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Abul Barkat
Editor

Bangladesh Economic Association
4/C, Eskaton Garden Road
Dhaka-1000, Bangladesh
Telephone: 880-222225996
E-mail : bea.dhaka@gmail.com
Website : bea-bd.org

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  4/C, Eskaton Garden Road, Dhaka-1000
  Phone: 880-222225996
  E-mail: bea.dhaka@gmail.com
  Website: www.bea-bd.org

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Editor's Note

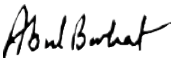
The Bangladesh Journal of Political Economy (BJPE) accommodates only the selected papers submitted for publication. The articles are critically reviewed by internal and external reviewers with endurance and finally concurred by the Editorial Board for publication.

This volume contains articles that combine astute theoretical arguments with a firm grip on practical situations, including institutional possibilities and limitations. This wide-ranging volume brings together research articles that deserve the respect of prudent readers.

Undoubtedly, we acknowledge that inequality, deprivation, and multifaceted poverty are still prime challenges for Bangladesh. This volume will help us to realise that inclusive development is not the outcome of a single aspect; but a combination of elements, including the improvement of physical, human, and social capital, the reduction of inequality, and the establishment of institutions enabling the information flow essential to market performance.

COVID-19 created palpable panic around the world. I hope this volume will help to monitor the current global situation and practice from a broad-based interdisciplinary perspective. Besides, it will keep arduous and interested writers in touch with the cutting-edge issues of lasting human development, thinking action, and sound strategies. More importantly, we are sure that the papers are innovative and thought-provoking, written by a galaxy of scholars and young, dynamic and masterly authors. This Journal, as expected, will be an essential resource for the relevant social science faculties and research institutions, policymakers and analysts, graduate teachers, researchers and practitioners intended to build a 'Decent Society.'

The reviewers and members of the Editorial Board of the Journal nudged us along, overseeing all aspects of this Journal with customary diligence and editorial vision. Including the credible authors, we express our heartfelt gratitude to all of them. It might be worthwhile to remember Lord Byron's words: 'The best prophet of the future is the past.'



Abul Barkat, Ph.D
Editor, Bangladesh Journal of Political Economy;
President, Bangladesh Economic Association

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Challenges for Sustainable Development and Health: Rapid urbanization, inclusive growth and smart and sustainable cities in Bangladesh

Haider A. Khan*

Abstract

The main purpose of this paper is to examine the causes and consequences -- in particular, the policy implications -- of the ongoing urbanization in Bangladesh with particular emphasis on the health conditions. Like many other Asian developing countries, a rapidly increasing share of the population of Bangladesh migrates to urban centers in search for employment opportunities outside agriculture in industrial enterprises or the services sector. For the first time in its history, the urban population is growing faster than the rural population, At the same time, the labor force in non-agriculture is growing faster than the labor force in agriculture. But the employment opportunities in either sector are not growing adequately. The congestion, lack of infrastructure, inadequate provision and inequitable supply of health services are affecting the disadvantaged adversely. This paper attempts to analyze the emerging trends and patterns of urbanization and prospects for building the institutions and infrastructure for smart, inclusive and sustainable cