্চয়তা
কৃষিজ ফসল (ধান, পাট, শাক-সবজি আবাদ নষ্ট)	পেশার পরিবর্তন
জলাবদ্ধতা নিরসনের উদ্যোগ	দূর্নীতির মহোৎসব
ত্রাণ বিতরণ (যতসামান্য)	সুদখোর বেসরকারি সংস্থার অনুগ্রহবেশ
হাইওয়ে রাস্তায় জল ও জলযান (খুলনা-যশোর, নওয়াপাড়া-মনিরামপুর, নওয়াপাড়া-মশিয়হাটী)	পরিবহন ও যোগাযোগ সংকট, ক্ষতিগ্রস্থ রাস্তা, দীর্ঘমেয়াদী ভোগান্তির আশংকা
উন্মুক্ত (জল, জলা, জলজ সম্পদ)	জলজ সম্পদ (মাছ, কাকড়া ইত্যাদি), খাস জমির দখলদার, বড় ভূ-স্বামীদের পুনঃদখল
কারেন্ট জালের বিস্তার	জলজ সম্পদ ক্ষতিগ্রস্থ
বনজ সম্পদ ধ্বংস	পরিবেশ বিপর্যয়
গবাদি পশু, মানুষ, খাবার ঘর যৌথ (রাস্তার উপর)	দূর্বল আত্মিক ও সামাজিক বন্ধন
জ্বালানী সংকট	খাদ্যের অনিশ্চয়তা
কর্মহীনতা	হাহাকার
বসতভিটা সহ শেষ সম্বল নষ্ট	শহরমুখী প্রবণতা, বস্তিয়ানের আশংকা

**৫. আশু করণীয় :-**

- ১। চলমান স্কেভেটর এর কার্যক্রমে গতি আনয়ন।
- ২। নতুন করে অধিক স্কেভেটরের এর ব্যবস্থাকরণ।
- ৩। স্কেভেটর বন্দ না রেখে নিরবিচ্ছিন্নভাবে কাজ করা।
- ৪। উত্তোলন কৃত পলি তীরে না রেখে দুরে অপসারণের ব্যবস্থা, ফলে পুনরায় নদীতে গড়িয়ে পড়ার হার কমবে।
- ৫। ভবদহের ২১ ও ৯ গেটের মাঝ দিয়ে ভবদহের উজান এবং ভাটির সরাসরি সংযোগ স্থাপন।
- ৬। আমড়াংগা খালের সংস্কার করা।
- ৭। নিহালপুরের দাইয়ের খাল সংস্কার।
- ৮। মনিরামপুরের দুর্বাডাঙ্গার বাকার খাল সংস্কার করতে হবে।
- ৯। উভয় পাশের জল প্রবাহ সংযোগের যে পুল-ব্রিজ ছিল তার উভয় পার্শ্বের প্রবাহ নিশ্চিত করা।
- ১০। বিল অভ্যন্তরের নিষ্কাশন খালসমূহ বাঁধাহীন করা।



### স্থায়ী সমাধান :-

প্রকৃতপক্ষে ভবদহের জলাবদ্ধতার সমাধান একক কোন পদ্ধতি বা কৌশলে সম্ভব না। মূলত: টিআরএম এবং বাঁধাহীন উজানের জলপ্রবাহ এক্ষেত্রে গুরুত্বপূর্ণ ভূমিকা পালন করবে। সংশ্লিষ্ট আর যা যা ভাবা যেতে পারে তা নিম্নরূপঃ

- ১। পরিকল্পিত এবং সর্বোচ্চ দক্ষতার সাথে পর্যায়ক্রমে এলাকার সকল বিলে টিআরএম ব্যবস্থায়ন করা।
- ২। টি আর এম কে নিরবিচ্ছিন্ন করা। মূলত একটা টিআরএম শেষ না হতেই অন্যত্র তা চালু করার ব্যবস্থা করা। একদিনও টিআরএম বিহীন পথ চলা নয়।
- ৩। আমড়াংগা খাল সংস্কারের মাধ্যমে সংকটের সহায়ক নিষ্কাশন পথ তৈরি করা।
- ৪। মাথা ভংগা, ভৈরবের সাথে মুক্তেশ্বরী কপোতাক্ষ সহ ভাটির সব নদীর অবাধ প্রবাহ সৃষ্টির নিশ্চিত ব্যবস্থাপনা।
- ৫। জলাবদ্ধ এলাকাকে ঘিরে জল প্রবাহ সার্কেল তৈরি করা। সংশ্লিষ্ট সকল নদী, খাল সংস্কার, (কৃত্রিম এবং প্রাকৃতিক উপায়ে) এবং পরস্পরের মধ্যে জীবন্ত সংযোগ স্থাপন।
- ৬। কৃত্রিম সব বাঁধ, বাঁধা অপসারণ করা। প্রাচীন সেই নিয়মে প্রকৃতির কাছে ফিরে যাওয়া।
- ৭। মৌলিক ভাবে ভূমি কৃষি, জল-জলা সংস্কার ( টিআরএম চলাকালীন সংশ্লিষ্ট বিলে সমবায় ভিত্তিক কার্যক্রম)
- ৮। নদী খনন, বাঁধ নির্মাণ ইত্যাদির মাধ্যমে জল প্রবাহ পরিকল্পিত করণ।
- ৯। উজানে ব্যারেজ নির্মাণ করে নিয়ন্ত্রিত জলপ্রবাহ (যদিও প্রশ্ন সাপেক্ষ)
- ১০। উজানের জলপ্রবাহ পর্যাপ্ত এবং নিশ্চিত করতে আন্তর্জাতিক নদী সমূহের প্রশ্নে জাতীয় নীতি নির্ধারণ কার্যক্রম পরিচালনা।
- ১১। ভবদহ, কাটেপাঁ, জামিরা, বিল ডাকাতিয়া, আফিল জুট মিল এবং জাহানাবাদ ক্যান্টনমেন্ট এর মাঝে বরাবর গিলাতলা সংলগ্ন ত্রিমোহনা ( ভৈরব- মুজতখালী ) সংযোগ চ্যানেল তৈরি।

### ৫. উপসংহার :

আমাদের উজানে হিমালয় আর ভাটীতে বঙ্গোপসাগর। মধ্যবর্তী পললভূমি আমাদের আবাসন। জলের মধ্যে, জলের খেলাতে এ ভূখন্ড এবং তার গঠন। প্রাকৃতিক বিপর্যয়কে একেবারে নির্মূল করা আমাদের তাই অসম্ভব। ঝুঁকি কমানোর কৌশল বের করা সম্ভব মাত্র। সম্ভবত বাংলাদেশে ১২৩/১২৫ টি পোল্ডার আছে। মূলত লবণাক্ততা, জোয়ার-ভাটা এবং জলোচ্ছ্বাস থেকে মুক্তির পথ খুঁজতে এর জন্ম। আর জলাবদ্ধতার গোড়ার কথাও এখানে। বাংলাদেশের দক্ষিণ-পশ্চিম অঞ্চলতো বটেই, পোল্ডারভুক্ত প্রায় সর্বত্র এ জলাবদ্ধতার সংকট বিদ্যমান। গত শতাব্দীর ষাটের দশকের শুরুতে আলোচিত ভবদহ এবং তত সংলগ্ন এলাকায় সংকটের উত্থান, আশির দশকের বিকাশ আর সাম্প্রতি এর চরম পরিণতি। হ্যাঁ প্রতি বছর মোটামুটি ২৪০ কোটি টন পলি এ ভূ-খন্ডে উজান এবং ভাটা থেকে প্রবাহিত এবং নিপোতিত হয়।

অবশ্য বাংলাদেশে রেইন কাট পলির বিষয়টি ভাবলে বলা যায় বন্যা এবং বৃষ্টির তারতম্যে এর হ্রাস বৃদ্ধি ঘটে। এর ব্যবস্থাপনা মুখ্য বিষয়। প্রকৃতির কাছে ফিরে গিয়ে প্রকৃতির নিয়মে দিনে দুই বার (জোয়ার ভাটা) প্লাবন ভূমিতে এ পলির বিক্ষেপন যেমন ভূমি গঠন করবে, স্বচ্ছ পানি ফেরার পথে নদীর প্রবাহ সচল রাখবে। এর ব্যত্যয় নদীর, খালের তলদেশ ভরাট হবে। এর প্রমাণ মাত্র দেড় মাসে ভবদহের স্লুস্ গেটের ভাটাতে ১৫ কিঃ মিঃ পলি দ্বারা ভরাট হওয়া। এর বিকল্প কি? যান্ত্রিক প্রক্রিয়ায় পলি ব্যবস্থাপনা নদীর সংস্কার তা তৃতীয় বিশ্বের দেশ বাংলাদেশে কতটুকু সম্ভব ভাববার বিষয়। বাংলাদেশের দক্ষিণ-পশ্চিম অঞ্চলের নদীসমূহ মূলত দক্ষিণ-পূর্বমুখী আর এর পলি ১০০% মিহি প্রায় কাঁদা যুক্ত (উল্লেখ্য দক্ষিণ-পূর্ব অঞ্চলের নদী দক্ষিণ-পশ্চিম মুখী এবং তার পলি খসখসে পাথরকুঁচি যুক্ত)। প্রাকৃতিক নিয়মে এর অপসারণের জন্য জলপ্রবাহ বেগবান হওয়া জরুরী। গতি ঘন্টায় ন্যূনতম ৩ কিলোমিটার। উজানের প্রবাহ বন্ধ থাকায় এটা ব্যাহত হয়। সেটি আর একটা বড় প্রশ্ন। সংকট উত্তরণে টিআরএম-ই ভরসা। তবে এটা স্যালাইন সাদৃশ্য, জীবন চলবে কিন্তু সুস্থ জীবন নয়। চূড়ান্ত সমাধানে শুধু দরকারই নয়, ভূমি কৃষি, জল, জলা, জঙ্গলে মৌলিক ব্যবস্থাপনা এবং যৌক্তিক সংস্কার নিশ্চিত জরুরী। তার জন্য চাই রাজনৈতিক সিদ্ধান্ত-রাষ্ট্রীয় উদ্যোগ এর কোন বিকল্প নেই।

### তথ্যসূত্র

- ১। জলাবদ্ধতার স্থায়ী সমাধানের লক্ষ্যে বিকল্প ভাবনা ও প্রস্তাবনা  
--- কৃষক, ক্ষেতমজুর, সংগ্রাম পরিষদ  
খুলনা-যশোর সমন্বয় কমিটি।
- ২। একটি ছোট্ট অপারেশন দক্ষিণ-পশ্চিম অঞ্চলের বহুবিধ সমস্যার সমাধান দিতে সক্ষম।  
--- সম্পাদনা- অনিল বিশ্বাস।
- ৩। টিআরএম অনিশ্চিত ঃ সংকটাপন্ন দক্ষিণ-পশ্চিম অঞ্চল।  
--- ফারুক আলম, উপাধ্যক্ষ ও সমাজকর্মী।
- ৪। মুক্তেশ্বরী নদী।  
--- ফারুক আলম, উপাধ্যক্ষ ও সমাজকর্মী।
- ৫। ভৈরব নদের সংস্কার ও খনন : দক্ষিণ, দক্ষিণ-পশ্চিমাঞ্চলের ভবিষ্যৎ  
--- গণ-কনভেনশনের উত্থাপিত পত্র।  
--- প্রফেসর আফসার আলী।
- ৬। খুলনা-যশোর নিষ্কাশন পূর্ণবাসন প্রকল্প। --- সংকলনে- আশরাফ-উল-আলম টুটু।
- ৭। ভবদহ পানি নিষ্কাশন সংগ্রাম কমিটি আয়োজিত গণ কনভেনশনে উত্থাপিত পত্র  
--- ভবদহ জলাবদ্ধতা ও নিরসন প্রস্তাবনা।  
--- আহবায়ক- প্রফেসর আফসার আলী
- ৮। ভবদহের জলাবদ্ধতার পদধ্বনি। --- সাংবাদিক রাজিব নূর ও মাসুদ আলম (প্রথম আলো)

- ৯। ভবদহের কান্না। --- সাংবাদিক মাসুদ আলম (প্রথম আলো)
- ১০। ভবদহের সার্বিক পরিস্থিতি। --- হিউম্যানিটি ওয়াচ।
- ১১। আপার ভদ্রা ও হরিনদী অববাহিকার জলাবদ্ধতা, পরিস্থিতি ও করণীয়। --- বাবর আলী গোলদার
- ১২। পূর্ববিল খুকশিয়ার জোয়ারাধার (টিআরএম) বাস্তবায়ন।--- মাসুদ করিম ও দীপক কুমার সরকার
- ১৩। হরি অববাহিকায় জলাবদ্ধতায় নিরসন ও টি,আর,এম বাস্তবায়ন বিষয়ক প্রস্তাবনা।  
--- হাসেম আলী ফকির।
- ১৪। ভবদহ জলাবদ্ধতার সমস্যা এবং আমাদের করণীয়। --- এম. আর খায়রুল উমাম
- ১৫। প্রগতি সমাজ কল্যাণ সংস্থা।
- ১৬। দৈনিক প্রথম আলো।
- ১৭। দৈনিক আমাদের সময়।
- ১৮। গ্রাফস ম্যানের ভূচিত্রাবলী, কেজেডিআরপির প্রকল্প ম্যাপ,
- ১৯। উপজেলা প্রকল্প বাস্তবায়ন কর্মকর্তা। ---অভয়নগর, মনিরামপুর, কেশবপুর (যশোর)।
- ২০। ভবদহ পানি নিষ্কাশন সংগ্রাম কমিটির সভার বক্তব্য, ভূক্তভোগী ও সংশ্লিষ্ট অভিজ্ঞদের মতামত।
- ইকবাল কবির জাহিদ, রণজীত বাওয়ালী, বৈকুণ্ঠ বিহারী রায়, নাজিমউদ্দিন, জাকির হোসেন হবি, অরুণা চৌধুরী, বৈদ্যনাথ বিশ্বাস, আঃ হামিদ গাজী, প্রভাষক সুকুমার ঘোষ, প্রভাষক জোবায়ের হোসেন, প্রভাষক চৈতন্য পাল, প্রভাষক তাপস কুমার, মহিরউদ্দিন বিশ্বাস, লিটু মন্ডল বিশ্বাস, অভিমূন্য বাওয়ালী, ইমরান হোসেন, রাকিবুল প্রমুখ।

## ভবদহের জলাবদ্ধতা-বিপর্যস্ত জনজীবন ও আমাদের করণীয়

সুকুমার ঘোষ \*

### ১. পটভূমি

ষাটের দশকের উপকূলীয় বাঁধ প্রকল্প গ্রহণের পূর্বে দক্ষিণ-পশ্চিমাঞ্চলের হিমালয় বিধৌত এ ব-দ্বীপ অঞ্চল ছিল অসংখ্য নদ-নদী, উপ-নদী ও শাখানদী বেষ্টিত। হিমালয় থেকে সৃষ্ট গঙ্গা নদীর মাধ্যমে বয়ে আসা হিমালয় বিধৌত পলি ও সুন্দরবনের জৈব বর্জ্য ভেসে এসে নিম্নভূমিতে অবক্ষিপিত হয়ে সৃষ্টি হয়েছে এ বিশাল ভূ-ভাগ- যা এক সময়ে সাগরের তলে নিমজ্জিত ছিল। জৈব ও পলিদ্বারা গঠিত এ ভূ-ভাগ ছিল খুবই উর্বর। খুব সহজেই এককথায় বিনা চাষে কৃষকেরা জমিতে আউশ ও আমনের চাষ করত। কখনও বন্যা, কখনও লবণাক্ততা আবার কখনও জলোচ্ছ্বাসে ফসলের ব্যাপক ক্ষতি হতো। মানুষ নিজস্ব অভিজ্ঞতাকে কাজে লাগিয়ে অষ্টমাসী বাঁধ দিয়ে তখন চাষাবাদ করত।

১৯৫৪-৫৫ সালের ভয়াবহ বন্যার পর জাতিসংঘের সুপারিশে পূর্ব-বাংলার (তৎকালীন পূর্ব পাকিস্তান) বন্যা সমস্যা সমাধানে গঠিত হয় ক্রুগ মিশন। এই মিশন বন্যা সমস্যা সমাধানে একটি সুপারিশ পেশ করে। ১৯৫৯ সালে ই.পি.ওয়াপদা গঠন হওয়ার পর পূর্ব-পাকিস্তানের বন্যা নিয়ন্ত্রণের দায়িত্ব দেওয়া হয় ই.পি.ওয়াপদাকে। ই.পি.ওয়াপদা বন্যা নিয়ন্ত্রণ ও লবণাক্ততা নিরসনে “উপকূলীয় বাঁধ” নামে একটি প্রকল্প হাতে নেয়। প্রকল্পের আওতায় “অধিক ফসল ফলাও”- এই শ্লোগানকে সামনে রেখে ১৯৬১ সালে ভবদহ নামক স্থানে হরি নদীর উপর বাঁধ দিয়ে (নদী বন্ধ করে) নদীর বাম দিকে ৬টি ও ২১ টি ও ডান পাশে ৯টি মোট ৩৬ টি স্লুইস গেট সহ শুধু খুলনাঞ্চলে ৩৭টি পোল্ডার, ৪০০০ কি.মি. বেড়িবাধ ও ২৮২ স্লুসজ গেট নির্মাণ করা হয়। বিলের অভ্যন্তরে মুক্তেশ্বরী অববাহিকায় খালসমূহের মুখেও স্লুইচ গেট নির্মাণ করে পোল্ডার গড়ে তোলা হয়। ফলে প্রকল্প পরবর্তী এক দশকেরও বেশী সময় ধরে এতদাঞ্চলে ৩ টি ফসল আউশ, আমন ও বোরো উৎপাদন হতো।

মানুষের জীবনে স্বাচ্ছন্দ্য ফিরে এলেও অতিবৃষ্টির ফলে স্লুইজ গেট দিয়ে দ্রুত পানি নামতে না পারায় এলাকা প্লাবিত হয়ে মানুষের ঘর-বাড়ী ফসলের ক্ষতি হয়েছে বার বার। কর্তৃপক্ষ জানতো প্রকল্পটি সর্বোচ্চ ২০-২৫ বছর কাজ করবে কিন্তু স্লুইজগেটগুলো ঠিকমত উঠানো-নামানোর অভাবে ১২-১৪ বছরের মধ্যে (৭০ এর দশকে) ভবদহ এলাকায় জলাবদ্ধতা দেখা দেয়, যা ৮০ এর দশকে মারাত্মক আকার ধারণ করে। পোল্ডার নির্মাণের ফলে জোয়ারের পলিযুক্ত পানি বিলে প্রবেশ করতে না পেরে গেটের বাইরে নদীর তলদেশে জমা হয় এবং গেটের ভিতরের বিস্তীর্ণ নিম্নাঞ্চলের স্বাভাবিক ভূমি গঠন

\* সহকারী অধ্যাপক, মশিয়াহাটা ডিগ্রী কলেজ, মশিয়াহাটা, যশোর।

প্রক্রিয়া ব্যাহত হতে থাকে। উজানে ফারাক্কা বাঁধের প্রভাবে পদ্মায় পানি প্রবাহ কমে যাওয়ায় শাখানদীগুলো প্রবাহহীন হয়ে পড়ে। হরি ও শ্রী এবং ভবদহের স্লুইজ গেটের অভ্যন্তরে অবস্থিত মুক্তেশ্বরী নদীর সাথে ভৈরব ও মাথাভাঙ্গার এককালে সংযোগ ছিল। পদ্মার শাখা মাথাভাঙ্গা নদী ভৈরবের একটি প্রবাহ মুখ। ঊনবিংশ শতাব্দীতে ব্রিটিশরা তাদের চলাচলের সুবিধার্থে নৌকা ভর্তি মাটি ফেলে খরশ্রোতা মাথাভাঙ্গা নদীকে শাসন করে। ফলে মাথাভাঙ্গা শ্রোতহীন হয়ে ভৈরবের নাব্যতা হ্রাস পায়। পঞ্চাশের দশকে ভৈরবের অপর উৎসে গঙ্গায় পশ্চিমবঙ্গের নদীয়া জেলার করিমপুর থানার হাগনা গাড়ী নামক স্থানে (ভারত অংশে নাম জলাঙ্গী নদী) তৎকালীন পশ্চিমবঙ্গ সরকার কর্তৃক বাঁধ দেয়ায় ভৈরব সম্পূর্ণভাবে গঙ্গা থেকে থেকে বিচ্ছিন্ন হয়ে যায়। এছাড়াও কোটচাঁদপুর থানার তাহেরপুর ও হাকিমপুরে কপোতাক্ষ নদী বিচ্ছিন্ন হওয়ার ফলে ভৈরবের শ্রোতধারা আরো দুর্বল হয়ে পড়ে। ভৈরব নদীকে বিভিন্ন জায়গায় শাসন ও লীজ প্রদান, মৎস্যঘের, পাটা দিয়ে মাছ ধরা ও বিভিন্ন স্থাপনা তৈরীতে ব্যবহার করায় শ্রোতহীন হয়ে পড়ে। এর ফলে ভবদহের উজানের পানি প্রবাহ বন্ধ হয়ে যায়। কপোতাক্ষ নদীও একই কারণে দুর্বল হয়ে পড়ে। এই নদীর সাথে সংযোগ রয়েছে হরিহর, বেত্রাবতী, ভদ্রা, ইছামতি প্রভৃতি নদীর। ভবদহের জলাবদ্ধতা নিরসনে দুটো নদীর নাব্যতা ফিরিয়ে আনা তাই জরুরী। মুক্তেশ্বরীতে উজানের পানি প্রবাহ না থাকায় পলিবাহিত জোয়ারের নোনা পানি ভূ-ভাগের অভ্যন্তরে প্রবেশ করে হামকুড়া, হরি, শ্রী, ভদ্রা, কপোতাক্ষ, বেত্রাবতী ও শোলমারীসহ দক্ষিণাঞ্চলের অধিকাংশ নদীর তলদেশ ভরাট হতে থাকে। হরি ও শ্রী নদীর তলদেশ বিলের ভূমির তলদেশ অপেক্ষা উঁচু হয়ে পড়ে এবং বিলের পানি নিষ্কাশন ব্যবস্থা অকোজো হয়ে যায়। ১৯৮৮ সালে যশোরের মনিরামপুর, কেশবপুর, অভয়নগর এবং খুলনার, ফুলতলা, ডুমুরিয়া ও বটিয়াঘাটার বিস্তীর্ণ এলাকা জলমগ্ন হয়ে পড়ে। যশোর জেলায় ২১টি ইউনিয়নের ২ শতাধিক গ্রাম ও ৮ লক্ষাধিক মানুষ জলাবদ্ধতার শিকার হয়।

আশির দশকে বামপন্থী সংগঠনগুলো জনগণকে সম্পৃক্ত করে গণ-অন্দোলন গড়ে তোলে এবং বিভিন্ন স্থানে বাঁধ কাটা, গেট ভাঙ্গা শুরু করে। ১৯৮৩ সালে জনগণ ভর্তের বিলের বাঁধ কেটে দেয়। ১৯৮৬ সালে “মরণ ফাঁদ ভবদহের বাঁধ”-শ্লোগানকে সামনে নিয়ে হাজার হাজার জনতা জলাবদ্ধতার হাত থেকে বাঁচার জন্য ভবদহের বেড়িবাঁধ কেটে দেয়। ১৯৮৭ সালে জনগণের আন্দোলনের মুখে তৎকালীন এরশাদ সরকার ভবদহে এসে জলাবদ্ধতা নিরসনে প্রয়োজনীয় ব্যবস্থা গ্রহণের প্রতিশ্রুতি দিয়েছিলেন। কিন্তু তিনি তার প্রতিশ্রুতি আংশিক রেখেছিলেন। স্থানীয় জনগণের কাছে শোনা ১৯৮৭ সালে ভবদহের স্লুইজ গেটগুলো খোলার ফলে শ্রী নদী নাব্যতা ফিরে পায় এবং বিল কেদারিয়া ও বিল বোকড়ে প্রচুর রবি শস্য হয়। বিল কেদারিয়ায় সে বছর যথেষ্ট পলিও পড়েছিল। ১৯৮৮ সালে জনতা ডহুরী ও ১৯৯৭ সালে ভরত-ভায়নার বেড়ী বাঁধ কেটে দেয়। মাস্তান বাহিনী ও পুলিশের সাথে প্রতিবাদী সংঘর্ষ হয়। জনতার সংঘর্ষে গোবিন্দ দত্ত মারা যান। ভরত-ভায়নায় অপরিকল্পিতভাবে বাঁধ কাটা হলেও বিলের তলদেশে ৫-৬ ফুট পলি পড়েছিল। শোলগাতিয়ায় হরি নদীর নাব্যতাও ১৫-২০ ফুট বৃদ্ধি পেয়েছিল।

১৯৯০ সালে বিল ডাকাতিয়া সংগ্রাম কমিটির নেতৃত্বে জনগণ ১৪৪ ধারা ভঙ্গ করে বিল ডাকাতিয়ার ৪-৫ স্থানে বেড়িবাঁধ কেটে দেয়। খুলনার বিল ডাকাতিয়ার জলাবদ্ধতা তৎকালীন সময়ে জাতীয় পর্যায়ে ব্যাপকভাবে আলোচিত হয়েছিল। আন্দোলনের মুখে সরকার ৪ কোটি টাকা খরচ করে শ্রী নদী খনন করে। সমস্যা সমাধানে সরকার একাধিক বিশেষজ্ঞ নিয়োগ দেন। হাসকোনিং, হালক্রো, পানি উন্নয়ন বোর্ড, কেজিডিআরপি বিশেষজ্ঞবৃন্দের প্রণীত প্রকল্প নিয়ে আলোচনা হয়।

## ২. সমস্যা সমাধানে উদ্যোগ

১৯৯৪-৯৫ সালে এশীয় উন্নয়ন ব্যাংকের আর্থিক সহায়তায় ২২৮৬৮.১৬ লক্ষ টাকা ব্যয়ে kahluna

Jessore Drainage Rehabilitation Project (KJDRP) গ্রহণ করা হয়। বিল ডাকাতিয়ার আংশিক জলাবদ্ধতা নিরসনে KJDRP সহায়ক হলেও উপকূলীয় বাঁধের সম্প্রসারণ, গ্যাংরাইলের উপর বড় ধরনের রেগুলেটর নির্মাণ প্রভৃতি পরিকল্পনা গ্রহণের ফলে জনতা প্রবল আপত্তি ও বাধা দেয়। ব্যাপক অনিয়ম ও দুর্নীতির কারণে প্রকল্পটি শেষ পর্যন্ত পরিত্যক্ত হয়।

টিআরএম : ১৯৯৭ সালের ৯ সেপ্টেম্বর যশোর জেলা পরিষদ মিলনায়তনে সিইজিআইএস এর জাতীয় কর্মশালায় জনগণের দীর্ঘ আন্দোলন, সিইজিআইএস (CEGIS)-এর ষ্টাডি রিপোর্ট এবং দাতা সংস্থার ইতিবাচক মনোভাব প্রদর্শনের ফলে অনিচ্ছা সত্ত্বেও পানি উন্নয়ন বোর্ড Tidal River Management (TRM) বাংলায় নদীর অববাহিকায় জোয়ারাধার ধারণাটি মেনে নেয়। TRM হলো মূল নদীর অববাহিকায় নির্বাচিত বিলে নদীর দিকে কিছু অংশ খোলা রেখে চারিদিক দিয়ে পেরিফেরিয়াল বাঁধ নির্মাণ করে বিলে জোয়ার ভাটা চালু করা। সমুদ্র থেকে জোয়ারের সাথে ভেসে আসা পলি কাট পয়েন্ট দিয়ে বিলে প্রবেশ করে অবক্ষিপিত হয়ে ভাটায় দ্রুত নেমে যাবে। সাধারণত: ৬০০ হেক্টর জমিতে ৩ বছর ব্যাপি জোয়ার-ভাটার মাধ্যমে পলি তুলে বিলকে উঁচু করার পাশাপাশি নদীর নাব্যতা বৃদ্ধি করাই প্রকল্পের উদ্দেশ্য। ১৯৯৮ সালে ১৭ জানুয়ারী বামপন্থী কৃষক সংগঠন, রাজনৈতিক দলের নেতৃবৃন্দ, ভবদহ আন্দোলনের সাথে সম্পৃক্ত নেতৃবৃন্দ, যশোর জেলা পরিষদ মিলনায়তনে একটি সেমিনার করে। সেমিনারে বিশিষ্ট পানি বিশেষজ্ঞ ড: আইনুন নিশাত, পরিবেশ বিজ্ঞানী ড: স্বপন আদনান, বিশিষ্ট প্রকৌশলী মোহাম্মদ শহীদুল্লাহ উপস্থিত ছিলেন। তাঁরাও জোয়ারাধারের পক্ষে মূল্যবাদ মতামত প্রদান করেন।

১৯৯৮ -২০০১ সাল পর্যন্ত বিল ভায়নায় স্থানীয় জনগণ স্ব প্রণোদিত হয়ে নিজস্ব অভিজ্ঞতাকে কাজে লাগিয়ে TRM চালু করে ভাল ফল পায়।

পানি উন্নয়ন বোর্ড ২০০২-২০০৪ সালে ২২৯ কোটি টাকা ব্যয়ে বিল কেদারিয়ায় ৬০০ হেক্টর জমিতে ১ম TRM চালু করে। জনগণের দাবী ছিল ২১ ভেন্ট ও ৯ ভেন্ট-এর ভিতর থেকে কেটে জোয়ারের শ্রোত কেদারিয়া বিলে নিয়ে যাওয়া। কিন্তু জনমতকে উপেক্ষা করে সরাসরি নদী না কেটে সুইজগেটের ভিতর দিয়ে জোয়ারের পানি প্রবাহিত করায় বিলে আশানুরূপ পলি পড়ে না। সুইজগেট থেকে বিল কেদারিয়ার দূরত্ব ৬কি:মি। জোয়ারের পানি যাবার পথে নদীর ভিতর অসংখ্য মাছ ধরার পাটা -জাল থাকাতে পলিযুক্ত শ্রোতকে বাধাপ্রাপ্ত করে। উপরন্তু পানিউন্নয়ন বোর্ডের কাজে দীর্ঘসূত্রতা, জনমতকে উপেক্ষা করা, অনিয়ম ও দুর্নীতি, সর্বোপরী বাস্তবায়নে উদাসীনতার ফলে প্রকল্পটি আংশিক সফল হয়। সে সময়ে পাউবোর বিরুদ্ধে মহিলারা বাটা মিছিল করেছিল। TRM চালুর ফলে শ্রী ও হরি নদীর নাব্যতা ২০-৩০ ফুট বৃদ্ধি পায়। বিল কেদারিয়ার কিছু কিছু এলাকায় বিশেষ করে উঁচু জমিগুলোতে ভাল ফসল হয়। তবে জমির মালিকদের কোন ক্ষতি পূরণ দেয়া হয়নি। গরীব কৃষকেরা ৩ বছরের জন্য স্বেচ্ছায় জমি দিয়েছিল জলাবদ্ধতা থেকে মুক্তি পাবার আশায় কিন্তু তাদের আশা পূরণ হয়নি।

বিল কেদারিয়ার ইরি,বোরো চাষীরা লবণ পানি থেকে তাদের ফসল রক্ষার্থে স্থানীয় বিএনপি নেতা নাজমুল সাদাতের কাছে সুইজ গেট বন্ধ রাখার দাবী জানান। তৎকালীন জেলা প্রশাসকের কাছে ৪৮৩ জনের স্বাক্ষরিত আবেদনের প্রেক্ষিতে ও স্থানীয় জনপ্রতিনিধিদের সম্মতিতে ১২ মার্চ থেকে গেটগুলো ৪৯ দিন বন্ধ রাখা হয়। পানি উন্নয়ন বোর্ড গেটগুলো খুলতে চেষ্টা করেও জনতার দাবীর মুখে ব্যর্থ হয়। উপরন্তু ডুমুরিয়ার শৈলগাতীতে আরসিসি ব্রীজ নির্মাণকালে নদী শাসন করা হয়েছে। নদীর মাঝে পূর্ব নির্মিত ব্রিজের পিলার থাকাতে নদীর প্রবাহকে বাঁধাধ্বংস করার ফলে নদীতে পলি অবক্ষিপন দ্রুত হয়। ইতোমধ্যে ১৭ কি:মি: নদী ভরাট হয়ে যায়। অক্টোবরের ৭দিন একটানা বৃষ্টিতে যশোর,খুলনা ও

সাতক্ষিরা জেলার ৪টি উপজেলার , ২৭টি ইউনিয়নের , ২০০ টি গ্রামের প্রায় ১০ লক্ষ লোক পানি বন্দি হয়ে পড়ে। স্কুল-কলেজ,রাস্তা-ঘাট,ঘর-বাড়ী পানিতে নিমজ্জিত হয়।শত শত লোক গৃহ ছেড়ে রাস্তায় আশ্রয় নেয়। এলাকার হাজার হাজার অশিক্ষিত-শিক্ষিত যুবক এসময়ে সংসার চালাতে যেয়ে শিল্প নগরী নওয়াপাড়াতে ঘাট শ্রমিক, মিল শ্রমিক, দিনমজুর, রিকসা-ভ্যান চালক, রাজমিস্ত্রী, মৎস্য শিকার পেশায় নিয়োজিত হয়। কিছু সংখ্যক শিক্ষিত লোক নওয়াপাড়া, মনিরামপুরসহ বিভিন্ন শহুরে প্রাইভেট টিউশনি ও অন্যান্য কাজ করে জীবিকা নির্বাহ করে। দেশ ত্যাগ করে ভারতে চলে গেছে বেশ কিছু পরিবার।

পরিস্থিতির প্রেক্ষিতে ভবদহ পানি নিষ্কাশন সংগ্রাম কমিটি, ২৭ বিল সংগ্রাম কমিটি, কপোতাক্ষ ও ভৈরব বাঁচাও কমিটি ব্যাপক আন্দোলন গড়ে তোলে। তাদের দাবী ছিল “পানি সরাও মানুষ বাঁচাও” পাউবো নয় সেনাবাহিনীর ইঞ্জিনিয়ারিং কোর-কে দিয়ে পানি সরাতে হবে। অবশেষে সরকার পানি নিষ্কাশনের জন্য ৭০ কোটি টাকা বরাদ্দ দেয় এবং সেনাবাহিনীর ইঞ্জিনিয়ারিং কোর-এর তত্ত্বাবধানে পাউবোকে দিয়ে কাজ করে। এদিকে যশোর- খুলনা রোডের পাশে আমড়াংগা খালের সাথে ভৈরবের সংযোগ ঘটিয়ে অভয়নগর জলাবদ্ধ এলাকার ১৫বিলের পানি সরানোর দাবী জোরালো হয়। ফলে আমড়াংগা খাল খনন করা হয়। কিন্তু উক্ত খালের উপর স্বল্প দৈর্ঘ্য ও অগভীর উচ্চতা সম্পন্ন একটি রেলওয়ে ও একটি হাইওয়ে ব্রীজ থাকায় পানি প্রবাহ বাঁধাধস্থ হয়। গত ১ আগষ্ট ২০০৬ তারিখের পানি সম্পদ সচিব ও স্থানীয় সাংসদের উপস্থিতিতে সভার সিদ্ধান্ত মোতাবেক রেলওয়ে ব্রীজ সংস্কার ও হাউওয়ে ব্রীজ নির্মাণ করে তৎসংলগ্ন ৫টি স্লুইজগেট স্থাপন করা হয়। এদিকে জনস্বার্থে দায়ের করা একটি মামলায় হাইকোর্ট ভবদহকে দুর্গত এলাকা ঘোষণা ও জলাবদ্ধ মানুষকে পর্যাপ্ত ত্রাণ ও পুনঃবাসনের ব্যবস্থা করতে বলে। কিন্তু হাইকোর্টের রায় বাস্তবায়িত হয়নি।

২০০৬ সালের ২৭ এপ্রিল পূর্ব বিল খুকশিয়ায় TRM চালু করা হয়। কিন্তু জুলাইয়ের প্রথম সপ্তাহে জোয়ারের পানির সাথে উজানের বৃষ্টির পানি কাট পয়েন্ট দিয়ে একসাথে ঢুকে বেসিনে পানির উচ্চতা বাড়িয়ে দেয়। ফলে পশ্চিম বিল খুকশিয়াসহ ২৬ বিলের (২৬ বিল বলা হলেও ভবদহ এলাকায় বাস্তবে ছোট ছোট আরও অনেক বিল রয়েছে) পানি কাটাখালী ৫ ভেন্টরে স্লুসজ গেট দিয়ে পূর্ব বিল খুকশিয়ায় নিষ্কাশন বাধাপ্রাপ্ত হয়। অবশেষে ১৫ জুলাই ২০০৬ স্থানীয় চেয়ারম্যানবৃন্দ জনসাধারণকে সাথে নিয়ে কাট পয়েন্ট বন্ধ করে দেয়। জনগণের মধ্যে ক্ষোভ বাড়তে থাকে। ৩০৭৫ জন জমির মালিকের মধ্যে মাত্র ৪৪৬ জন ১,৮৫,২৩,৩৩২ টাকা গ্রহণ করে। জনগণের বক্তব্য, প্রকল্পের টাকা ব্যাপকভাবে লুটপাট হয়েছে। নদী কাটা, বাঁধ দেয়া, স্কেভেটর মেশিন দিয়ে ঘের কাটা, মেশিন আকেজো দেখিয়ে তেল চুরি প্রভৃতি কারণে পানি নিষ্কাশন সংগ্রাম কমিটি আন্দোলন শুরু করে। ২৮ সেপ্টেম্বর ২০০৬ থেকে সেনাবাহিনীর সহযোগিতায় জলাবদ্ধতা নিরসনে কাজ শুরু হয় এবং পুনরায় TRM চালু হয়। ২০০৮ সালে প্রকল্পটি শেষ হওয়ার কথা থাকলেও পাউবো TRM চালু রাখে। ২০১৩ সালে সংক্ষুদ্ধ জনগণ গোরশিয়ালের কাট পয়েন্ট বন্ধ করে দেয়। ফলে নদীতে আবার পলি জমতে শুরু করে।

৫ মে, ২০১২ সালে বিল কপালিয়ায় TRM উদ্বোধন করা হয়। কিন্তু ২ জুন ২০১২ পেরিফেরিয়াল বাঁধ তৈরী করতে গেলে TRM বিরোধী জনতা জাতীয় সংসদের হুইপ শেখ আব্দুল ওহাব,এম পি,অভয়নগর উপজেলা পরিষদের চেয়ারম্যান আব্দুল মালেক, পাউবোর কর্মকর্তাবৃন্দসহ ২৬ জন আহত হয়। পাউবো ও পুলিশের গাড়ীতে ভাঙচুর ও পোড়ানো হয়। মূলত: পাউবোর কর্মকর্তা ও সংশ্লিষ্টদের সীমাহীন দুর্নীতি,খাস জমি ও অর্পিত সম্পত্তি দখলকারী বড় বড় ঘের মালিকের ক্ষতি পূরণ না পাওয়া, দখলকৃত খাস জমি ও অর্পিত সম্পত্তি বেদখল হয়ে যাওয়ার ভয়, জনগণকে প্রকল্প সম্পর্কে মোটিভেশন না করে অনেকটা গায়ের জোরে TRM করা, TRM সঠিকভাবে বাস্তবায়ন হবে কিনা -সে বিষয়ে জনমনে সংশয়,সর্বোপরী ক্ষতি পূরণ প্রাপ্তিতে সংশয় প্রভৃতি কারণে জনগণ বাঁধা দেয়। ৩০ জুন ২০১২ প্রকল্পের

মেয়াদ শেষ হলে পাউবো ৩০ জুন ২০১৫ পর্যন্ত মেয়াদ বৃদ্ধি করে। কিন্তু প্রকল্পের কাজ চালু করতে ব্যর্থ হয়। জলাবদ্ধতা ঠেকাতে ভবদহের সব গেট খুলে দেয়া হয়। সিঙ্গিয়ার বাঁধ ভেঙ্গে যাবার ফলে পানির চাপে ভাগ্যক্রমে হরি নদী ভরাট হয়না।

২০১৬ সালে ১৬০ কোটি টাকা ব্যয়ে পাউবো ঠিকাদার দিয়ে ভবদহের স্লুজগেটগুলো আটকে রেখে ভিতরে টেকা নদী ২ কি:মি: ও বাইরে হরি নদী ৫০০ মি: কাটে। হরি নদী কাটার সাথে সাথে জোয়ারের পানিতে পলি পড়ে বন্ধ হয়ে যায় (ভবদহ গেটের মৎস্য শিকারী ছালাম হালদারের ভাষ্য অনুযায়ী TRM চালু না থাকলে শুষ্ক মৌসুমে প্রতি জোয়ারে গেটের বাইরে প্রায় ২ ফুট পলি জমে যায়। এক গ্লাস পলি যুক্ত পানি গ্লাসে রাখলে অর্ধেকের বেশী পলি জমে)। স্থানীয় লোকের অভিমত গেট আটকে রেখে ভেতরে খনন করায় সমস্ত গেটগুলো এবং নদী পলিতে দ্রুত ভরে গেছে। একই অবস্থা হয়েছে ৬ ভেন্ট ও ৯ ভেন্টেরে। কপালিয়ার বাসিন্দা হরি পদ মন্ডল বলেন, স্লুজগেটগুলো বন্ধ করে ভিতরে মাঠি কাটার ফলে পলি জমে হরি নদী শোলগাতী ব্রীজ পর্যন্ত প্রায় ১২ কি:মি: চর পড়ে গেছে। আমরা বহুবার কর্মকর্তাদের অনুরোধ করেছি গেট তুলে দিতে। কিন্তু কেউ আমাদের কথা শোনেনি।

ভবদহ এলাকা পুনরায় জলাবদ্ধ হয়ে পড়ার আশংকা বিগত দুই বছর যাবৎ সব মহলে আলোচিত হয়েছে। এ নিয়ে পত্র-পত্রিকায় প্রচুর লেখালেখি হয়েছে। কিন্তু বাস্তবে এলাকার জনসাধারণকে সংগঠিত করে বড় ধরনের কোন আন্দোলন হয়নি। এবছর আগে থেকেই বৃষ্টি শুরু হয়। ভবদহ এলাকার বৃষ্টি ও উজানের বৃষ্টির পানি এসে জমতে থাকে বিলে। বঙ্গোপসাগরে সৃষ্ট নিম্নচাপে ৯ থেকে ১০ আগস্ট এবং ২০ ও ২১ আগস্ট একটানা বৃষ্টিতে এলাকা তলিয়ে যায়। আবহাওয়া অধিদপ্তর ২৪ ঘন্টায় ১৯২ মি:মি: বৃষ্টিপাত রেকর্ড করে। নদীগুলোর পানি বিপদসীমার ৩.৫৮ মি: উপর দিয়ে প্রবাহিত হচ্ছিল। ভারী বৃষ্টিপাতে যশোরের মনিরামপুর, কেশবপুর ও অভয়নগর উপজেলার ২৭ টি ইউনিয়নের ২ শতাধিক গ্রামের ৩ লক্ষ লোক পানি বন্দী হয়ে পড়ে। এলাকার স্কুল-কলেজ, বসত বাড়ী, অধিকাংশ রাস্তা ২-৩ ফুট কোথাও আরও বেশী পানির তলে নিমজ্জিত। যেসব রাস্তায় পানি ওঠেনি সেখানে মানুষ তাদের গবাদী পশু ও হাঁস-মুরগী নিয়ে একসাথে বসবাস করছে। অনেকের ধান-চাল পানিতে ভিজে নষ্ট হয়েছে। বাকীরা ইট কাঠ দিয়ে কোনক্রমে সংরক্ষণ করেছে অথবা কমদামে বিক্রি করে দিতে বাধ্য হচ্ছে। এলাকাবাসি গরু পালনে খুবই দক্ষ। কিন্তু অধিকাংশ গরু রাখার জায়গা ও খাবারের অভাবে অর্ধেক দামে ব্যাপারীর কাছে বিক্রি করে দিয়েছে। ক্ষেতের ফসল, শাক-সজী, ঘেরের মাছ, বাগানের ফল, ঘাছ-পালা সবকিছু বিনষ্ট হয়েছে। বাথরুম-ল্যাট্রিন পানিতে নিমজ্জিত থাকায় মানুষ খোলা জায়গায় প্রাকৃতিক কাজ সারতে বাধ্য হচ্ছে। ফলে পানি পচে চারিদিকে দুগন্ধ ছড়াচ্ছে। দূষিত পানি গৌছল ও ব্যবহার করে হাত-পায়ে ঘা, চুলকানী,আমাশয়, কলেরা প্রভৃতি রোগ মহামারী আকার ধারণ করেছে। এলাকার স্কুল-কলেজ বন্ধ থাকাতে ছাত্র-ছাত্রীদের শিক্ষা কার্যক্রম দারুণভাবে ব্যাহত হচ্ছে। ইতোমধ্যে সাপের কামড়ে ১৩ জন ও জলে ঢুবে মারা গেছে ১২ জন (সূত্র-৮ সেপ্টেম্বর ২০১৬ দৈনিক পূর্বাঞ্চল)। এলাকার নারী, শিশু, বৃদ্ধ ও প্রতিবন্ধীরা সবচেয়ে বেশী ক্ষতিগ্রস্ত ও দুর্বিসহ জীবন যাপন করছে। ( ১৮ সেপ্টেম্বর, ২০১৬ পর্যন্ত যশোর জেলার অভয়নগর, মনিরামপুর ও কেশবপুর উপজেলার সার্বিক ক্ষয়-ক্ষতির চিত্র ও ম্যাপ সংযুক্ত করা হলো,সূত্র- জেলা ত্রাণ ও পুন:বাসন অফিস,যশোর)। বাস্তবে ক্ষয়ক্ষতির পরিমাণ আরো বেশী ও সুদূরপ্রসারী।

### ৩. পানি নিষ্কাশনের জন্য সুপারিশ :

#### স্বল্পমেয়াদী

১। হরি-শ্রী নদী শোলগাতী ব্রীজ পর্যন্ত ১৫-২০ ফুট গভীর করে খনন করতে হবে



- ২। ভবদহ স্লুজগেটের পাটার নীচে জমে থাকা সমস্ত পলি (ডাইভারশন চ্যানেলের পলি) দ্রুত অপসারণ করতে হবে
- ৩। ৯ ও ৬ ভেন্ট-এর পলি দ্রুত অপসারণ করে পানি বের করার ব্যবস্থা করতে হবে
- ৪। জোয়ারের পানি প্রবেশ রোধে সমস্ত কপাটের রবারসেল লাগাতে হবে
- ৫। ভবদহ গেটের ভাঙ্গা রেলিং, হুক, পিলার ও ট্রলি মেরামত/নতুন করে লাগাতে হবে
- ৬। নদীর ভিতরের সমস্ত পাটা, জাল, কুমোর (নদীতে ঢাল ফেলে মাছ ধরার স্থান) অপসারণ করতে হবে
- ৭। আমড়াংগা খাল গভীর ও প্রশস্ত করতে হবে
- ৮। ঘেরের ভিতর থেকে সমস্ত খালকে অবমুক্ত করতে হবে
- ৯। TRM বেসিনের জমির মালিকদের হাল রেকর্ড ও দখল সত্ত্বে সহজে ক্ষতিপূরণ প্রদান করাতে হবে
- ১০। পূর্ব বিল কপালিয়ায় TRM চালু করতে হবে
- ১১। সমস্ত পরিকল্পনা জনগণকে অবহিত করতে হবে ও স্থানীয় ভূমিহীনদের দ্বারা কার্যক্রম বাস্তবায়ন করতে হবে
- ১২। পাউবো, স্থানীয় প্রশাসন ও এলাকার সম্মানিত ব্যক্তিবর্গের সমন্বয়ে প্রয়োজনীয় সংখ্যক মনিটরিং কমিটি গঠন করতে হবে
- ১৩। স্লুজগেটগুলোর পাটা উঠানো-নামানো ও আনুষঙ্গিক কাজের জন্য স্থায়ী লোক নিয়োগ দিতে হবে।
- ১৪। ভবদহ এলাকাকে দূর্গত এলাকা ঘোষণা করতে হবে

### দীর্ঘমেয়াদী

- ১। পদ্মার সাথে মাথাভাংগা, মাথাভাংগার সাথে ভৈরব, ভৈরবের সাথে কপোতাক্ষ ও মুক্তেশ্বরীর কার্যকরী সংযোগ স্থাপন করতে হবে
- ২। নদীর সাথে সকল সংযোগ খাল, নালা অবমুক্ত করে খনন করতে হবে
- ৩। অপরিকল্পিতভাবে গড়ে তোলা সকল মৎস্য ঘের উচ্ছেদ করতে হবে
- ৪। এলাকার সকল কালভার্ট - ব্রিজ দ্রুত পানি নিষ্কাশনের উপযোগী করে নির্মাণ করতে হবে
- ৫। স্কুল-কলেজ, বসতবাড়ী, গোয়ালঘর, রাস্তাসহ সকল স্থাপনা বর্তমান ওয়াটার লেভেলের চেয়ে ৫ ফুট উঁচু করে তৈরী করতে হবে
- ৬। আমড়াংগা খাল দখলমুক্ত ও অংশ বিশেষ অধিগ্রহণ করে রাজাপুর খালের সাথে সংযোগ ঘটাতে হবে। খাল গভীর ও প্রশস্ত করতে হবে এবং জমির মালিকদের ন্যায্য ক্ষতিপূরণ দিতে হবে
- ৭। পর্যায়ক্রমে সকল বিলে পরিকল্পিত উপায়ে TRM চালু করতে হবে
- ৮। সকল বিলে অবাধ জোয়ার-ভাটার সুযোগ তৈরী করতে হবে। লবণ পানির প্লাবন থেকে ফসল রক্ষার জন্য অষ্টমাসী বাঁধ (৩০ ডিসেম্বর- ৩০ এপ্রিল) নির্মাণ কর

গ্রন্থপঞ্জী

- ১। মো. জয়নাল আবেদীন - বাংলাদেশে পানির সে কাল ও এ কাল
- ২। মো. জয়নাল আবেদীন - জলবায়ু পরিবর্তন: বাংলাদেশে এর প্রভাব, প্রস্তুতি ও করণীয়
- ৩। রাশেদা আক্তার খানম - জলবায়ু পরিবর্তন ও বাংলাদেশ-সংকটে গ্রামীণ নারী
- ৪। প্র. আশরাফ আলী - ভৈরব নদের সংস্কার ও খনন
- ৫। প্র. আশরাফ আলী - ভবদহসহ দক্ষিণ-পশ্চিমাঞ্চলের লবণাক্ততা ও জলাবদ্ধতা নিরসনের উপায়
- ৬। প্র. আশরাফ আলী - ভবদহ পানি নিষ্কাশন সংগ্রাম কমিটি আয়োজিত কনভেনশনে উত্থাপিত পত্র
- ৭। মহির উদ্দিন বিশ্বাস - TRM
- ৮। এম আর খায়েরুল আলম - ভবদহ জলাবদ্ধতা সমস্যা এবং আমাদের করণীয়
- ৯। হাসেম আলী ফকীর - হরি অববাহিকায় জলাবদ্ধতা নিরসন ও টিআরএম বাস্তবায়ন বিষয়ক প্রস্তাবনা
- ১০। বাবুর আলী গোলদার - আপার ভদ্রা ও হরি অববাহিকায় জলাবদ্ধতা পরিস্থিতি ও করণীয়
- ১১। ফারুক আলম- টিআরএম অনিশ্চিত সংকটাপন্ন দক্ষিণ পশ্চিমাঞ্চল
- ১২। ক্ষেত মজুর সংগ্রাম পরিষদ, খুলনা-যশোর সমন্বয় কমিটি - জলাবদ্ধতা স্থায়ী সমাধানের লক্ষ্যে বিকল্প ভাবনা ও প্রস্তাবনা
- ১৩। সুকুমার ঘোষ - উপকূলীয় বাঁধ মরণ ফাঁদ



## নারী অধিকার ও সমাজ সচেতনতা: প্রেক্ষিত বাংলাদেশ

শাহানারা বেগম\*

সারকথা: নারী সমাজের মোট জনসংখ্যার অর্ধেক হওয়া সত্ত্বেও সমাজে প্রায় প্রতিটি ক্ষেত্রে নারী তার অধিকার থেকে কেবল বঞ্চিতই নয় বরং তারা পুরুষতান্ত্রিক সমাজ কাঠামোর দ্বারা নির্যাতনের শিকার। আধুনিক যুগে অনেক আন্দোলন সংগ্রামের মধ্য দিয়ে নারীরা সমাজে তাদের কিছু কিছু অধিকারের কিতাবী স্বীকৃতি পেলেও বাস্তবে তার তেমন একটা প্রয়োগ দেখা যায় না বিশেষত বাংলাদেশের মত দেশে। পুরুষতান্ত্রিক সমাজ-মানস 'নারী' বিষয়ক যে 'মিথ' তৈরী করেছে তাতে নারী পুরুষের অধস্তনই কেবল নয় বরং সে হলো তার ভোগের সামগ্রী। এ 'মিথ' নারী পুরুষ নির্বিশেষে সকলের মনোজগতে সমভাবে ক্রিয়াশীল, তাই আমাদের মত সমাজে নারী এখনো স্বাধীন সত্ত্বা হিসাবে নিজেদের অধিকার প্রতিষ্ঠা করতে পারে নি, কেবল তাই নয় এ প্রতিষ্ঠা করা যে দরকার সে চেতনাও অনেক নারীর মধ্য গড়ে ওঠেনি। মূলত অধস্তনতার এই মিথ থেকে সমাজ মানসকে মুক্ত করা না গেলে নীতি কিংবা আইন করে নারী অধিকার প্রতিষ্ঠা করা যাবে না। এমনকি বিভিন্ন ক্ষেত্রে নারীর ব্যক্তিগত দক্ষতাও এ ক্ষেত্রে তেমন একটা কার্যকরী ভূমিকা রাখতে পারবে না। আমাদের দেশে বেশ কিছুকাল যাবৎ দেশের প্রধান মন্ত্রী ও বিরোধীদল নেতা নারী কিন্তু তারপরও সমাজে নারীর ক্ষমতায়ন সেভাবে হয়নি, হয়নি তার অধিকার প্রতিষ্ঠা। অনেকে বলে থাকেন যে, নারীশিক্ষার বিস্তার এবং অর্থনৈতিক কর্মকাণ্ডে নারীর অংশগ্রহণের সুযোগ সমাজে নারী অধিকার প্রতিষ্ঠা করতে পারে। বাস্তবে যখন দেখি বিশ্ববিদ্যালয় থেকে সর্বোচ্চ ডিগ্রিধারী নারীরা যৌতুকের বলি কিংবা যৌন নিপীড়নের শিকার হন অথবা কর্মজীবী নারী হওয়া সত্ত্বেও পারিবারিক ক্ষেত্রে সিদ্ধান্ত গ্রহণে তার ভূমিকা গৌণই থেকে যায় তখন বক্তব্যটি প্রশ্নসাপেক্ষ হয়ে পড়ে। আসলে নিজেদের অধিকার সম্পর্কে যতক্ষণ নারীরা সচেতন না হবেন, কিংবা সমাজে নারীও যে স্বাধীন মানুষ এ চেতনার বিকাশ ঘটানো না যাবে ততদিন পর্যন্ত নারী তার অধিকার পাবে না। অবশ্যই শিক্ষা, অর্থনৈতিক সক্ষমতা ইত্যাদি নারীকে তার অধিকার আদায়ে খানিকটা যোগ্য করে কিন্তু মনোজাগতিক পরাধীনতা থাকলে এসব তেমন কোন কাজে আসে না। বাংলাদেশের প্রেক্ষিতে বলা যায় পুরুষতান্ত্রিক সমাজ মানসিকতার পরিবর্তে মানবীয় সমাজমানসিকতার নির্মাণই নারী অধিকার প্রতিষ্ঠার প্রধান উপায়। আর তা নির্মাণ করতে হবে নারী পুরুষ নির্বিশেষে সকল মানুষ মিলে। এ মূল কাজটিকে বাদ দিয়ে নিছক নারীবাদী আন্দোলন কিংবা কাগজে আইন নারী অধিকার প্রতিষ্ঠা করতে পারবে না। আর এ সমাজ সচেতনতার কাজে সামনে থেকে নেতৃত্ব দিতে হবে নারীদেরকে। জায়া-ভগ্নি-মাতা নির্বিশেষে সকল নারী ও নারীর সহযোগী পুরুষকে বুঝতে হবে প্রথমত ও প্রধানত নারী মানুষ, আর মানুষ হিসাবে তার প্রাপ্য অধিকার যেখানেই হরিত হবে সেখানেই যৌথভাবে রুখে দাঁড়াতে হবে। এ প্রতিরোধ যেমন নারীকে সুরক্ষা দেবে তেমনই তার অধিকার প্রতিষ্ঠার লাগাতার লড়াইকে সামনে এগিয়ে নিয়ে যাবে।

\* সহযোগী অধ্যাপক, অর্থনীতি বিভাগ, নড়াইল সরকারী ভিক্টোরিয়া কলেজ

## ১. ভূমিকা

একটি সমতাভিত্তিক অসম্প্রদায়িক বৈষম্যহীন রাষ্ট্র ও সমাজ গঠনের অঙ্গীকার নিয়ে ১৯৭১ সালের মুক্তিযুদ্ধের মধ্যদিয়ে আমাদের মূল অর্জন ১৯৭২ সালের সংবিধান। পবিত্র সংবিধানের ২৬, ২৭, ২৮, ২৯ অনুচ্ছেদে নারীর সমানাধিকারের কথা বলা হয়েছে। বিশেষ করে ২৭ নং অনুচ্ছেদে বলা হয়েছে "সকল নাগরিক আইনের দৃষ্টিতে সমান এবং আইনের সমান আশ্রয় লাভের অধিকারী"। ২৮(২)নং অনুচ্ছেদে বলা হয়েছে "কেবল ধর্ম, গোষ্ঠী, বর্ণ, নারী-পুরুষের জন্মস্থানের কারণে কোন নাগরিকের প্রতি রাষ্ট্র বৈষম্য প্রদর্শন করবে না"। কাঙ্ক্ষিত স্বাধীনতা অর্জনের ৪৬ বছর পর নারীর অবস্থান নিয়ে চিৎকার করতে হচ্ছে, নারী কি? নারী কে? নারী কি মানুষ নয়? স্বাধীনতা অর্জনে সক্রিয় অংশগ্রহণ করেও স্বাধীনতার সুফল ভোগ করার অধিকার তার নেই কেন !

জনসংখ্যার শতকরা বন্টন থেকে দেখা যায় বাংলাদেশের মোট জনসংখ্যার অর্ধেক নারী, যারা প্রতিনিয়ত সামাজিক, রাজনৈতিক, অর্থনৈতিক, ধর্মীয় ও সাংস্কৃতিক এবং পারিবারিক দিক থেকে বৈষম্য ও বিবিধ নির্যাতনের যাতাকলে পিষ্ট। অন্যান্য অনুন্নত ও উন্নয়নশীল দেশের মত এ দেশের নারীরা প্রান্তিক জনগোষ্ঠী হিসাবে দ্বিবিধ নিগ্রহের শিকার, একদিকে দরিদ্র হিসাবে ধনিক শ্রেণীর শোষণ ও নির্যাতন, অপর দিকে নারী হিসাবে পুরুষতান্ত্রিক সমাজ ব্যবস্থার নিজস্ব নির্যাতন। নিচের তথ্য থেকে খানিকটা ধারণা পাওয়া যেতে পারে।

- ইউএনডিপি'র হিসাব অনুসারে যে সব মানুষকে দরিদ্র মনে করা হয় তার ৭০শতাংশ নারী।
- গত ২০ বছরে সম্পূর্ণ দরিদ্র সীমার (absolute poverty Limit) নিচে নারীদের সংখ্যা ৫০শতাংশ বেড়েছে, যেখানে পুরুষের ক্ষেত্রে এই হার ৩০শতাংশ।
- উন্নয়নশীল দেশসমূহে নিরক্ষর নারীদের সংখ্যা পুরুষের তুলনায় ৫০ শতাংশ বেশি।
- প্রাথমিক স্কুলে মেয়েদের ভর্তির হার ছেলেদের তুলনায় ১৩ শতাংশ কম।
- মেয়েদের মজুরি পুরুষদের মজুরির তুলনায় মাত্র ৭৫ শতাংশ।
- শিল্পোন্নত দেশসমূহে মেয়েদের বেকারত্বের হার ছেলেদের তুলনায় অনেক বেশি।
- যারা বিনা মজুরিতে শ্রম দেয় বা দিতে বাধ্য হয় তাদের মধ্যে ৭৫ শতাংশই নারী।

উৎস: (United Nations Development Fund for Women & World Report on human Development)

উপরের তথ্য থেকে দেখা যায় নারীরা শিক্ষা, কর্মসংস্থান, শ্রমের মজুরি, বেগার শ্রম এবং বেকারত্বের মত অর্থনৈতিক নির্ধারক সমূহের দিক থেকে ব্যাপক বৈষম্যের শিকার। পরিণতিতে দরিদ্রকরণের ভয়াবহ চক্রে সে ক্রমাগতই অধঃপতিত হচ্ছে। দুর্ঘটনা ও বিবাহ বিচ্ছেদের হার ক্রমশবৃদ্ধির কারণে নারীর উপর নির্ভরশীলতার হারও প্রতিনিয়ত বেড়ে চলেছে। অপরদিকে সামাজিক কিংবা পারিবারিক ক্ষেত্রে সিদ্ধান্ত গ্রহণ অথবা স্বাধীন মত প্রকাশের কোন সুযোগ নারী পায় না বললেই চলে। সম্পত্তি ও সম্পদের অধিকারহীন নারী হয় সমাজে উদ্বাস্ত ও ভাসমান। শ্রমশক্তি হিসেবে নারীকে অবমূল্যায়ন করা হয়। এমন কি প্রথাগত অর্থনৈতিক জরীপেও আবশ্যিক স্বাভাবিক গৃহকর্মকে অর্থনৈতিক কাজ হিসেবে স্বীকার করা হয় না। নারী আক্রান্ত হয় পুরুষতন্ত্রের পাশবিক আক্রমণের। দরিদ্র ভূমিহীন কৃষক পরিবারের নারী থেকে টাকা বিশ্ববিদ্যালয়ের শিক্ষক কেউই এর হাত থেকে নিস্তার পায় না। যৌতুক, স্বাধীন মতপ্রকাশ, ক্ষমতাসীনদের লালসার খোরাক হতে রাজি না হওয়া, ইত্যাদি বিবিধ কারণে প্রতিনিয়ত ঘটে চলেছে এই

পাশবিকতা। যার ব্যাপ্তি ইভটিজিং থেকে ধর্ষণ, এসিড নিক্ষেপ থেকে হত্যা পর্যন্ত প্রসারিত। এসব ছাড়াও আমাদের সমাজে ক্ষয়িষ্ণু সামন্ত অবশেষের প্রতিনিধি বিভিন্ন ধর্মীয় মৌলবাদী গোষ্ঠী ধর্মীয় বিধানের অপব্যখ্যা ও অপপ্রয়োগের মাধ্যমে নারীর বিকাশের পথকে রুদ্ধ করার চেষ্টা চালায় এবং নারীকে শৃঙ্খলিত ও অবরোধবাসিনী করে তাকে আরো বেশি প্রান্তিক ও অসহায় করে তোলে। যে-সমাজ বিশৃঙ্খল, যে-সমাজে মৌলবাদের বিকাশ ঘটছে যে সমাজ পুরুষাধিপত্যবাদী, যে সমাজে কারোই নিরাপত্তা নেই, আর নারী যেহেতু সমাজে সবচেয়ে অসহায়; তাই সেখানে নারী নির্যাতন, সহিংসতা ও ধর্ষণ প্রকটরূপে দেখা দেয়। বি.বি.এস(বাংলাদেশ পরিসংখ্যান ব্যুরো) এর তথ্য অনুযায়ী বাংলাদেশে ৮৭.১২% নারী প্রতিনিয়ত নির্যাতন ও সহিংসতার শিকার হয়। শহর অঞ্চলে এই নির্যাতনের হার ৭৯.২৮% হলেও গ্রামে নির্যাতনের হার আরও বেশী, যার পরিমাণ ৮৮.৭৭%।

সমস্যার বাংলাদেশের নারীসমাজের কারণ অনুসন্ধান এবং প্রতিকারের পথ।

বাংলাদেশের প্রচলিত পিতৃতান্ত্রিক মতাদর্শ অনুসারে নারীরা প্রধানত গৃহাভিমুখী, এর সাথে ধর্মের ব্যবহারের মাধ্যমে এই গৃহাভিমুখীতাকে আরো বেশি শক্তিশালীভাবে সংরক্ষিত করা হয়। পিতৃতন্ত্র এবং ধর্মীয় মূল্যবোধ অনুসারে নারী কেবল গৃহাভিমুখীই নয় সাথে সাথে পরিবারের অভ্যন্তরে সে পুরুষের অধস্তনও বটে। সমাজের অন্য সকল ক্ষেত্রে এই অধস্তনতা আরো অনেক বেশি প্রকট। এই মতাদর্শ নারীকে কেবলমাত্র পুনঃউৎপাদনের হাতিয়ার (Reproduction Tools) হিসাবে তুলে ধরে। ফলে সমাজে আদর্শ নারী নামে একটি মিথ (Myth) তৈরী হয় যা অনুসারে নারীর আদর্শ হয়ে ওঠে “সন্তান ধারণ, লালন ও পালনে সক্ষমতা” এ থেকে সমাজে নারীদের সম্পর্কে যে প্রধান ধারণা সমূহ গড়ে উঠে সেগুলি হলো :-

- \* নারী হলো ঘরের শোভা।
- \* যতই শিক্ষিত বা চাকুরিজিবি হোক নারীর আসল কাজ ঘরে।
- \* নারী হবে নরম, কোমল, কমনীয় ও সহনশীল স্বভাবের।
- \* নারীরা পুরুষের তুলনায় দুর্বল, মেধা, মনন ও কর্মদক্ষতায় কম ক্ষমতাসম্পন্ন।
- \* নারী সবসময় পরিবার ও স্বামীর কাছে সমর্পিত ও নিবেদিত হবে।
- \* স্বামীর সন্তুষ্টির উপর স্ত্রীর ইহলোক পরলোক নির্ভর করে।
- \* লজ্জাশীলতা হলো নারীর প্রধান পরিচয়।

উপরের প্রচলিত ধারণাগুলি প্রমাণ করে আমাদের সমাজে নারী জন্মগতভাবে এমন একটি সাংস্কৃতিক প্রেক্ষাপটে শৃঙ্খলাবদ্ধ যেখানে তার প্রথম পরিচয় হলো পুরুষের অধস্তনত। এই অধস্তনতার মূল্যবোধ কেবল পুরুষ নয় অধিকাংশ নারী ও আত্মস্থ করে নেয়। এর ফলে ‘নারী শাড়ি, গয়না, বাড়ী, গাড়ি ছাড়া আর কিছু বোঝে না’ কিংবা ‘বাইরের জগৎ সম্পর্কে মেয়েরা কি বুঝবে’ ইত্যাদি প্রচলিত বয়ান কেবল পুরুষ নয়, অধিকাংশ নারীও তার মননে ধারণ করে এবং সেইভাবে নিজেকে তৈরী করে।

সমাজের এই মূল্যবোধের পাশাপাশি আর একটি দিক না বললে আমাদের সমাজের নারীদের অবস্থা পরিস্কার ভাবে বোঝা যাবে না। এ সমাজ-কাঠামোতে নারী হলো একটি ভাসমান জনগোষ্ঠী। যাদের একাংশ অন্য কোন পরিবারে প্রতিপালিত হয়ে একটি পরিবারে এসেছে বৈবাহিক সূত্রে। অন্যাংশ কোন পরিবারে জন্ম নিচ্ছে, প্রতিপালিত হচ্ছে, এবং প্রস্তুতি নিচ্ছে অন্য কোন অজানা পরিবারে যাবার জন্যে।

এর কারণে আমাদের সমাজে নারীর জীবন আবর্তিত হয় ' ভাল ঘর, ভাল বর ' পাওয়ার আকাঙ্ক্ষায় । নারীর যোগ্যতা বলতে তাই ' ভাল বর, ভাল ঘর ' পাওয়ার যোগ্যতাকেই বোঝানো হয় । ফলে নারীর যোগ্যতার প্রধান বিষয় হয়ে দাঁড়ায় তার দৈহিক সৌন্দর্য (যা পুরুষের ভোগের সামগ্রী হিসাবে নারীকে পুরুষের কাছে অধিক কাম্য করে তোলে) পিছনে পড়ে যায় তার মেধা মনন বা অন্য সব ধরনের যোগ্যতা ।

বর্তমান সমাজের এই সকল মূল্যবোধ ও নারীর অবস্থাকে টিকিয়ে রাখা ও তাকে ব্যবহার করে মুনাফা অর্জনের জন্য কর্পোরেট পুঁজিতার বিবিধ পণ্য বিপননে ব্যাপকভাবে যেমন নারী শরীর ব্যবহার করে তেমনই নারীকে একটি শরীরসর্বস্ব ভোগদ্রব্য হিসাবে তুলে ধরে । প্রচলিত বিজ্ঞাপনসমূহ বিশ্লেষণ করলে দেখা যাবে প্রায় সকল বিজ্ঞাপনের মূল ম্যাসেজ হলো নারী জীবনের লক্ষ্য 'আদর্শ গৃহবধু, সুনিপুণ গৃহিনী, ও পুরুষের চোখে সৌন্দর্যের প্রতীক হওয়া' । কেবল কর্পোরেট পুঁজিই নয়, ধর্মীয় মৌলবাদও বিষয়টিকে টিকিয়ে রাখার জন্য সর্বশক্তি নিয়োগ করে । পুঁজি যেখানে নারীকে ঘরের বাইরে এনে তাকে ভোগ্যপণ্য হিসাবে তুলে ধরে, ধর্মীয় মৌলবাদ সেখানে ভোগ্যপণ্য হিসাবে নারী শরীরকে ব্যক্তিভোগের লক্ষ্যে নিজস্ব সম্পত্তি হিসাবে চার দেওয়ালের ভিতর আটকে রাখতে চায় । আপাতভাবে এদের কাজকে আলাদা মনে হলেও উভয়ের উদ্দেশ্য নারীকে নিছক ভোগ্যপণ্য হিসাবে ব্যবহার করা ।

সামাজিক মূল্যবোধগত অবস্থানের পাশাপাশি শ্রমশক্তি হিসাবে নারীকে অবমূল্যায়ন করা এমনকি অস্বীকৃতির একটি ধারাও এ সমাজে প্রচলিত রয়েছে । নারীদের কাজের একটি বড় অংশকে আবশ্যিক স্বাভাবিক গৃহকর্ম হিসাবে দেখা হয় যার কোনরূপ বিনিময় মূল্য বা মজুরি স্বীকৃত নয় । এমনকি আমাদের প্রথাগত অর্থনৈতিক জরিপেও একে অর্থনৈতিক কাজ হিসাবে স্বীকার করা হয় না । এই অস্বীকৃতির পাশাপাশি নারী শ্রমকে অবমূল্যায়িতও করা হয় । আমাদের দেশে সবচেয়ে বেশি নারী শ্রমিক যে পোশাকশিল্পে কাজ করে তার দিকে তাকালে আমরা দেখতে পাব এখানে পুরুষ শ্রমিকের তুলনায় নারী শ্রমিকের মজুরির হার অনেক কম । কেবল মজুরি নয় কর্মক্ষেত্রে দায়িত্ব ও মর্যাদাগত দিক থেকেও ব্যাপক বৈষম্য রয়েছে, রয়েছে কর্মপরিবেশগত সামাজিক অবস্থানগত বৈষম্য ।

সামাজিক ও অর্থনৈতিক এই অধস্তনতার কারণে নারীকে পুরুষের তুলনায় কম গুরুত্ববহ ও কম মূল্যবান মনে করা হয় , পাশাপাশি নারী জীবনের মূল লক্ষ্য ' ভাল বর ভাল ঘর 'এ কথা মেনে নেওয়ার কারণে সমাজে উদ্ভূত হয় যৌতুক নামক এক ভয়াবহ প্রথার, যার বলী হয় অজস্র নারী । বিশেষত শারীরিকভাবে কম সুশ্রী বা সামাজিকভাবে অপেক্ষাকৃত দুর্বল পরিবারের নারীর ক্ষেত্রে এর ব্যাপ্তি ও ভয়াবহতা অত্যন্ত বেশি ।

উপরের সংক্ষিপ্ত আলোচনা থেকে আমরা বলতে পারি আমাদের সমাজে নারীরা অধিকার বঞ্চিত এবং বিবিধ ধরনের বৈষম্যের শিকার । এখন প্রশ্ন হলো কিভাবে এই বঞ্চিত ও বৈষম্য থেকে মুক্তি পাওয়া যেতে পারে ? প্রচলিত অন্যতম ধারণা হলো নারীর শিক্ষা , দক্ষতা ও কর্মসংস্থানের অভাব দূর করা গেলে নারীর সমস্যার সমাধান হবে । আমরা মনে করি নারী অধিকার আদায়ের ক্ষেত্রে নারী শিক্ষা ও কর্মসংস্থান গুরুত্বপূর্ণ হলেও যতক্ষণ পর্যন্ত সমাজে বিশেষত পুরুষ ও নারীদের মধ্যে অধিকার সচেতনতা গড়ে তোলা না যাবে, ততক্ষণ পর্যন্ত তা খুব একটা কাজে আসবে না । অর্থাৎ নিছক নারী বা পুরুষ হিসাবে নয় সমাজের একজন মানুষ হিসাবে নিজের অধিকার সম্পর্কে সচেতন হয়ে ঐ সকল অধিকার প্রতিষ্ঠার লক্ষ্যে সামাজিক, সাংস্কৃতিক, অর্থনৈতিক, ধর্মীয় ও রাজনৈতিক মূল্যবোধ পরিবর্তনের সংগ্রামে অংশগ্রহণে যতক্ষণ পুরুষ বা নারীরা উদ্বুদ্ধ না হবে ততক্ষণ পর্যন্ত কেবল শিক্ষা বা কর্মসংস্থান খুব বেশি কিছু করতে পারবে না । বর্তমানে কর্মে নিয়োজিত নারীদের অবস্থা পর্যালোচনা করলে আমরা দেখতে পাব ঘরের

বাইরে কাজে নিয়োজিত হওয়ার পরও তারা ঘরের কাজ থেকে মুক্তিতে পানই না বরং কর্মক্ষেত্রে দায়দায়িত্ব পালনের কারণে ঘরের কাজে অবহেলার বোধ তাদের তাড়িত করে। এই তাড়নায় বাইরের কাজ শেষে ঘরে ফিরে নারীরা সাধ্যানুযায়ী 'সার্বক্ষনিক গৃহ পরিচর্যায়' নিয়োজিত হন। অর্থাৎ কর্মজীবী নারীকে ঘরের কাজ ও বাইরের কাজ উভয়ই করতে হয়। এ ছাড়া নারীদের কর্মপরিবেশ এবং নিরাপত্তার দিকটি বিবেচনা করলে দেখা যাবে কর্মজীবী নারীরা তাদের কর্মক্ষেত্রেও নানামুখী নির্যাতন ও বৈষম্যের শিকার হন। Joekes S. Trade Related Employment for Woman in Industry and Services নামক গবেষণাপত্রে উন্নয়নশীল দেশের নারী শ্রমিকদের অবস্থা সম্পর্কে বলেন “ম্যানেজার ও সুপারভাইজার নারী শ্রমিককে ড্রাগ খেতে উৎসাহ দেয়, তাদের ক্লান্তি দূর করতে! গর্ভনিরোধ খেতে বলে যাতে তাদের গর্ভে সন্তান না আসে। যে মেয়েরা আপত্তি করে, তারা বরখাস্ত হয়। মারধোরও চলতে পারে। কোন কোন জনকে খুন বা পঙ্গু করে দেওয়া হয়।” আমাদের গর্মেন্টস শিল্পে কর্মরত নারী শ্রমিকদের ক্ষেত্রে উল্লেখিত নাইজেরিয়ান নারী শ্রমিকদের অবস্থার চেয়েও অনেক ভয়াবহ ঘটনা প্রতিদিন ঘটে চলেছে। যখন দেখা যায় বিশ্ববিদ্যালয় পেরোনো মেয়েরাও প্রতিনিয়ত যৌতুকের বলী হচ্ছেন কিংবা যৌতুকের বিয়েতে মত দিচ্ছেন বা দিতে বাধ্য হচ্ছেন তখন শিক্ষার বিষয়টি কতখানি কার্যকর হতে পারে তা সহজেই বোঝা যায়। এ প্রসঙ্গে অর্থনীতিবিদ আনু মুহাম্মদ তার 'নারী, পুরুষ ও সমাজ' গ্রন্থে বলেন “বাহ্যিক দৃষ্টিতে নারী শিক্ষা, সম্পদ, অর্থ ইত্যাদির কারণে কোনো কোনো ক্ষেত্রে আপাত মর্যাদা লাভ করলেও এ সমাজে নারীরা মূলত জন্মগতভাবে পুরুষের অধস্তন থাকার মতো সাংস্কৃতিক প্রেক্ষাপটে শূঙ্খলাবদ্ধ।” আমরা দেখতে পাচ্ছি নারী অর্থ, বিত্ত, শিক্ষা, চাকুরী সম্পন্ন হলেও সমাজের নিজস্ব মতাদর্শ দিয়েই সে মূল্যায়িত হয়। ফলে তার ব্যক্তি-বিকাশ কিংবা ব্যক্তিস্বাভাব প্রকাশিত হতে পারে না তাই উন্নয়ন তথা জীবনযাত্রায় মৌলিক সুবিধাদি ভোগে তাদের অর্জন সীমিতই থেকে যায়।

### ৩. প্রতিকার

অনেকে মনে করেন রাষ্ট্র অধিকহারে নারীবান্ধব কঠোর আইন প্রণয়নের মাধ্যমে নারী বৈষম্য ও নারী নির্যাতন বন্ধ করতে পারে। এ ক্ষেত্রে আমরা মনে করি নারীবান্ধব আইন নারীর অধিকার নিশ্চিত করার ক্ষেত্রে ততক্ষণ পর্যন্ত খুব বেশি ভূমিকা রাখতে পারবে না যতক্ষণ না নারীরা তাদের অধিকার আদায়ে সচেতন ও সংগঠিত শক্তি হিসাবে সমাজে নিজেদের অবস্থান তৈরী করতে সক্ষম হবে। আইনের কথা প্রসঙ্গে আমরা ১৯৮০ সালের যৌতুক নিরোধ অধ্যাদেশ, ১৯৮২ ও ১৯৮৬ সালের যৌতুক নিরোধ সংশোধনী অধ্যাদেশ, ১৯৮৩ সালের নারী নির্যাতন (নিবর্তনমূলক) শাস্তি অধ্যাদেশ, ১৯৮৮ সালের নারী নির্যাতন (নিবর্তনমূলক শাস্তি সংশোধনী) অধ্যাদেশ, ১৯৮৫ সালের পারিবারিক আদালত অধ্যাদেশ, ১৯৮৯ সালের পারিবারিক আদালত (সংশোধনী) অধ্যাদেশ, এবং ১৯৯৫ সালে ধর্ষণের শাস্তি মৃত্যুদণ্ড পর্যন্ত বর্ধিত করণের কথা আমরা বলতে পারি। এতসব আইন প্রণয়নের পরও বিদ্যমান পরিস্থিতি খুব একটা পাল্টায়নি। আসলে নারী নির্যাতন সামগ্রিক নারী অধস্তনতার অন্যতম বহিঃপ্রকাশ, কাজেই নারী অধস্তনতার সামাজিক, অর্থনৈতিক, রাজনৈতিক, মতাদর্শগত ব্যবস্থাকে টিকিয়ে রেখে নারী নির্যাতন রোধে যত কঠোর আইনই প্রণয়ন করা হোক না কেন তা খুব বেশি কার্যকর ফল বয়ে আনতে পারবে না। নানাবিধভাবে যারা ক্ষমতার সাথে যুক্ত তাদের বিরুদ্ধে লড়াইতে অধস্তন, দুর্বল, নিস্কর্মাদার নারীকে এ সমাজ বেশিদূর এগোতে দেয় না। তাই প্রণীত আইনের খুব বেশি সুফল নারীরা ভোগ করতে পারে না।

এতক্ষণ যে নারী অধিকার ও সচেতনতার কথা বলা হলো এবার আমরা অতি সংক্ষিপ্ত পরিসরে তার আন্তর্জাতিক প্রেক্ষিতটি তুলে ধরার চেষ্টা করবো। দীর্ঘকাল ধরে ব্যক্তি ও গোষ্ঠী পর্যায়ে এ বিষয়ে আলোচনা ও আন্দোলনের ফলশ্রুতিতে আন্তর্জাতিকভাবে বিষয়টি পাদপিঠে আসে ১৯৬০ এর দশকের শেষার্ধ্বে এবং বিশ্ব উন্নয়ন প্রক্রিয়ায় নারীর অংশগ্রহণের বিষয়টি সামনে চলে আসে। উদ্ভব হয় WID



(Woman in Development) ধারণার। এর প্রভাবে জাতিসংঘ ১৯৭৫ সালকে নারীবর্ষ এবং ১৯৭৬-৮৫ কে আন্তর্জাতিক নারী দশক ঘোষণা করে। পাশাপাশি ১৯৪৫ সালে নারী পুরুষের মধ্যে সমতার নীতিমালা প্রতিষ্ঠার উদ্দেশ্যে গৃহীত প্রথম আন্তর্জাতিক জাতিসংঘ সনদের পূর্ণবাস্তবায়নের উদ্যোগ গৃহীত হয়। ১৯৭৪ সালে জাতিসংঘের নারীদের অবস্থা সম্পর্কিত কমিশনের ২৫তম সভায় নারীর প্রতি বৈষম্য দূরকরণের খসড়া দলিল প্রণয়ন করা হয়। ১৯৭৫ সালে মেজিকোতে ‘সমতা, উন্নয়ন ও শান্তি’ এই শ্লোগান নিয়ে জাতিসংঘের উদ্যোগে প্রথম বিশ্ব নারী সম্মেলন অনুষ্ঠিত হয়। গৃহীত হয় ‘বিশ্ব কর্ম পরিকল্পনা’। দীর্ঘ ৪ বৎসরের বিবিধ আলোচনা সমালোচনার পর ১৯৭৯ সালের ১৮ই ডিসেম্বর জাতিসংঘ সাধারণ পরিষদে ‘নারীর প্রতি সব ধরনের বৈষম্য দূরীকরণ বিষয়ক সনদ’ বা ইউডেভ (ঈডুহাবঃরডুহ ডুহ উবরসরহঃরডুহ ডুহ ডুহ অষষ ভডুৎসং ডুহ উরংপত্রসরহঃরডুহ অমধরহঃ ডুডসবহ) গৃহীত হয়। মোট ৩০টি ধারা বিশিষ্ট এই সনদের ১-১৬ নারী পুরুষের সমতা, ১৭-২২ সিডওর কর্মপন্থা ও দায়িত্ব, ২৩-৩০ সিডওর প্রশাসন বিষয়ক ধারা সমূহ রয়েছে। এই সনদে ঘোষণা করা হয় “নারীর প্রতি বৈষম্য, অধিকারের সমতা ও মানব মর্যাদার প্রতি সম্মানের নীতির লংঘন ঘটায়; নিজ দেশের রাজনৈতিক, সামাজিক, অর্থনৈতিক ও সাংস্কৃতিক জীবনে পুরুষের মত সমান শর্তে নারীর অংশগ্রহণে প্রতিবন্ধকতা সৃষ্টি করে; সমাজ ও পরিবারের সমৃদ্ধির বিকাশ ব্যত করে এবং নিজ দেশ ও মানবতার সেবায় নারীর সম্ভাবনার পূর্ণ বিকাশ আরও কঠিন করে তোলে।” [বাংলাদেশ ১৯৮৪ সালে ২.১৩(ক), ১৬.১(গ,চ) ধারা সংরক্ষণসহ উক্ত সনদে স্বাক্ষর করে। ১৯৯৭ সালে ১৩(ক) ও ১৬.১(চ) ধারার আপত্তি প্রত্যাহার করে নেয়।] এরপর ১৯৮০ তে কোপেনহেগেন, ১৯৮৫তে নাইরোবি এবং ১৯৯৫ তে বেইজিং বিশ্ব নারী সম্মেলন অনুষ্ঠিত হয় এবং আন্তর্জাতিক ভাবে নারী অধিকার ও নারীর ক্ষমতায়নের বিষয়টি বিশেষ গুরুত্ব লাভ করে।

আন্তর্জাতিক এই সকল প্রক্রিয়ার ধারাবাহিকতায় ১৯৯৭ সালের ৮মার্চ সর্বপ্রথম তদানিন্তন প্রধানমন্ত্রী শেখ হাসিনা বাংলাদেশের ‘জাতীয় নারী উন্নয়ন নীতি’ ঘোষণা করেন যা মূলত ছিল ৪র্থ বিশ্ব নারী সম্মেলন তথা বেইজিং সম্মেলনে গৃহীত ১২ ইস্যুর (নারী ও দরিদ্র, নারীর শিক্ষা ও প্রশিক্ষণ, নারী ও স্বাস্থ্য, নারীর বিরুদ্ধে সহিংসতা, নারী ও সশস্ত্র সংঘাত, নারী ও অর্থনীতি, ক্ষমতা ও সিদ্ধান্ত গ্রহণে নারী, নারীর জন্য প্রাতিষ্ঠানিক কাঠামো, নারীর মানবাধিকার, নারী ও তথ্যমাধ্যম, নারী ও পরিবেশ, মেয়ে শিশু) আলোকে রচিত। নীতিটি শেষ পর্যন্ত কার্যকর হতে পারেনি পরবর্তী সরকার ২০০৪ সালে নতুন করে নারীনীতি ঘোষণা করেন যা ছিল পূর্বে ঘোষিত নীতি অপেক্ষা পশ্চাদপদ। এটিও বাস্তবায়িত হয়নি। ২০০৮ সালে তত্ত্বাবধায়ক সরকার আমলে আবারও নারীনীতি ঘোষিত হয় সেটিও কার্যকর হয়নি।

বর্তমান সরকার ক্ষমতায় এসে নারী উন্নয়ন নীতি ২০১১ ঘোষণা করেছেন। আমরা মনে করি এই নীতি নারীর সকল অধিকারকে স্বীকৃতি না দিলেও তা অনেকগুলি অধিকারকে নীতিগতভাবে মেনে নিয়েছে যা নারী অগ্রযাত্রায় সহায়ক হবে। মৌলবাদী গোষ্ঠী এ নীতির বিরুদ্ধে মাঠে নেমেছে এবং ধর্মীয় জিগির তুলে নারী অধিকার হরণের পুরাতন পথ ধরেছে। নারীর অধিকার প্রতিষ্ঠা ও বৈষম্য দূরীকরণের জন্য এই নারী নীতির পূর্ণ বাস্তবায়ন প্রয়োজন বলে আমরা মনে করি। পাশাপাশি সিডও (CEDAW) সনদের পূর্ণ বাস্তবায়ন ও সকল ধরনের নারী নির্যাতন প্রতিহত করা অতীব প্রয়োজন। এ গুলি বাস্তবায়ন ও সমাজের নারী অধস্তনতার মূল্যবোধ পরিবর্তনের জন্য সকল স্তরের নারী ও প্রগতিশীল মানবিক পুরুষদের ঐক্যবদ্ধ আন্দোলন গড়ে তোলার যে প্রচেষ্টা তাকেই আমরা সমাজ সচেতনতা বলে চিহ্নিত করছি। অর্থাৎ সমাজ সচেতনতা কেবল একটি ধারণা নয় বরং একই সাথে এটি একটি করণীয় কাজ। এই সচেতনতার বিকাশের জন্য সকল প্রকার নারী নির্যাতনের বিরুদ্ধে প্রতিরোধ গড়ে তোলা যেমন প্রয়োজন, তেমনই প্রয়োজন নারী সমাজকে সংগঠিত করে সামাজিক শক্তি হিসাবে তার বিকাশ সাধন করা। গনমানুষের

অর্থনীতিবিদ ড. আবুল বারকাত তাঁর বাজেট প্রস্তাবনায় উল্লেখ করেছেন, নারীর মৌলিক অধিকারসমূহ চিহ্নিত করে প্রয়োজনীয় পদক্ষেপসমূহ জাতীয় বাজেটে থাকতে হবে এবং লাগাতারভাবে বাস্তবায়ন প্রক্রিয়া অব্যাহত রাখতে হবে। এই প্রয়াসে দরিদ্র নারী ও শিশুর মৌলিক চাহিদাসমূহ পূরণ করার জন্য জাতীয় বাজেটে তা অর্ন্তভুক্ত করতে হবে। চাহিদাসমূহ হলো অন্ন, বস্ত্র, বাসস্থান, চিকিৎসা, কর্মসংস্থান, পারিবারিক ও সামাজিক নিরাপত্তা ইত্যাদি। নারীর সামাজিক নিরাপত্তা, সমতা এবং ন্যায় বিচার প্রাপ্তির অধিকার প্রতিষ্ঠার লক্ষ্যে জাতীয় বাজেটে উদ্দেশ্য-নির্দিষ্ট ও সুস্পষ্ট-সহজবোধ্য বড় মাপের বরাদ্দসহ সময় নির্দিষ্ট পথ নির্দেশনা থাকতে হবে। \*নারী-উদ্দিষ্ট (Gender sensitive) কর্মসূচী ও প্রকল্পসমূহকে সুস্পষ্টভাবে চিহ্নিত করে তা সবিস্তার উন্নয়ন বাজেটে উল্লেখ করতে হবে। এ ধরনের কর্মকাণ্ডে উল্লেখযোগ্য হ'ল মহিলাদের কর্মসংস্থান, কর্মজীবী মহিলাদের আবাসন(গার্মেন্টসসহ), মহিলাদের পলিটেকনিক ও ভোকেশনাল ট্রেনিং সেন্টার, আশ্রয়ন, বিধবাভাতা, দুঃস্থ মহিলা ভাতা, শিক্ষকদের ৬০% মহিলা, মহিলাদের নিরাপত্তা, যোগাযোগ সুবিধা, ডেকেয়ার সেন্টার, বিশেষ চিকিৎসা সুবিধা ইত্যাদি। \*সকল শ্রেণির নারী উদ্যোক্তাদের অধিকার উৎসাহিত করার জন্য ঋণনীতির পরিবর্তন আনতে হবে। একই সঙ্গে স্বল্প সুদে ঋণ প্রদানের জন্য বাজেটে বিশেষ ব্যবস্থা থাকতে হবে। \*নারীর সামগ্রিক উন্নয়ন সুনিশ্চিত করার মধ্য দিয়ে দেশ ও জাতির উন্নয়নকে এগিয়ে নিতে গতানুগতিকতার বিপরীতে বাজেটে নারীর জন্য বিশেষত দরিদ্র-প্রান্তিক নারীদের দারিদ্র-বঞ্চনা-বৈষম্য-অসমতা দূরীকরণে বরাদ্দ কয়েকগুণ বৃদ্ধি করতে হবে। জেডার বাজেট বাস্তবায়নে জাতীয় পর্যায়ে মনিটরিং ব্যবস্থা থাকতে হবে। সেই সাথে নারীর ক্ষমতায়নের বিষয়টিকে গুরুত্বের সাথে উপস্থাপন ও তার বাস্তবায়নের সংগ্রামের কাজটিকে সামনে এগিয়ে নিয়ে যেতে হবে। মনে রাখা দরকার এ কাজ একটি লাগাতার প্রক্রিয়া তাই সাংগঠনিক কাঠামো ছাড়া নিছক ব্যক্তি উদ্যোগে এ কাজকে বেশিদূর এগিয়ে নেওয়া যাবে না। কাজেই নারী অধিকার প্রতিষ্ঠার জন্য প্রথমেই নারীদের সংগঠিত হতে হবে এবং এগিয়ে আসতে হবে সমাজ সচেতন মানুষদের। তবেই সামাজিক সচেতনতার মাধ্যমে অধিকারহীন নারী পাবে তার অধিকার ও দেশ পাবে উন্নয়নের হাতিয়ার এবং নারী-পুরুষের সমানাধিকারের ভিত্তিতে উন্নয়নের শিখরে পৌঁছাতে বাংলাদেশের বেশী সময় লাগবে না।

## তথ্যপঞ্জী

১. আবুল বারকাত, আশরাফ উদ্দিন চৌধুরী ও জামাল উদ্দিন আহমেদ- বাজেট প্রস্তাবনা-২০১৬-১৭
২. হুমায়ুন আজাদ, নারী
৩. মহিলা ও শিশু বিষয়ক মন্ত্রনালয়, মার্চ ২০১১-জাতীয় নারী উন্নয়ন নীতি ২০১১
৪. মজুমদার, প্রতিমা পাল এবং জহির, সালমা চৌধুরী – বাংলাদেশের পোশাক শিল্পে নিয়োজিত নারী শ্রমিকের আর্থ-সামাজিক অবস্থা, বি আই ডি এস।
৫. মুহাম্মদ, আনু- নারী, পুরুষ ও সমাজ, সন্দেশ ১৯৯৭।
৬. আহমেদ হাসিনা – অধিকার, সংগঠন ও সমাবেশীকরণের সমস্যা : প্রসঙ্গ গার্মেন্টস নারী শ্রমিক, সমাজ নিরীক্ষন সংখ্যা- ৬৯
৭. করিম, নিলুফার আহমেদ – শিল্পক্ষেত্রে মহিলা, জেডার নীতি ও প্রয়োগ- জেডার এবং উন্নয়ন।
৮. Delphy Christine – Sharing the Same Table : Consumption and the Family.
৯. Kabeer, Naila – Women's Labour in Bangladesh Garment Industry, Choice and constraints. Cross Cultural Perspectives on Women, vol.12.
১০. গার্মেন্টস কথা – মানবাধিকার সংখ্যা ১৯৯৮।
১১. রহমান কাওসার 'জনকর্ষ' এক অসম প্রতিযোগিতায় নারী শ্রমিক ১৬ জুন '৯৮।
১২. আকতার ফরিদা – 'চিন্তা' নারী শ্রমিকের দাবী সর্বস্তরে জনপ্রিয় করতে হবে।
- ৩১ শে মার্চ ১৯৯৮।
১৩. শায়লা, কাজী – শোষণের শিকলে বাঁধা ১৫ই জুন, '৯৯।
১৪. উইম্যান ফর উইম্যান গবেষণা ও পাঠচক্র – নারী ও উন্নয়ন, প্রাসংগিক পরিসংখ্যান, ১ম সংস্করণ, মার্চ ১৯৯৫।
১৫. রুশিদান ইসলাম, রহমান – উন্নয়নশীল কর্মকাণ্ডে বাংলাদেশের নারী সমাজ ও উন্নয়ন প্রক্রিয়ায় তাদের অংশ গ্রহণ। বাংলাদেশ উন্নয়ন সমীক্ষা ৭ম খন্ড কার্তিক সংখ্যা।
১৬. আকতার তাহমিনা – মহিলা উন্নয়ন ও পরিকল্পনা, প্রেক্ষিত বাংলাদেশ। বাংলা একাডেমী, ঢাকা।
১৮. Ainun Nahar, Mijan – Empowerment of Women.
১৯. জামান সৈয়দ তারিকুজ – বাংলাদেশের শিল্প শ্রমিকের প্রলেতারিত হওয়ার প্রক্রিয়া ও মাত্রা : একটি জরিপ বিশ্লেষণ। বাংলাদেশ উন্নয়ন সমীক্ষা –১২শ খন্ড।

## ভবদহ ও সংলগ্ন এলাকার জলাবদ্ধতার গতি প্রকৃতি ও সম্ভাব্য সমাধান সূত্র

অনিল বিশ্বাস\*

মো. রবিউল ইসলাম\*

সারকথা: ভবদহ ও সংলগ্ন এলাকার জলাবদ্ধতা সমস্যা এ অঞ্চলের দীর্ঘদিনের এক অনিবার্য নিয়তি হয়ে দাঁড়িয়েছে। ৮০'র দশকের মাঝামাঝি থেকে বর্তমান পর্যন্ত এ সমস্যার বিস্তৃতিকাল। হাজার হাজার হেক্টর কৃষি জমি এবং কয়েকটি উপজেলার লক্ষ লক্ষ মানুষ এ সমস্যায় জর্জরিত। ফসল থেকে আবাসভূমি, খাদ্য থেকে শিক্ষা ও চিকিৎসা, পরিবেশ, প্রতিবেশ এক কথায় এ অঞ্চলের সবকিছুই এর দ্বারা আক্রান্ত। সমস্যাটির উদ্ভব-বিকাশ, প্রতিবিধানের দৃষ্টিভঙ্গি, গৃহিত পদক্ষেপ সমূহের ঐতিহাসিক পর্যালোচনা ও মূল্যায়ন এবং তাদের ত্রুটি ও সীমাবদ্ধতা ইত্যাদি চিহ্নিত করে সমস্যাটির সমাধানের পথনির্দেশের সুপারিশসমূহ এখানে তুলে ধরারই প্রবন্ধের প্রধান উদ্দেশ্য। সমস্যাটি ক্রুগ মিশনের (১৯৫৪ সালে তদানিন্তন যুক্তফ্রন্ট সরকারের অনুরোধে আগত বিশ্বব্যাংকের পরামর্শক ইউএস আর্মীর ইঞ্জিনিয়ারিং কোরের জেনারেল মি. ক্রুগের নেতৃত্বে পরিচালিত মিশন) বন্যা ও লবনাক্ততা নিয়ন্ত্রণের জন্য প্রণীত সুপারিশ অনুসারে 'কর্ডন পদ্ধতি'(যার মূল কথা হ'ল, নদীর দুই পাড়ে উঁচু বাঁধ দিয়ে নদীর পানিকে নদীতে রাখতে হবে; সাথে সাথে উপকূল ও নিকটবর্তী অপেক্ষাকৃত নিচু এলাকার চারিদিকে ভেড়ি বাঁধ তৈরি করে জোয়ারের পানি তথা লবনাক্ততা থেকে জমিকে রক্ষা করতে হবে।) বাস্তবায়নের পরিনতিতে উদ্ভূত হয়েছে। ২১০ কোটি মার্কিন ডলারের (১৯৬৪ সালের হিসাব) এ প্রকল্প বাস্তবায়নের সময়কাল ছিল ১৯৬৫-১৯৮৫ এই বিশ বছর। অর্থাৎ ভবদহ ও সংলগ্ন অঞ্চলের জলাবদ্ধতার সমস্যা কোন প্রাকৃতিক দুর্যোগ নয় বরং এ হলো গণবিহীন, অদূরদর্শী, তথাকথিত উন্নয়ন পরিকল্পনার নামে পরিবেশ প্রতিবেশের সাথে সংগতিহীন মানবীয় দায়িত্বজ্ঞানহীন জবাবদিহিতাবিহীন কর্মকাণ্ডের একটি ভয়ংকর বিষময় ফল। দৃষ্টিভঙ্গিগত সমস্যা থাকায় এ সমস্যার সমাধানে গৃহীত পানি উন্নয়ন বোর্ডের এতদিনের পদক্ষেপ ও প্রকল্পসমূহ শেষ পর্যন্ত কার্যকর কোন সমাধান দিতে পারেনি। বরং তা সমস্যার ঘনত্বকে ক্রমান্বয়ে আরো তীব্র থেকে তীব্রতর করে তুলেছে। তাই বিগত তিনযুগেরও অধিক সময় সমস্যাটি সমাধানে বহু কোটি টাকা বরাদ্দ ও ব্যয় করা হলেও এ অঞ্চল জলাবদ্ধতার সমস্যার ক্ষেত্রে যে তিমিরে ছিল সেই তিমিরেই রয়ে গেছে। ভুক্তভুগি মানুষের দীর্ঘকালীন জ্ঞান পরম্পরা ও বাস্তব অভিজ্ঞতাভিত্তিক জ্ঞানকাঠামোকে বিবেচনায় রেখে সমস্যা সমাধানের প্রতিবন্ধকতাসমূহ চিহ্নিত করে এ সমস্যা সমাধানের জন্য সঠিক দৃষ্টিভঙ্গি, আশু করণীয়, মধ্যমেয়াদী করণীয় ও স্থায়ী করণীয় সম্পর্কে বেশকিছু সুপারিশও এখানে তুলে ধরার চেষ্টা করা হয়েছে।

১. প্রারম্ভিক কথা : বিগত সাড়ে তিন দশকে (১৯৮১ থেকে বর্তমান সময় পর্যন্ত) ভবদহ এবং সংলগ্ন অঞ্চলসমূহের জলাবদ্ধতার সমস্যা নানা ভাবে ও নানা কারণে সমগ্র জাতির কাছে পরিচিতি পেয়েছে।

\* আহ্বায়ক, কপোতাক্ষ বাঁচাও আন্দোলন এবং সহযোগী অধ্যাপক, দর্শন, নড়াইল সরকারি ভিক্টোরিয়া কলেজ

ভবদহ অভয়নগর উপজেলার টেকা নদীর পাড়স্থ একটি স্থান, যেখানে শ্মাশান বিদ্যমান। 'ক্রুগ মিশনের নীল-নকশানুসারে 'কর্ডন পদ্ধতিতে বন্যা ও লবণাক্ততা দূরীকরণের' প্রকল্প বাস্তবায়নের পরিণতিতে দক্ষিণ-পশ্চিমাঞ্চলে ভেড়িবাদের মধ্যস্থ ৩৭ টি পোল্ডারের ২৪ নং পোল্ডারের প্রধান স্লুস গেট (পাশাপাশি ২১ ভেন্ট ও ৯ ভেন্ট) এখানে স্থাপিত হওয়ার পর (ভবদহ গেট ২ টি টেকা নদীর উপর স্থাপিত সত্য, তবে গেটের দক্ষিণ অংশে বা ভাটিতে নদীটি টেকার পরিবর্তে শ্রী নামে পরিচিত) তা ভবদহ গেট নামে পরিচিতি পায় এবং ২৪ নং পোল্ডারের অন্তর্গত সমগ্র অঞ্চল ভবদহ অঞ্চল নামে চিহ্নিত হয়। যশোরের অভয়নগর, মণিরামপুর এবং কেশবপুর উপজেলার অংশ বিশেষ নিয়ে এ পোল্ডারের বিস্তৃতি। অপরদিকে 'ভবদহ সংলগ্ন এলাকা' বলতে ২৫, ২৬ ও ২৭ নম্বর পোল্ডারের ভবদহ সংলগ্ন অঞ্চল সমূহকে বোঝানো হয়। ভবদহ পোল্ডারের প্রধান নদী মুক্তেশ্বরী যা যশোর শহরের পাশ দিয়ে উত্তর থেকে দক্ষিণে প্রবাহিত হয়ে ক্রমান্বয়ে টেকা, শ্রী ও হরি নাম ধারণ করে প্রবাহিত হয়েছে। এ অঞ্চলে ৫৩ মতান্তরে ৫৭ টি বিল ও ৮০/৮৫ টি গ্রাম রয়েছে।

**২. ভবদহ ও সংলগ্ন এলাকার জলাবদ্ধতার ঐতিহাসিক প্রেক্ষাপট :** কয়েক লক্ষ (আনুমানিক ৮ থেকে ১০ লক্ষ) মানুষের জীবন-জীবিকার ক্ষেত্রে অবর্ণনীয় দুর্ভোগ সৃষ্টিকারী ভবদহ ও সংলগ্ন এলাকার জলাবদ্ধতার সমস্যাটি কোনরূপ প্রাকৃতিক দুর্যোগ কিংবা আকস্মিক ঘটনা নয়; বরং এ হলো গণবিচ্ছিন্ন, অদূরদর্শী, তথাকথিত উন্নয়ন পরিকল্পনার ভয়ংকর বিষময় ফল। এক কথায় মনুষ্যসৃষ্ট দুর্যোগ। এ কারণে ভবদহ ও সংলগ্ন এলাকার জলাবদ্ধতার গতি-প্রকৃতি বোঝার জন্য এর পিছনের ইতিহাসটি জানা দরকার। এ ইতিহাস যেমন দীর্ঘ তেমনই বহুমাত্রিক। এর সূত্রাপাত ১৮৫৯-৬১ সালে আসাম-বেঙ্গল রেল লাইনের অংশ হিসাবে কলিকাতা-কুষ্টিয়া ১৭০ কি.মি রেল লাইন স্থাপনের সময়। লাইনটি মাথাভাঙ্গা নদীর পূর্ব তীর বরাবর স্থাপিত হওয়ায় ভৈরব, চিত্রা, নবগঙ্গা, কুমারনদী তথা বাংলাদেশের দক্ষিণ-পশ্চিমাঞ্চলে প্রবাহিত সকল নদনদীর উত্তরের উৎসমুখ বাধা পড়ে যওয়ায় পদ্মার পানিপ্রবাহ থেকে বিচ্ছিন্ন হয়ে যায়। কেবলমাত্র দর্শনা শহরের ১.৫ কি.মি. দক্ষিণে একটি অতি সংকীর্ণ রেলব্রীজের নিচে দিয়ে ভৈরবের একটি ক্ষীণধারা প্রবাহিত থাকে। (বর্তমানে নদীপ্রবাহ না থাকলেও রেলব্রীজটি আছে।) ১৯৩৯ সালে দর্শনায় কেরু এন্ড কোম্পানির চিনিকল স্থাপনের অতি অল্প সময়ের মধ্যেই ভৈরবের ক্ষীণধারার ক্যানেলটি ভরাট হয়ে পানি প্রবাহ বন্ধ হয়ে যায়। এ ভাবে ১৯৫০ দশকের মধ্যে দক্ষিণ-পশ্চিমাঞ্চলের মূল নদী কাঠামো (River system), 'ভৈরব-কপোতাক্ষ নদী কাঠামো' (Bhairab – Kapataksha River system) উজানের পানি প্রবাহ তথা পাহাড়ী ঢলের পানি থেকে সম্পূর্ণ বিচ্ছিন্ন হয়ে পড়ে। দক্ষিণ পশ্চিমাঞ্চলের (কুষ্টিয়া, চুয়াডাঙ্গা, মেহেরপুর, বিনাইদহ, মাগুরা, নড়াইল, যশোর, খুলনা, সাতক্ষীরা, বাগেরহাট জেলা) উপর্যুক্ত নদী-কাঠামো ভৈরব, মাথাভাঙ্গা, গড়াই-মধুমতি পদ্মার এ সকল শাখা নদী থেকে মিষ্টি পানির যোগান পেত। কুমার, নবগঙ্গা ও চিত্রা মাথাভাঙ্গা নদীর মাধ্যমে পদ্মার পানি পেত। অপরদিকে বেতনা, হরিহর, মুক্তেশ্বরী টেকা, হরি, শ্রী, গ্যাংরাইল, শোলমারি, ভদ্রা, বেগবতী, ব্যাঙ, ফটকি, কালীগঙ্গা, রূপসা, দড়াটানা, খোলপটুয়া, আড়পাঙ্গাশিয়া, শিবসা, মর্জার, ঢাকি, কয়রা, মেনস, ইছামতি, কদমতলি, সাহেবখালি, কাকশিয়ালি, মালধু ইত্যাদি নদনদী যে 'ভৈরব-কপোতাক্ষ নদী কাঠামো' (Bhairab-Kapataksha River System) গড়ে তুলেছিল তার মাধ্যমে কুষ্টিয়া থেকে সুন্দরবন পর্যন্ত মিষ্টি পানির প্রবাহ সঞ্চারিত হত। পদ্মার সাথে বিচ্ছিন্নতার ফলে সমগ্র নদী-কাঠামোটি ক্ষতিগ্রস্ত হয়; এর স্বাভাবিক মিষ্টি পানির প্রবাহ ধীরে ধীরে স্তিমিত হয়ে যায়। প্রথম দিকে এ সকল নদ-নদীতে উজানের অববাহিকার নিষ্কাশন এলাকায় (Catchment Area) ঝরে-পড়া বৃষ্টির পানি বর্ষা মৌসুমে খানিকটা উজানের শ্রোত তৈরি করলেও তা যেমন নদীর স্বাভাবিক গতি বজায় রাখতে পারেনি; তেমনই পারেনি সমুদ্রের জোয়ারে উঠে আসা পানির লবণাক্ততাকে প্রতিহত করতে। পরিণতিতে নদীভরাট হয়ে তার

জলপ্রবাহ ও নিষ্কাশন ক্ষমতা কমে যায়, শুরু হয় নদী দখলের মহোৎসব, বাড়তে থাকে বন্যার প্রকোপ, ঘটে ব্যাপক ফসলহানি। অপরদিকে উজানের শ্রোত না থাকায় লবণাক্ততার এলাকা অনেক বেড়ে যায়। এ দ্বিবিধ কারণে দক্ষিণ-পশ্চিম অঞ্চলের সমুদ্র উপকূল সংলগ্ন এলাকা থেকে শুরু করে যশোরের অভয়নগর, কেশবপুর এমনকি সদর পর্যন্ত ব্যাপক ফসলহানি, প্রতিবেশ-পরিবেশের ব্যাপক ক্ষতি ও জীববৈচিত্র্য ধ্বংসের মুখে পড়ে। পঞ্চাশ দশকের শুরুতে ধারাবাহিকভাবে এ অঞ্চলে ব্যাপক বন্যা দেখা দেয় যা সমগ্র অঞ্চলের জীবনযাত্রাকে বিপর্যস্ত করে দেয়। এর প্রেক্ষিতে ১৯৫৪ সালে যুক্ত ফ্রন্ট সরকারের অনুরোধে জাতিসংঘের উদ্যোগে বিশ্বব্যাংকের পরামর্শক ইউ এস আর্মি ইঞ্জিনিয়ারিং কোরের জেনারেল মি. ড্রুগের নেতৃত্বে গঠিত কমিশন বন্যা ও লবণাক্ততা দূরীকরণের জন্য 'কর্ডন পদ্ধতি'-নির্ভর পরিকল্পনার প্রস্তাবনা একটি রিপোর্ট আকারে তদানিন্তন সরকারের কাছে জমা দেয়। এটি 'ড্রুগ মিশন রিপোর্ট' নামে পরিচিত। রিপোর্টটির মূল থিম হলো, নদীর দুইপাড়ে উঁচু বাঁধ দিয়ে নদীর পানিকে নদীতে রাখতে হবে; সাথে সাথে উপকূল ও নিকটবর্তী অপেক্ষাকৃত নিচু এলাকার চারিদিকে ভেড়িবাঁধ তৈরি করে জোয়ারের পানি তথা লবণাক্ততা থেকে জমিকে রক্ষা করতে হবে। সরকার রিপোর্টটি গ্রহণ করে এবং রিপোর্টের সুপারিশ মোতাবেক ১৯৫৯ সালে পূর্বপাকিস্তান পানি ও বিদ্যুত উন্নয়ন কর্তৃপক্ষ বা ই পি ওয়াপদা (East Pakistan Water & Power Development Authority- EP WAPDA) গঠন করে। নবগঠিত কর্তৃপক্ষ ইন্টারন্যাশনাল ইঞ্জিনিয়ারিং কোম্পানি (International Engineering Company-IEC) কে প্রধান পরামর্শক (Consultant) নিয়োগ করে। আইইকো'র সহায়তায় ১৯৬৪ সালে ইপিওয়াপদা 'মাস্টার প্লান' (Master Plan) নামে এক বিশাল বন্যা নিয়ন্ত্রণ পরিকল্পনা হাজির করে। ২১০ কোটি মার্কিন ডলারের (১৯৬৪ সালের হিসাব) এ পরিকল্পনা বাস্তবায়নের সময়কাল ছিল ১৯৬৫-১৯৮৫ এই বিশ বছর। এ পরিকল্পনানুসারে কয়েক হাজার কি.মি. ভেড়িবাঁধ একশোর অধিক পোল্ডার এবং অসংখ্য স্লুস গেট ও জলপ্রবাহ নিয়ন্ত্রক কাঠামো তৈরির উদ্যোগ নেওয়া হয়। পরিকল্পনাটি উপকূলীয় বাঁধ প্রকল্প (Costal Embankment Project-CEP-1,2) ১ম পর্যায় ও ২য় পর্যায় নামে দুটি প্রকল্পের মাধ্যমে বাস্তবায়ন করা হয়। উপকূলীয় বাঁধ প্রকল্প ১ম পর্যায় ১৯৬৭ সালে সমাপ্ত হয়। এ পর্যায়ে ৯২ টি পোল্ডার ৪০০০ কি.মি ভেড়িবাঁধ ও ৭৮০ টি স্লুস গেট নির্মাণ করা হয়। যার মধ্য দক্ষিণ-পশ্চিম অঞ্চলের (খুলনা যশোর অঞ্চল, ভবদহ ও সংলগ্ন এলাকা যার অন্তর্গত।) ১৫৬৬ কি.মি.ভেড়িবাঁধ, ৩৭টি পোল্ডার ও ২৮২টি ছোট বড় স্লুস গেট ছিল। অর্থাৎ 'ড্রুগ মিশন' পরিকল্পনায় নির্দেশিত পথে এ অঞ্চলের বন্যা ও লবণাক্ততার সমস্যার সমাধান করার উদ্যোগ বাস্তবায়ন করা হয়।

পরিকল্পনা বাস্তবায়নের প্রথম এক দশক প্রকল্প এলাকার কৃষি উৎপাদন যথেষ্ট পরিমাণে বৃদ্ধি পেলেও ১৯৭৬/৭৭ সাল থেকে ক্রমান্বয়ে এ অঞ্চলের পরিবেশ প্রতিবেশ ও আর্থসামাজিক অবস্থার উপর এর ব্যাপক নেতিবাচক প্রতিক্রিয়াসমূহ সুস্পষ্ট হয়ে ওঠে।

নিচে প্রধান প্রতিক্রিয়াগুলি দেখানো হ'ল :

**পরিবেশের উপর প্রতিক্রিয়া :**

১। নদী সমূহের জোয়ারের প্লাবন ভূমি (Tidal Prism) সঙ্কুচিত হয়ে পড়ে এবং সমগ্র নিম্নভূমি নদীবাহিত পলি থেকে বিচ্ছিন্ন হয়ে পড়ায় নদীবাহিত সমগ্র পলি নদীবক্ষে সঞ্চিত হতে থাকে। যা অনেক নদীকে ভরাট করে ফেলার ফলে নদী হারালো তার নাব্যতা, অবরুদ্ধ হতে থাকলো পানি প্রবাহের পথ, শুরু হ'ল জলাবদ্ধতা।

২। স্বাভাবিক বন্যার পলি সঞ্চয়ন থেকে বঞ্চিত হওয়ায় কারণে ভূমির নিম্নগমন পূরণ প্রক্রিয়া বন্ধ হয়ে যাওয়ায় ভূমির স্বাভাবিক গঠন প্রক্রিয়া ব্যাপকভাবে ক্ষতিগ্রস্ত হয়।

**প্রতিবেশের উপর প্রতিক্রিয়া :**

- ১) মাছ ও সামুদ্রিক জীবের চারণক্ষেত্র সঙ্কুচিত হতে থাকে।
- ২) অনেক দেশীয় প্রজাতির ধানের বিলুপ্তি ঘটে।
- ৩) মিষ্টি পানির যোগান বন্ধ হয়ে যাওয়ায় সুন্দরবনের ব্যাপক ক্ষতি।

**আর্থ সামাজিক প্রতিক্রিয়া :**

- ১) জলবদ্ধতার ফলে কৃষি ব্যবস্থা ক্ষতিগ্রস্ত হয়। কৃষকরা বাস্তুচ্যুত ও পেশাচ্যুত হয়।
- ২) বৃহদাকারের চিংড়ী খামার গড়ে উঠার কারণে সাধারণ স্বল্প জমির মালিক গরিব কৃষক জমি হারাতে থাকে, নদী-নালা-খাল-জলাভূমিতে প্রভাবশালী ও সম্পদশালীদের অবৈধ দখল বাড়ে।

ত্রুগ মিশন প্রস্তানা ও বিশেষজ্ঞ মতামত: এ সকল প্রতিক্রিয়া আকস্মিক যেমন নয়, তেমনই অস্বাভাবিকও নয়। এ বিষয়ে অনেক পূর্বেই অনেক বিশেষজ্ঞ সতর্ক করেছেন। এ প্রসঙ্গে অধ্যাপক মহলানবীশের গবেষণার কথা বলা যায়। ১৯২২ সালের উত্তরবঙ্গের প্রলয়ঙ্করী বন্যার প্রেক্ষিতে প্রেসিডেন্সী কলেজের ভূগোল্যের অধ্যাপক প্রশান্ত মহলানবীশ ১৯২৭ সালে প্রকাশিত সমীক্ষায় বলেন যে, নদীতীর বরাবর বাঁধ তৈরি করে বন্যা ঠেকানোর প্রচেষ্টা কোন স্থায়ী সমাধান হতে পারে না। কারণ তাতে আবদ্ধ বন্যার পানিবাহিত পলি নদীবক্ষে সঞ্চিত হয়ে নদীতল ক্রমশঃ ভরাট ও উঁচু হয়ে যাবে। ফলে অবশেষে পানি আবার বাঁধ উপচে পড়বে এবং বন্যার প্রকোপ আগের তুলনায় বেড়ে যাবে। বিলের মত নিচু এলাকার চারিপাশে বাঁধ তৈরি করা হলে সেগুলিও খুব একটা উপকারে আসবে না। বরঞ্চ জলপ্রবাহের পথে বাঁধা সৃষ্টি করবে। মহলানবীশ মনে করেন যে, বন্যার প্রবাহকে দ্রুত বেরিয়ে যাবার পথ করে দেওয়াটাই হচ্ছে বন্যা নিয়ন্ত্রণের সুযোগ্য পন্থা। তাছাড়া অবাধে বন্যার প্রবাহকে চলতে দিলে পলিমাটি পড়ে নিচু এলাকাগুলো ক্রমশঃ ভরাট হয়ে উঠতে পারবে এবং তাতে বন্যার প্রকোপ কমবে। পরবর্তীতে ষাটের দশকে মার্কিন বিশেষজ্ঞ জেনারেল হার্ডিন (Hardin) এবং ওলন্দাজ বিশেষজ্ঞ প্রফেসর থীস (Thijss)ও অধ্যাপক মহলানবীশের অনুরূপ সতর্কবাণী উচ্চারণ করেন। ত্রুগ মিশন পরিকল্পনায় এ সকল সতর্ক বাণীর কোন কিছুই বিবেচনা করা হয় নাই। তাই অচিরেই প্রমাণিত হয় 'ত্রুগ মিশন' পরিকল্পনা প্রসূত 'উপকূলীয় বাঁধ-প্রকল্পটি ছিল নিছক তাৎক্ষণিকতা প্রসূত, অদূরদর্শী এবং আত্মঘাতী। বাস্তব পর্যবেক্ষণ, ভৌগোলিক পরিবেশ, প্রচলিত কৃষি উৎপাদন ব্যবস্থার সম্ভাবনায় সংকট, আর্থ-সামাজিক কাঠামো, প্রাকৃতিক পরিবেশ প্রতিবেশ, জীববৈচিত্র্য ইত্যাদি দিকসমূহ গভীরভাবে বিশ্লেষণ এবং বিবেচনায় না নিয়েই পরিকল্পনাটি বাস্তবায়ন করা হয়।

তাছাড়া সমস্যা সমাধানের জন্য পরিবেশ ব্যবস্থাপনার দৃষ্টিভঙ্গির দিক থেকেও 'ত্রুগ মিশন' পরিকল্পনাটি যথাযথ ছিল না। পরিবেশ-ব্যবস্থাপনার ক্ষেত্রে প্রধানতঃ মানবকেন্দ্রিক প্রকৌশলগত দৃষ্টিভঙ্গী (Anthropocentric Engineering Approach-AEA) ও প্রতিবেশিক প্রযুক্তিগত দৃষ্টিভঙ্গী (Ecological Engineering Approach-EEA) নামে দু'টি দৃষ্টিভঙ্গী রয়েছে।

প্রথম দৃষ্টিভঙ্গীতে কাঠামোগত নির্মাণই প্রধান বিষয়; প্রকৃতি, পরিবেশ, প্রতিবেশ, ইত্যাদি বিষয় এখানে গুরুত্বহীন। এ দৃষ্টিভঙ্গী উন্নয়ন কর্মকাণ্ডকে প্রকৃতির সাথে খাপ খাওয়ানোর পরিবর্তে প্রকৃতিকে নিয়ন্ত্রণের উদ্দেশ্যে ব্যবহার করা হয়।

দ্বিতীয় দৃষ্টিভঙ্গীতে কাঠামোগত নির্মাণের তুলনায় প্রকৃতির যাবতীয় উপাদানসহ উদ্ভিদ ও প্রাণিকুল অধিক গুরুত্বপূর্ণ বলে বিবেচিত হয়। এ দৃষ্টিভঙ্গীতে উন্নয়ন কর্মকাণ্ড প্রকৃতিকে নিয়ন্ত্রণ নয়; বরং প্রকৃতির সাথে

কার্যকর অভিযোজনের উপর অধিক জোর থাকে।

বাংলাদেশের দক্ষিণ-পশ্চিম উপকূলীয় অঞ্চলের মত জটিল ও স্পর্শকাতর পরিবেশ ও প্রতিবেশিক বৈশিষ্ট্যপূর্ণ অঞ্চলের জন্য উন্নয়নের প্রতিবেশিক প্রযুক্তিগত দৃষ্টিভঙ্গী যেখানে অপরিহার্য সেখানে 'ক্রুগ মিশন পরিকল্পনা'টি সম্পূর্ণ মানবকেন্দ্রিক প্রযুক্তিগত দৃষ্টিভঙ্গীতে প্রণীত, যা এ ক্ষেত্রে কোন অর্থেই যথাযথ দৃষ্টিভঙ্গী নয়।।

যাহোক, তথাকথিত এ উন্নয়ন পরিকল্পনা বাস্তবায়নের পর ১৯৭৬/৭৭ সালে এ অঞ্চলের বিভিন্ন পোল্ডারে জলাবদ্ধতা সমস্যার প্রাথমিক অবস্থা দেখা দিতে থাকে ধীরে ধীরে। ১৯৮২ সালে ২৫ নং পোল্ডার (বিল ডাকাতিয়া) থেকে এক ভয়াবহ জলাবদ্ধতা শুরু হয়ে একে একে ২৪,২৬,২৭ ও ২৮ নম্বর পোল্ডারের বিস্তীর্ণ অঞ্চলে জলাবদ্ধ প্রসারিত হয়। অন্যান্য অনেক অঞ্চলের মত ভবদহ অঞ্চলে সমস্যাটি ভয়াবহ আকার ধারণ করে। এ পোল্ডারের সবচেয়ে বড় অবকাঠামোগত স্থাপনা ভবদহ স্ফুসংগেটটি পরিণত হয় মরণফাঁদে। ফসলি জমি থেকে বাস্তভিটা, শিক্ষাপ্রতিষ্ঠান থেকে রাস্তা-ঘাট, চিকিৎসালয় থেকে উপসনালয় সবই জলাবদ্ধতায় আক্রান্ত হয়। জলাবদ্ধ সাধারণ মানুষ পানিউন্নয়ণ বোর্ডের কাছে আবেদন-নিবেদন করে ব্যর্থ হয়ে সংঘবদ্ধ আন্দোলনের দিকে অগ্রসর হতে থাকে। স্থানীয় রাজনৈতিক দল ও নেতৃত্ব মানুষের পাশে এসে দাঁড়ায়। এর ধারাবাহিকতায় ১৯৮১ সালে ভবদহ স্ফুসংগেটের কাছে স্থানীয় সকল রাজনৈতিক দলের (ডান ও বাম) এক সর্বদলীয় জনসভা অনুষ্ঠিত হয়। যদিও এ ত্রৈক্য বেশিদিন ধরে রাখা যায় নি। পরবর্তীতে ভুক্তভোগী স্থানীয় জনতা পানি নিষ্কাশন সংগ্রাম কমিটি গড়ে তোলে এবং তাদের উদ্যোগে স্থানীয় ও জেলা পর্যায়ে মতবিনিময় সভা, ডেপুটেশন, জনসভা, মানব বন্ধন, সড়ক রেলপথ অবরোধ, হরতাল প্রভৃতি কর্মসূচী চলতে থাকে। এ কমিটি ঢাকা জাতীয় প্রেস ক্লাবেও সেমিনার করে। স্থানীয় ও জাতীয় দৈনিকসমূহ বিষয়টিকে গুরুত্বের সাথে তুলে ধরে। শাসক দলগুলি ভোটের রাজনীতিতে বিষয়টিকে ব্যবহার করতে থাকেন। এগিয়ে আসে ছোট বড় অনেক বেসরকারি প্রতিষ্ঠান। মহামান্য রাষ্ট্রপতি, মাননীয় প্রধান মন্ত্রী, বিভিন্ন মন্ত্রিসহ রাষ্ট্রের কর্তাব্যক্তির এলাকা পরিদর্শন করেন। পানি উন্নয়ণ বোর্ড ও রাষ্ট্রীয় প্রসারণের উপর চাপ বাড়তে থাকে। আক্রান্ত মানুষ ও আন্দোলনের সামনের সারির নেতারা বাস্তব অভিজ্ঞতা ও ইতিহাস পর্যালোচনা থেকে বুঝতে পারেন ভেড়িবাঁধ, পোল্ডার স্ফুসংগেট এক কথায় কর্ডন পদ্ধতিই হলো এ অঞ্চলে জলাবদ্ধতা সমস্যার প্রধান কারণ। পানি উন্নয়ণ বোর্ড প্রাথমিকভাবে বিষয়টিকে তেমন একটা আমলে নেয়নি এবং পানি নিষ্কাশনের তেমন কোন কার্যকর পদক্ষেপ ও তারা নেয়নি। কোন দেনদরবারে কাজ না হওয়ায় সংঘবদ্ধ জনতা পূর্ব ঘোষণা দিয়ে ১৯৯০ সালের ১৮ সেপ্টেম্বর ২৫ নং পোল্ডারের (বিল ডাকাতিয়া) বাঁধের ৪টি স্থানে কেটে দেয়। এর ফলে হামকুড়া নদীর সাথে বিল ডাকাতিয়ার পানি প্রবাহের সংযোগ পুনঃস্থাপিত হয়। মাত্র কয়েক সপ্তাহের মধ্যে হামকুড়া নদী ৪০/৫০ হাত গভীরতা প্রাপ্ত হয় এবং বিলের পানি নেমে যায়। অপরদিকে বিলে নিয়মিত জোয়ার ভাটা এবং পলি অবক্ষেপনের ফলে ১৯৯২ সালের মধ্যে ডাকাতিয়া বিলে প্রায় ৫০০০ একর জমি জলাবদ্ধতা মুক্ত হয়ে ফসল চাষের উপযোগী হয়। পাশের পোল্ডারের এ ঘটনা অন্যান্য স্থানের জনগণের উপর প্রভাব ফেলে। স্বল্প সময়ের ব্যবধানে আরো বেশ কিছু জলাবদ্ধ বিলের মানুষ বাঁধ কাটা লড়াইতে সক্রিয় অংশগ্রহণ করতে এগিয়ে আসে; একে একে উর্ধ্বর এবং ভরতভায়নার বাঁধ কেটে দেয়। আন্দোলনের প্রধান শ্লোগান হয়ে ওঠে 'অবাধ জোয়ার- ভাটাই কেবল পারবে জলাবদ্ধতা দূর করতে।' বিল ডাকাতিয়ার এ সফলতা খুব বেশি দিন ধরে রাখা যায় নি। এ প্রসঙ্গে এডাবের এক প্রতিবেদনে বলা হয়, "বাঁধ কাটা পরবর্তী পরিস্থিতিতে উপযোগী সাংগঠনিক কাঠামোর অভাবে পলিকে পরিকল্পিতভাবে বিলের অভ্যন্তরে নিয়ে যাওয়া সম্ভব হয় নি, সম্ভব হয়নি জোয়ারভাটা সৃষ্ট তাৎক্ষণিক অসুবিধাগুলিকে মোকাবেলা করার জন্য দুর্গত এলাকার জনগণকে সহযোগিতা করা। পানি উন্নয়ন



বোর্ডের দায়িত্ব ছিল জনগণের এই অভিজ্ঞতা থেকে শিক্ষা নিয়ে এই কার্যক্রমকে বাস্তবোচিত প্রকল্প প্রণয়ন ও তা বাস্তবায়ন করা। কিন্তু পানি উন্নয়ন বোর্ড এর বিপরীতে অবস্থান গ্রহণ করে। তারা প্রথমে জনগণের কাটা বাঁধ বন্ধ করে দেয়। ফলে হামকুড়া নদী আবার দ্রুত ভরাট হয়ে পড়ে। দেখা দেয় নতুন নতুন এলাকায় জলাবদ্ধতা।”

**ভবদহের জলাবদ্ধতার প্রকৃতি ও কারণ :** ইতোপূর্বে দক্ষিণ পশ্চিমাঞ্চলের জলাবদ্ধতার যে সাধারণ ইতিহাস ও প্রকৃতির কথা বলা হয়েছে ভবদহের ক্ষেত্রেও তা প্রযোজ্য। ভবদহে পানি উন্নয়ন বোর্ড নির্মিত ২৪ নং পোল্ডারটির (ভবদহ) মূল জলাধার ও জলনিষ্কাশন পথ হলো মুক্তেশ্বরী নদী যা উত্তর থেকে দক্ষিণ দিকে প্রবাহিত এবং যথাক্রমে মুক্তেশ্বরী, টেকা, শ্রী ও হরি নামে পরিচিত। এ নদীর প্লাবনভূমি (Prism) ও নিষ্কাশন এলাকা (Catchment Area) নিয়ে পোল্ডারটি গঠিত। উজানের শ্রোতের সাথে বিচ্ছিন্ন এ প্রবাহকে নিয়ন্ত্রণ ও লবণপানির আক্রমণ থেকে বিলে ফসলি জমিকে রক্ষা করার উদ্দেশ্যে টেকা ও শ্রী নদীর সংযোগ স্থলে ভবদহ নামক স্থানে ২১ ভেল্ট ও ৯ ভোল্টের দু’টি স্লুস গেট নির্মিত হয়। স্লুস গেটের মূল উদ্দেশ্য ছিল ভাটার সময় বিলের অতিরিক্ত পানিকে নদী পথে নিষ্কাশন এবং জোয়ারের সময় লবণপানিকে বিলে প্রবেশ করতে না দেওয়া। সাদামাঠা ভাবে খুবই সাধু উদ্দেশ্য কিন্তু বাস্তবে দেখা গেল এ নিয়ন্ত্রণ-কাঠামো তৈরির পর একদিকে স্লুস গেটের ভাটিতে অতিদ্রুত হারে নদীবক্ষে পলি অবক্ষেপিত হতে থাকে। (জাপানী ভূ-তত্ত্ববিদ উমিতসুর মতে নদী বক্ষে স্বাভাবিক পলি সঞ্চয়ের হার ৪ সে.মি. অথচ হামকুড়া নদী যখন ভরাট হতে শুরু করে তখন প্রতিদিন নদীবক্ষে ৫ সে.মি. পলি অবক্ষেপিত হত। একটানা মাত্র ১৯ দিন গেট বন্ধ থাকায় শ্রী নদীতে ০.৯ মিটার পলি অবক্ষেপিত হতে দেখা যায়। এ নদী দু’টিতে পলি অবক্ষেপণের হার অস্বাভাবিক রকমের বেশি। এ অঞ্চলের অন্য নদীসমূহে বাৎসরিক ১১.৭৫ সে.মি. হারে পলি অবক্ষেপিত হয়ে থাকে।) নদীবক্ষে পলি অবক্ষেপণের ফলে নদী ভরাট হতে থাকল এবং অচিরেই পোল্ডারের অভ্যন্তরস্থ বিলের তলদেশ অপেক্ষা নদীবক্ষ (River Bed) অনেক উঁচু হয়ে গেল; ফলে নদীর পানি নিষ্কাশনের ক্ষমতা যেমন হ্রাস পেতে থাকলো, তেমনই গেটের পাশে ৬/৭ ফুট পলি জমে যাওয়ার পর গেট তার কার্যকরিতা হারালো। এ ভাবে ভবদহ স্লুসগেট জলনিষ্কাশনের পরিবর্তে জলাবদ্ধতার প্রধান কারণ হয়ে দেখা দিল। অপরদিকে পোল্ডারের অভ্যন্তরের নদী খালসমূহে স্বাভাবিক জোয়ারভাটার অভাবে ক্রমাগত ভরাট হয়ে নিষ্কাশন এলাকার জল নিষ্কাশনের অযোগ্য হয়ে গেল। অন্যদিকে পোল্ডারের অভ্যন্তরস্থ প্লাবনভূমিতে ঘটলো আরো ভয়াবহ ঘটনা, এ অঞ্চলের ভূমি প্রকৃতি এমন যে, এখানে প্রতিবছর স্বাভাবিক কারণে (ভূমি-গঠন প্রক্রিয়ায়) ২ থেকে ৩ সে.মি. হারে ভূমির নিম্নগমন (Earth Subsidence) ঘটে। (অবশ্য গবেষক ড. মনিরুল হকের মতে দক্ষিণ পশ্চিমাঞ্চলের বিলের নিচু জলাভূমিতে ‘ভূমি বসে যাওয়া’র পরিমাণ বছরে ১০ মি.মি।) স্বাভাবিক বন্যায় প্লাবনরূমিতে ৪ সে.মি. পলি অবক্ষেপিত হয়ে ভূমির এ নিম্নগমনকে পূর্ণ করে প্রতি বছর ২ সে.মি. উঁচু করত। পোল্ডার নির্মাণের পর এ পলি অবক্ষেপণ বন্ধ হয়ে যায়। ফলে প্রতিবছর প্লাবনভূমির নিচু জমি আরো নিচু হতে থাকে এবং নদীর পানির স্বাভাবিক উচ্চতার তুলনায় নিচু হওয়ায় ঐ পানি আর নদী পথে নিষ্কাশিত হতে পারে না। ফলে শুরু হয় এক স্থায়ী জলাবদ্ধতা। এ অঞ্চলের বিলসমূহে অসংখ্য খাল ছিল ধীরে ধীরে তা যেমন ভরাট হয়েছে তেমনই প্রভাবশালী ব্যক্তিবর্গ তার অধিকাংশই অবৈধভাবে দখল করে নিয়েছে, এমনকি নদীতে বহুস্থানে আড়াআড়ি বাঁধ দিয়ে নদীও দখল করেছে। এসব কারণে ভবদহ পোল্ডারের অভ্যন্তরস্থ জল নিষ্কাশন ব্যবস্থা (Drainage system) অকেজো হয়ে পড়েছে। ভবদহ অঞ্চল হয়ে ওঠে একটি স্থায়ী ও পুণঃপৌনিক জলাবদ্ধ অঞ্চল। ঘটনাটি একদিনে ঘটে নি। ১৯৭৫-৭৬ সালে প্রথমে মুক্তেশ্বরী নদীঅববাহিকায় অবস্থিত যশোর শহরের দক্ষিণাংশ সংলগ্ন বিল হরিণা, মণিরাপুর উপজেলার ঢাকুরিয়া ইউনিয়নের (বিলের নামটি লিখতে হবে)

বিলে জলাবদ্ধতা দেখা দেয়। পর্যায়ক্রমে প্রায় প্রতিবছর বর্ষা ঋতুতে জলাবদ্ধতার আয়তন বাড়তে থাকে এবং সেই সাথে বাড়তে থাকে এর আর্থাসী রূপ। এ সময় থেকে স্থানীয় মানুষেরা মাছ ধরার জন্য নদীতে কোথাও পাটা দিয়ে, আবার কোথাও বাঁধ দিয়ে মাছ ধরতে শুরু করে, যা নদী প্রবাহের স্বাভাবিক গতি রোধ করায় পরিস্থিতির আরও অবনতি ঘটেএদের মধ্যে একদল অতিলোভী স্বার্থান্বেষী মানুষ সরকারি ভূমি অফিসের অসাধু নায়েব ও সেটলমেন্ট অফিসের কর্মচারি কর্মকর্তাদের সহযোগিতায় মিথ্যার আশ্রয় নিয়ে ভূমির স্বাভাবিক চরিত্র বদলিয়ে মুক্তেশ্বরী নদীর খাদকে পরিত্যক্ত অথবা প্রাকৃতিক জলাশয় দেখিয়ে উন্নয়নের নামে, মৎস্য চাষের অছিলায়, কোথাও ভূয়া মৎস্য সমবায়ের নামে, কোথাও বা নিজেদেরকে মিথ্যা ভূমিহীন দেখিয়ে তাদের নামে জমি বরাদ্দ ও লিজ নিয়ে আড়াআড়ি বাঁধ দিয়ে নদী খাতকে পর পর একাধিক পুকুর ও দীঘির মতো করে মাছ চাষ করা শুরু করে। এমনকি কোন কোন স্থানে নদীকে ফসলি জমি হিসাবে ব্যবহার করতে শুরু করে। ঢাকুরিয়ার তারুয়াপাড়াতে এইরকম একাধিক ঘটনা তখন ঘটেছিল। আবার সতীঘাটা ব্রিজের নিচেয় বাঁধ দিয়ে মাছ ধরতে থাকে প্রভাবশালী স্বার্থান্বেষী ব্যক্তিরা। এসব নিয়ে একাধিকবার স্থানীয় পর্যায়ে মারামারি ও রক্তপাতের ঘটনাও ঘটেছে। ভবদহ গেট পর্যন্ত একাধিক জায়গায় একই ধরনের ঘটনা ঘটতে থাকে। মাঝখানে নদীর প্রবাহ বন্ধ হয়ে পড়ে। অববাহিকার বিলগুলিতে তীব্র জলাবদ্ধতা, ফসলহানি, চলাচলের অসুবিধা, খাদ্যাভাব। জন-অসন্তোষ মাথাচাড়া দিতে থাকে। আমরা ইতিহাস আলোচনায় দেখেছি এক দশক জলাবদ্ধতার যন্ত্রণা থেকে মুক্তি পাওয়ার উপায় হিসাবে ভুক্তভোগী সাধারণ মানুষ সব ধরনের বাঁধা ও রক্তক্ষু পেরিয়ে সংঘবদ্ধ হয়ে পোল্ডারের বাঁধ কাটতে শুরু করে দেয়। এমন বাস্তবতায় পানি উন্নয়ন বোর্ড তাদের 'কর্ডন পদ্ধতি'কে রক্ষা করার উদ্দেশ্যে ১৯৯২ সালে পোল্ডার সমূহকে অটুট রেখে এশিয়া উন্নয়ন ব্যাংকের সহায়তায় পানি নিষ্কাশনের জন্য ব্যাপক পরিকল্পনা গ্রহণ করেন।

প্রাক্কলিত খরচসহ পানি উন্নয়নবোর্ডের প্রস্তাবিত পরিকল্পনাসমূহ :

প্রকল্পের নাম	কর্ম এলাকা	প্রাক্কলিত ব্যয়	মন্তব্য
CERP হার্কনিং পরিকল্পনা ১৯৯৩ (উপকূলীয় বাঁধ পুনর্বাসন প্রকল্প)	১০০৬ বর্গ কিলোমিটার	২২৯ কোটি ৪৮ লক্ষ টাকা	নদীসমূহের উজানে ড্রেজিং, বিল কেদারিয়ায় জলাধার নির্মাণ, চুকনগরের কাছে নদীতে লুপকাট
সংশোধিত হার্কনিং পরিকল্পনা ১৯৯৩	১০০৬ বর্গ কিলোমিটার	২৩৮ কোটি ২৭ লক্ষ টাকা	
FAP-4 হ্যালকো পরিকল্পনা	১৩০৬ বর্গ কিলোমিটার	২৮৬ কোটি ১৬ লক্ষ টাকা	টেবুনিয়ায় সালতা নদীতে খুব বড় একটি রেগুলেটর (১০০ মি. প্রস্থের ৪০ ভোল্ট) নির্মাণ, তেলিগাতী ও হুদা নদীর ভাটিতে পানিপ্রবাহ বন্ধের ব্যবস্থা
পাউবো প্রকৌশলীদের প্রস্তাবিত পরিকল্পনা	১৩০৬ বর্গ কিলোমিটার	২৭৪ কোটি ১৬ লক্ষ টাকা	প্রস্তাবিত বড় রেগুলেটর টিয়ারাবুনিয়ার পরিবর্তে যেংরাইল নদীর আরো দক্ষিণে বসানোর কথা বলা হয়।
KJDRP-1	১০০৬ বর্গ কিলোমিটার	২১৬ কোটি ২৩ লক্ষ টাকা	টিয়ারাবুনিয়ার খুব বড় রেগুলেটর টিকে বিভক্ত করে টিয়ারাবুনিয়া ও খর্নিয়ায় স্থাপনের প্রস্তাব।
KJDRP-2	১১২৬ বর্গ কিলোমিটার	২৩৩ কোটি ২২লক্ষ টাকা	

প্রকল্প প্রস্তাবগুলি বিবেচনা করলে দেখা যাবে এদের সবগুলিই “পোল্ডারই মূলত সঠিক” পাউবো’র এ দৃষ্টিভঙ্গিকে অনুসরণ করে প্রণীত।

পরিকল্পনাগুলির মর্মকথা হল “প্রকল্প এলাকার বাইরে, দক্ষিণে বড় আকারের কয়েকটি স্লুইসগেট তৈরি

করা স্লুইস গেটের বাইরে পলি আটকিয়ে রাখা ।

ইমার্জেন্সী এ্যাকশন প্লান : হাঙ্কোনিং এন্ড এসোসিয়েটস কর্তৃক উপকূলীয় বাঁধপুনর্বাসন প্রকল্পের সমীক্ষা চলাকালে খুলনা জেলার বিল ডাকাতিয়ার জলাবদ্ধতা দূর করার জন্যে ১৮/০৮/১৯৯৩ তারিখের এক অদাপ্তরিক স্মারকে অন্তর্বর্তীকালীন তাৎক্ষণিক ব্যবস্থা হিসাবে 'ইমার্জেন্সী এ্যাকশন প্লান' (Emergency Action plan-EAP) গ্রহণ করা হয় । নিচে এর সংক্ষিপ্তসার দেওয়া হ'ল :

#### ইমার্জেন্সী এ্যাকশন প্লান ১৯৯২-৯৩

ক্রমিক	কাজের নাম	কাজের পরিমাণ	ব্যয় ( লক্ষ টাকা)
১	জনগণের কেটে দেওয়া বাঁধ পুনর্নির্মাণ	৪ টি স্থানে	৯৩.৬০
২	স্লুইসগেট মেরামত	৩ টি	৬.৪০
৩	ডাইভারসান খাল পুনঃখনন	৬.৩৯ কি.মি.	১০২.৮৫
৪	বিলের অভ্যন্তরীণ খাল পুনঃখনন	৪.০০ কি.মি.	৬.৪৫
৫	শোলমারী নদী ড্রেজিং	২.৪৬ কি.মি.	১৩৭.৮৯
৬	সংস্থাপন ও অন্যান্য	-----	৩.৪৯

ইমার্জেন্সী এ্যাকশন প্লান ১৯৯৩-'৯৪ : পদ্ধতিগত সমস্যার কারণে ১৯৯৩-'৯৪ তে কোন বাস্তব কাজ হয় নি ।

এ্যাকশন প্লান ১৯৯৪-'৯৫ : ২৬২৫ লক্ষ টাকার সংস্কার কাজ পানি উন্নয়ন বোর্ড কর্তৃক অনুমোদিত হলেও পরামর্শক নিয়োগ এশিয় উন্নয়ন ব্যাংকের সাথে চুক্তির শর্তমোতাবেক না হওয়ায় কাজ করা যায় নি । তবে ১৮/৮/৯৪ এর পর্যালোচনা সভায় খুলনা যশোর নিষ্কাশন পুনর্বাসন প্রকল্পের ১৯৯৪-'৯৫ সালের কর্মসূচীতে ভবদহ রেগুলেটরকে কার্যকর এবং ভবদহ এলাকার জলাবদ্ধতা দূরীকরণের উদ্দেশ্যে ইমার্জেন্সী এ্যাকশন প্লান গ্রহণ করা হয় ।

ইমার্জেন্সী এ্যাকশন প্লান ১৯৯৫-'৯৬ : ১৯৯৬ সালে কে,জে,ডি,আর,পি,র ইমার্জেন্সী এ্যাকশন প্লানের আওতায় ভদ্রা নদীতে ক্রসড্যাম নির্মাণের ফলে শ্রী নদী দিয়ে প্রচুর পলি এসে ভবদহগেটের মুখে জমা হয় । (যার পরিমাণ ছিল স্বাভাবিকের চেয়ে ৫ ফুট বেশি) । পরিণতিতে ভবদহ গেট পানি নিষ্কাশনে অকার্যকর হয়ে পড়ে, যে কারণে ১৯৯৬ সালে আগস্ট মাসে মাত্র তিনদিনের টানা বর্ষণে মণিরামপুর, অভয়নগর, কেশবপুর এবং ডুমুরিয়া উপজেলার ৬২ গ্রামের কয়েক লক্ষ মানুষ ভয়াবহ জলাবদ্ধতার শিকার হয় । এ প্রেক্ষিতে ২৩-০২-'৯৭ তারিখে গণপ্রজাতন্ত্রী বাংলাদেশ সরকারের মাননীয় প্রধানমন্ত্রী এলাকা পরিদর্শনে এসে জনগণের দাবির প্রেক্ষিতে ভবদহ স্লুইসগেটের ভাটিতে হরিনদী পুনঃখননের নির্দেশ দেন ও প্রকল্প অতিরিক্ত দুই কোটি টাকা বরাদ্দ দেন । তদানুসারে হরি নদীর ৮.৬২ কি.মি. জনশ্রমে পুনঃখনন, ভাটিতে ২.৮৮ কি.মি. যান্ত্রিকভাবে পলি অপসারণ কাজ করা হয় এবং আরো ভাটি অঞ্চলে খর্নিয়া নামক স্থানে ড্রেজারের সাহায্যে পলি অপসারণের কাজ করা হয় । এদিকে ভদ্রা নদীতে ক্রসড্যাম দেওয়ার ফলে ড্যামের পিছনে ৮/১০ ফুট পলি জমে যাওয়ায় পরবর্তীতে ক্রসড্যাম উঠানোর পরও হরি নদীকে নাব্য করা যায়নি ।

উপরের আলোচনায় দেখা যায়, ভবদহ জলাবদ্ধতা নিরসনে সরকারি উদ্যোগ ও অর্থব্যয়ে কার্পণ্য খুব একটা না থাকলেও সমস্যা সমাধানের সঠিক দৃষ্টিভঙ্গী ও জবাবদিহিতামূলক সুদূরপ্রসারী ও সমন্বিত পরিকল্পনার অভাবে কেবলমাত্র তাৎক্ষণিক স্বল্পকালীন কিছ সুবিধা ছাড়া সমস্যার স্থায়ী সমাধানের তেমন কোন অগ্রগতি হয় নি । তাই আজ ২০১৬ সালে এসে ২.১১.১৬ তারিখ মাত্র একটানা ৩৭ ঘন্টা এবং

সপ্তাহান্তে আরও ২৭ ঘন্টা একটানা বৃষ্টিপাতের ফলে যশোর জেলার দক্ষিণাংশ তথা মণিরামপুর, কেশবপুর, অভয়নগর ও যশোর সদর উপজেলার সমধিক শতকরা ৬০ ভাগ এলাকা ভবদহ জলাবদ্ধতার শিকার হয়ে পড়েছে। সরকারি হিসাবে তিন উপজেলার ৩০ ইউনিয়নের ১৫০টি গ্রামের ১লক্ষ ৫০ হাজার অধিবাসী জলাবদ্ধতার কারণে চরম দুর্ভোগের কবলে পড়ে মানবের জীবন যাপন করছেন। ৫০ লক্ষ হেক্টর দোফসলি এবং তিন ফসলি জমিতে কৃষিকাজ বিপর্যস্ত হয়ে পড়েছে। ৭০টি শিক্ষা প্রতিষ্ঠান পানিত ডুবে গেছে। তার মধ্যে . . . .টি প্রাথমিক বিদ্যালয়, . . . .টি মাধ্যমিক বিদ্যালয়, . . . . উচ্চ মাধ্যমিক ও ডিগ্রি কলেজ ও মাদ্রাসা পানিতে ডুবে থাকায় সেগুলি পাঠদানের অননোপযোগী হয়ে পড়েছে। জলনি-মগ্ন হয়েছে . . . .টি স্বাস্থ্য ও পরিবার পরিকল্পনা কেন্দ্র। এবং এই নির্দিষ্ট এলাকার পশ্চিমাংশ জুড়ে কপোতাক্ষ অববাহিকায় বিকরগাছা, মণিরামপুর ও কেশবপুর উপজেলার ১০ থেকে ১৫ শতাংশ আবাদি জমি জলাবদ্ধতার শিকার। তিন উপজেলার . . . .টি পরিবার বাড়িতে টিকতে না পেরে নিকটস্থ কাঁচা পাকা সড়কে অস্থায়ী পলিখিনের তাবুতে বাস করছেন। সঙ্গে নিয়ে এসেছেন তাদের গৃহপালিত গবাদি পশু, ছাগল, হাঁস মুর্গি।

**জলাবদ্ধতা নিরসনে ভুক্তভুগী জনগনের নিজস্ব উত্তাবন :** পানিউন্নয়ন বোর্ডের প্রকল্পসমূহের ব্যর্থতার প্রেক্ষাপটে স্থানীয় জনগণ সমস্যা সমাধানের জন্য এ অঞ্চলের দীর্ঘদিনের প্রচলিত অস্টামাসী বাঁধের অভিজ্ঞতা থেকে বিলের জলাবদ্ধতা নিরসন ও ভূমি গঠনের সমন্বিত কার্যক্রম হিসাবে যে প্রস্তাবনা দেয় তা টি.আর.এম. (Tidal River Management-TRM) নামে পরিচিত। ১৯৯৮ সালের ২৪ শে জানুয়ারি মাসে যশোর জেলা পরিষদ মিলনায়তনে বামপন্থী আটটি কৃষক সংগঠন ও জেলার রাজনৈতিক নেতৃবৃন্দ একটি সেমিনারের আয়োজন করে। যেখানে ড.আইনুন নিশাত, ড. স্বপন আদনান, প্রকৌশলী মো. শহিদুল্লাহসহ দেশবরেণ্য পানি ও পরিবেশ বিশেষজ্ঞগণের উপস্থিতি ও সমর্থনে জোয়ারাধার প্রস্তাব গ্রহণ করা হয়। এটিই পরবর্তীতে টি.আর.এম. নামে পরিচিত হয়। জনগণের আন্দোলনের চাপে সরকার প্রস্তাবটি গ্রহণ করতে বাধ্য হয়। সিদ্ধান্ত হয় যে, পর্যায়ক্রমে বিল কেদারিয়া, বিল খুকশিয়া এবং বিল কপালিয়ায় টি.আর.এম চালুকরা হবে। বিল কেদারিয়া ও বিল খুকশিয়ায় তা চালু করা হয় এবং এলাকার জনগণ তার সুফল লাভ করে। এর ফলে টি.আর.এম. চালু হওয়ায় বিলের ভূমির উচ্চতা বৃদ্ধিপায় অপরদিকে জোয়ার ভাটার কারণে নদী সমূহের গভীরতা বেড়ে যায়। কিন্তু দেখা দেয় বেশ কিছু জটিলতা, যেমন জোয়ারাধার চলা কালীন বিলের ফসলের ক্ষতিপূরণের টাকা পাওয়ার জটিলতা, গ্রাম রক্ষা বাঁধ নির্মাণ ক্রটির (প্রধানত পাউবো'র দূর্নীতিবাজ কর্মকর্তাদের যোগসাজসে) কারণে গ্রামে পানি প্রবেশ, প্রভাবশালী ঘের মালিক ও নদী-খাল-জলা-জমি অবৈধ দখলকারীদের তীব্র বিরোধিতা ও নানামুখি ষড়যন্ত্র ইত্যাদি। এসব কারণে সিদ্ধান্ত থাকলেও বিল কপালিয়ায় টি.আর.এম আজও চালু করা যায়নি। ফলে ভবদহের জলাবদ্ধতা নিরসনের একমাত্র কার্যকরী পদ্ধতিটির ধারাবাহিকতা নষ্ট হয়ে স্থবির হয়ে পড়েছে। এর সাথে যুক্ত হয়েছে পাউবো'র দূর্নীতিবাজ প্রকল্প বিশারদ কর্মকর্তাদের অনীহা।

বিষয়টি বোঝার জন্য বিল খুকশিয়া ও বিল কপালিয়া জোয়ারাধারের টি.আর.এম. চলাকালীন সময়ের ক্ষতিপূরণের একটি হিসাব দেওয়া হ'ল

## বিল খুকশিয়া

ক্রমিক	বিষয়	পরিমাণ
১	বিল খুকশিয়ায় মোট জমি	১৩৭৩.৬৬ একর
২	ক্ষতিগ্রস্ত কৃষকের সংখ্যা	১০৮২ জন
৩	এ পর্যন্ত ক্ষতিউরণের অর্থ পেয়েছেন	২৫৫ জন
৪	পাউবো কর্তৃক জেলাপ্রশাসনের কাছে হস্তান্তরিত টাকা	৩,৩৩,৯৯,০০০/=
৫	এ পর্যন্ত বন্ডিত অর্থ	৯১,২৯,৫৪৭/=
৬।	বন্টন না হওয়া অর্থ	২,৪২,৬৯,৪৫৩/=

## বিল কপালিয়া

ক্রমিক	বিষয়	পরিমাণ
১	বিল কপালিয়ায় মোট জমি	১৫৮৮.৪৩ একর
২	ক্ষতিগ্রস্ত মোট কৃষক	২৬৩৯ জন
৩	চেক প্রদান করা হয়েছে	১৬১ টি
৪	পাউবো কর্তৃক জেলা প্রশাসনের কাছে হস্তান্তরিত মোট টাকা	১৫,২৪,২৪,৭১৯/=
৫	বন্টনকৃত টাকা	৪০,৪৭,৬৫০/=
৬	অবন্ডিত টাকা	১৪,৮৩,৭৭,০৬৯/=
৭	মোট এওয়ার্ডি সংখ্যা	২৬৩৯ টি
৮	মোট প্রাপ্ত আবেদন	১৯৮ টি
৯	দুই বছরে একর প্রতি ক্ষতি পূরণের পরিমাণ	৯৬,০০০/=

উপরের ছক থেকে সহজেই বোঝা যায়, ক্ষতিপূরণ দেওয়ার বিষয়টি আরো সহজ করা না গেলে এবং প্রকৃত কৃষক তার ক্ষতিপূরণের অর্থ না পেলে তারা টি.আর.এম. বাস্তবায়নে আগ্রহী যেমন হবে না, তেমনই ঘের মালিক ও অবৈধ দখলদারদের ষড়যন্ত্রের জালে পড়ে অতি সহজে বিস্রান্ত হবে।

## ৪. অনুসিদ্ধান্ত

- ভবদহ ও সংলগ্ন এলাকার জলাবদ্ধতার সমস্যার মূল কারণ দক্ষিণ-পশ্চিমাঞ্চলের নদীব্যবস্থা (River System) এর সাথে উজানের মূল পানিপ্রবাহের সংযোগ বিচ্ছিন্নকরণ এবং পরবর্তিতে ট্রেগমিশনের নীল-নকশা অনুসারে নানাপ্রকল্প বাস্তবায়নের মাধ্যমে 'কর্ডন পদ্ধতি' প্রয়োগ ও স্থানীয় নদী প্রবাহের অবাধ জোয়ার ভাটাকে বাঁধাগ্রস্ত করণ।
  - এ অঞ্চলের ভূমি গঠন ও আন্তঃনদী সংযোগের গুরুত্বকে বিবেচনায় না নিয়ে বিবিধ প্রকল্প বাস্তবায়ন।
  - পরিবেশ প্রতিবেশ ও জীববৈচিত্র্যের সাথে তথাকথিত উন্নয়ন প্রকল্পসমূহের বৈপরীত্য।
  - 'পোল্ডার ব্যবস্থাই সর্বোৎকৃষ্ট পস্থা' পানি উন্নয়ন বোর্ডের নীতিনির্ধারকদের এ চিন্তাগত অবস্থান
  - সাধারণ মানুষের বংশানুক্রমিক ঐতিহাসিক জ্ঞান ও বাস্তব অভিজ্ঞতা প্রসূত অভিজ্ঞানকে বিবেচনায় না আনা।
  - প্রকল্প প্রণেতাদের কোনরূপ জবাবদিহিতার আওতায় না আনা।
  - নদী, খাল, জলাভূমি নানা অর্থে প্রভাবশালীদের জবরদখল ও অবৈধ ঘের স্থাপন।
- ভবদহ ও সংলগ্ন অঞ্চলের জলাবদ্ধতা সমস্যা নিরসনে আমাদের সুপারিশসমূহ :
- আশু করণীয়

- ১। জলাবদ্ধ এলাকাকে দুর্গত এলাকা ঘোষণা করে পর্যাপ্ত ত্রাণ ও পুনর্বাসনের ব্যবস্থা করা।
- ২। দ্রুততম সময়ে শ্রী ও হরি নদীতে খনন কাজ করে ভবদহের জল নিষ্কাশনের ব্যবস্থা করা। এ ক্ষেত্রে দুর্নীতি রোধ ও জবাবদিহিতা নিশ্চিত করতে হবে।
- ৩। পানি উন্নয়ন বোর্ডের গৃহীত সিদ্ধান্ত মোতাবেক ভবদহ স্টুইস গেটের ২১ ও ৯ ভেটের মাঝখানের বাঁধ কেটে সরাসরি নদী-সংযোগ দিতে হবে।
- ৩। প্রয়োজনীয় গ্রাম প্রতিরক্ষা বাঁধের ব্যবস্থা করা।
- ৪। আমডাঙ্গার খালকে সোজাকরে কেটে প্রয়োজনীয় সংস্কার করে রাজাপুরের খালের সাথে সংযোগ দিতে হবে; যাতে মুক্তেশ্বরীর উজানের পানি এ খাল দিয়ে সরাসরি ভৈরবে পড়তে পারে।
- খ। মধ্যমেয়াদী সমাধানের জন্য করণীয়
- ১। অস্টমাসি বাঁধের প্রচলন করে প্রথাগতভাবে জোয়ারের পানি প্রবাহিত পলিকে বিলে অবক্ষেপণের ব্যবস্থা করতে হবে।
- ২। টি.আর.এম. (Tidal River Management-TRM) ব্যবস্থাকে নিয়মিতভাবে চালু রাখতে হবে। এ ক্ষেত্রে ক্ষতিপূরণসহ বিভিন্ন রকমের সমস্যা সমাধানে কার্যকর পদক্ষেপ গ্রহণ করতে হবে।
- ৩। নদীকাঠামোর নাব্যতা বজায় রাখার স্বার্থে নদীর উপর সকল ধরনের ক্রসড্যাম নির্মাণ থেকে বিরত থাকতে হবে এবং নির্মিত ক্রসড্যাম উঠিয়ে দিতে হবে।
- ৪। নদীর স্বাভাবিক গতিপথ সর্পিলাইন নদীর স্বাভাবিক প্রবাহকে বজায় রাখার স্বার্থে সকল ধরনের 'লুপকাট' পরিকল্পনা বর্জন করতে হবে।
- ৫। অবৈধ দখলদারদের হাত থেকে সকল নদী, খাল ও প্লাবনভূমি উদ্ধার করতে হবে।
- গ। স্থায়ী সমাধানের জন্য করণীয়
- ১। মাথাভাঙ্গা নদীর সাথে চিত্রা নদীর সংযোগ স্থাপন করে ভৈরবের প্রবাহের সাথে তার সংযোগ স্থাপন করতে হবে। (বহু আন্দোলন সংগ্রামের পরিণতিতে সম্প্রতি বিষয়টি একটি প্রকল্প হিসাবে একনেকে পাশ হয়েছে)
- ২। ভৈরব-কপোতাক্ষ নদী কাঠামোকে পূণঃজাগরিত করার সমন্বিত পরিকল্পনা প্রণয়ন ও বাস্তবায়ন করতে হবে। এ ক্ষেত্রে নদীসমূহের প্রয়োজনীয় খনন পূণঃখনন, স্বাভাবিক পানিপ্রবাহ অব্যাহত রাখার জন্য নদীপথের সকল অপ্রয়োজনীয় প্রতিবন্ধকতা অপসারণের ব্যবস্থা করতে হবে। পাশাপাশি বর্ষা মৌসুমের পানির ও পলির পরিকল্পিত ব্যবস্থাপনা নিশ্চিত করতে হবে।

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## **Problems and Prospects of Eco-Tourism in Sundarbans**

**Dr Biswas Shaheen Ahmmad\***

**Abstract:** *Eco-tourism is a buzzword. It is one of the important sources of job creation and the way of poverty alleviation. Eco-tourism is basically nature-based tourism. It has originated from conscience of environment. It does not harm environment. This study reveals that the future of eco-tourism in the Sundarbans is very positive and it will bring benefits for the locals as well as the whole country. This study suggests that public-private partnership (PPP) is necessary for the development of eco-tourism in the Sundarbans. Eco-tourism can generate economic benefits at local and national levels and thus promotes incentives to conserve the resources on which it depends on. In this context, the focus should be given on sustainable planning to flourish eco-tourism as a great potential for the economic development. Eco-tourism can be a tool not only for poverty alleviation but also for the economic emancipation of local communities and the country as a whole. It is multi-billion dollar industry and one of the largest job opportunities in the world.*

### **1. Introduction**

Tourism has many faces; eco-tourism is one of them. The term “eco-tourism” blends “ecology” and “tourism” and covers the scope of tourism that draws upon natural, man-made and cultural environment. It is comparatively a new term in tourism literature. Eco-tourism came into prominence in the 1980s as a strategy for reconciling conservation with development in ecologically rich areas. Recognizing its global importance, the United Nations (UN) designated the year 2002 as the International Year of Eco-tourism (IYE). The United Nations has effectively recognized the economic and social importance of this activity which is increasing globally. Tourism has become one of the major cultural and economic forces in the world today. A very recent but widely hailed tourism, alternatively known as eco-tourism, is a potential instrument for rural economic development, environmental natural heritage conservation. In the perspective of Bangladesh it is a very new

\* Associate Professor, Dept of Economics, Govt. B L College, Khulna,  
Email: sahammad1970@gmail.com



term. Only few people are known about this matter. In this study, it is tried to show the brief of eco-tourism and its characteristics. Then the problems and prospects of eco-tourism in the Sundarbans will be showed.

Eco-tourism is basically a nature-based tourism. Eco-tourism has originated from conscience of environment. It does not harm environment. On the other hand, the local people earn money through eco-tourism. Eco-tourism is defined as environmentally and culturally sustainable tourism that provides and ensures social and economic benefits primarily to the local people and then to the nation as a whole, which interact with each other and live within a definable area.

According to the Encyclopedia of Eco-tourism, the term 'eco-tourism' is nature based, environmentally friendly and sustainably managed.

Finally, eco-tourism is a nature-based tourism that involves interpretation of natural and cultural environment and ecologically sustainable management of natural areas.

While there is no universal definition of eco-tourism, its general characteristics can be summarized as follows by the World Tourism Organization (WTO).

- (1) All nature-based forms of tourism in which the main motivation of the tourists is the observation and appreciation of nature as well as the traditional cultures prevailing in natural areas.
- (2) It contains educational and interpretational features.
- (3) It is generally, but not exclusively organized for small groups by specialized and small, locally owned businesses. Foreign operators of varying sizes also organize, operate and/or market eco-tourism tours generally for small groups.
- (4) It minimizes negative impacts upon the natural and socio cultural environment.
- (5) It supports the protection of natural areas by generating economic benefits for host communities, organizations and authorities managing natural areas with conservation purposes.
- (6) Increasing awareness towards the conservation of natural and cultural assets, both among the locals and the foreign tourists.
- (7) Providing alternative employment and income opportunities for the local communities.

## **2. Objectives and Methodology**

The study attempts to achieve the following objectives:

- (1) To see the possible prospects of eco-tourism in Sundarbans.

(2) To identify the problems and offer some policy guide lines.

The present study is mainly based on secondary data. The secondary data were collected from published official statistics, reports, documents, books, articles, daily newspapers, theses, dissertations, statistics and publications of BPC and the Ministry of Civil Aviation and Tourism, web-sites of related local and international institutions.

### **3. Eco-tourism Products in Bangladesh**

Bangladesh is a combination of verdant forests, riverine countryside, and long stretches of sunbathed beaches, fearsome wildness, meandering rivers and magnificent World's largest mangrove forest. Bordering the mighty Bay of Bengal stands this magical tapestry in green with all the glory of its past and the splendid colors of its natural present.

Bangladesh enjoys a unique position, being easily accessible from many popular destinations in South Asia. Bangladesh has a fairly large number of virgin eco-tourism spots to offer.

**The Sundarbans: The Single Largest Mangrove Forest and the Abode of the Royal Bengal Tiger**

Consummately located about 320 kilometer south-west of Dhaka and spread over an area of about 6000 square kilometer of deltaic swamps along the coastal belt of Khulna, is the single largest mangrove forest on the earth, the Sundarbans- the home of the Royal Bengal Tiger. These deeply dense mangrove forests are criss-crossed by a network of rivers and creeks. Tourists find here tides flowing in two directions in the same creek and often tigers swimming across a river or huge crocodiles basking in the sun. Other wild lives in this region are cheetahs, spotted deer, monkeys, pythons, wild-boars and hyenas. The forest is accessible by river from Khulna or Mongla. There are rest-houses for the visitors to stay and enjoy the unspoiled nature with all its charm and majesty.

The World Heritage Site, declared by the UNESCO, the Sundarbans is an immaculate place for eco-tourism. Main tourist spots inside the Sundarbans include Hiron Point (Nilkamal), Katka and Tin Konna Island to view tigers, deer, monkey, crocodiles, birds and natural beauty. Herds of spotted deer are often found to graze here. Another major attraction inside the Sundarbans is Dublachar (island), mainly a fishermen's village.

**Flora and Fauna of The Sundarbans**

The Sundarbans mostly comprises of mangrove forests. Mangroves are salt-tolerant plants occurring in the tropical and sub-tropical intertidal estuarine regions, sheltered coastline and tidal creeks. Sundarbans are the largest mangrove reserve in the world. The specialties of mangrove plants are that they are inundated

by salt water during high tides. Hence to adapt to these adverse situation the plants develop negatively geotropic breathing roots which occurs vertically from the ground. These roots are known as pneumatophores. There are more than 80 species of mangrove in Sundarbans including the mangrove associates and the true mangrove species.

The Sundarbans has rich faunal diversity. Nature in its pristine form exists here. The mangrove forests of the Sundarbans consist of a complex eco-system. The Sundarbans is rich in wildlife. It is mainly because the forests of the Sundarbans is protected by the government and hence it is more or less undisturbed especially the core area.

#### Future of Eco-tourism in the Sundarbans and Benefits

There is no doubt that tourism has an impact on the environment both natural and man-made. But if it is a planned tourism and properly defined eco-tourism, we can consider its impact in a positive way. The Sundarbans play a vital role in developing the entire regional economy and national economy.

Globally people are interested in enjoying nature. The demand of nature and eco-tourism is increasing day by day. In Bangladesh, The Sundarbans is one of the centers of eco-tourism. Globally it is well known as a famous tourist spot. At present 45000 tourists visit this place annually. On the other hand, 300000 people are indirectly dependent on Sundarbans' resources.

There is a good chance of developing eco-tourism in the Sundarbans and obviously it will be profitable. It is the only alternative to use Sundarbans' resources and landscapes in a properly planned way. The philosophy is minimum use and maximum profit without destruction of the tourists. The Sundarbans' landscapes and plants and animals are the real raw materials of tourism and for the near future.

Local people's participation is for the benefits of the locals. They can create employment opportunities and can earn money from the eco-tourism industries. They can change their life styles if they can earn money. Some private organizations such as Sundarbans' tourism, Bengal Tours and Travels, Surma Travel Agency are making eco-tours privately and expecting a good chance and bright future for eco-tourism in the Sundarbans.

Finally, the Sundarbans has economic and ecological chance for eco-tourism development. For the preservation of the Sundarbans' culture and tradition, long-term conservation and forest management, biodiversity and ecosystems protection of, local employment creation and socio economic development for the inhabitants, there is no alternative way without eco-tourism development. So the future of eco-tourism in the Sundarbans is very positive and it will bring benefits for the locals.

## Eco-tourism and Sustainable Development

Eco-tourism is basically thought to conserve the biological diversity and renewable resources. The main reason for saving renewable energy is to think, about the sustainable development. So eco -tourism and sustainable development are interrelated with each other. Because to ensure eco tourism there is needed to have a sustainable plan for the development of any country. At present time, Bhutan has taken a plan to increase its economy size by adopting eco-tourism strategy.

### **4. SWOT Analysis of Eco-tourism in The Sundarbans**

#### Strength

The climate of Bangladesh is very much favorable to the tourists. The country has a tropical monsoon. The strengths include the following points:

1. Virgin natural beauty is a major strength of the country. It is also known as a green country.
2. The Sundarbans in the South is the largest mangrove forest in the world. Its wild variety of flora and fauna attracts tourists from far and wide. If exploited properly, it could be the centre of attraction for nature loving soft adventurous tourists.
3. The people of the country are hospitable and welcoming, especially the people of the rural areas.
4. Bangladesh is located strategically in a very vital position of the South Asia.

#### Opportunities

It is not very difficult to implement eco-tourism, riverine tourism and spiritual tourism as the country possesses enough opportunities to develop these types of tourism. Government has formulated favorable foreign investment policy to attract overseas investors in readymade garments, leather goods, natural gas and petroleum sectors and liberal policy for joint venture investment in tourism sector as well.

#### Weakness

The following points show the weaknesses in this area:

- (1) The main weakness is the country's infrastructure. It is not well developed for suiting the needs of the tourists.
- (2) The political situation is not stable and often hartal and strikes discourage the tourists to visit the country.
- (3) Fund allocation on eco-tourism is insufficient.
- (4) The country often suffers from image crisis. The country continues to

remain as an unknown Country to the tourist generating countries.

### Threats

The followings are the threats for the eco-tourism industry in Bangladesh:

- (1) Natural disasters are the biggest threat for the country especially flood and cyclone.
- (2) Unstable political situation has already created a bad image abroad, which is the biggest threat for development of eco-tourism.
- (3) Continuous campaign against Bangladesh by certain quarters as a fundamentalist country is another obstacle. This is a threat because it may raise socio-economic problems in future.

### 5. Problems and Prospects of Expansion of Eco-tourism in Bangladesh

It is a very clear matter that eco-tourism is a new idea in the context of Bangladesh. So experts have started to think about this form of tourism now a days. So problems of expanding eco-tourism have been discussed below.

- The burning problem is the budgetary problem. Govt. don't allocate big amount to expand eco-tourism.
- Bangladesh is still in mass tourism.
- Another critical problem is the lack of coordination among the ministries.
- Lack of awareness of local people about foreign tourists is another concern.
- Bangladesh can't sell its tourism as eco-tourism to the world tourists. People know it as mass tourism.
- The process to make policy for eco-tourism is in under refrigerator.
- Animals and forests are depleted by the people of Bangladesh every day which is a significant problem of expanding eco-tourism.

There are some good news about the expansion of eco-tourism in our country. It shows some features of Bangladesh which are very potential for eco-tourism. Some points are given below-

- Nature of Bangladesh is very preferable for eco-tourism
- We have some tourist spots they are rich by attractive flora and fauna like the Sundarbans.
- There is the largest mangrove forest "Sundarbans" which can be the ideal of eco-tourism for all over the world.

- It should bring economic development. It should contribute to GDP. It should create the scope of employment for local people and so on.
- Ecological or environmental development- it should preserve flora and fauna, no destruction of nature and animal.
- Natural beauty of Bangladesh helps to establish eco-tourism

## 6. Major Findings and Recommendations

- It is found in this study that eco-tourism can be not only for poverty alleviation but also for the economic emancipation of the local communities and the country as a whole.
- This study reveals that the future of eco-tourism in the Sundarbans is very positive and it will bring benefits for the locals as well as the whole country.
- This study suggests that public-private partnership (PPP) is necessary for the development of eco-tourism in the Sundarbans.
- At present 45000 tourists visit this place annually. On the other hand, 300000 people are indirectly dependent on Sundarbans' resources.

### Recommendations

There is shown the finding from two sides of studies on the problems and prospects of eco-tourism above. Now after considering every matter from fields and policy levels some recommendations can be set to establish eco, tourism in Bangladesh.

- As it is a new idea in Bangladesh, so at first a very pragmatic policy of eco tourism in Sundarbans is a crying need at this moment.
- To make this policy, govt. can take the help from the neighbor countries Nepal or Maldives.
- Effective strategy is needed to go ahead for the progress of eco-tourism.
- Cooperation among related department of govt. should be established on this issue.
- Experts on eco-tourism can be hired from countries rich in eco-tourism and visiting our natural sites with them to understand potentiality.
- Bangladesh government should start to conserve the forest and natural sites like the Sundarbans.
- Public Private Partnership (PPP) needs to get priority on this issue.
- Mass tourism should be stopped by policy.

- Strong rules and regulation for tourists should be set by the government.
- Encouragement of growing eco resort can be the way to spread eco-tourism.
- Govt. should invite the eco-tourists to our country through advertisement in the prominent tourist spots of the world.
- In term of infrastructures in tourist areas need to be well planned and should maintain some codes and conducts which will save the environment.

## **7. Conclusion**

Eco-tourism can generate economic benefits at local and national levels and thus promote incentives to conserve the resources on which it depends. In this context, the focus should be given on sustainable planning to flourish eco-tourism as a great potential for the economic development.

The goal of eco-tourism development in the Sundabans should be to capture a portion of the enormous global tourism market by attracting visitors to natural areas and by using the revenues, it is possible to fund local conservation and fuel economic development.

Eco-tourism can be a tool not only for poverty alleviation but also for the economic emancipation of local communities and the country as a whole. It can also help addressing various dimensions of poverty and complement conservation efforts. Bangladesh, being easily accessible from many popular destinations in South Asia, enjoys a unique position to attract eco-tourists and can change the socio-economic scenario of the nation in near future.

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Problems and Prospects of Eco-Tourism in Sundarbans



Bangladesh Economic Association

4/C, Eskaton Garden Road

Dhaka-1000, Bangladesh

Tel : 934 5996, Fax : 880-2-934 5996

E-mail : bea.dhaka@gmail.com

Website : bea-bd.org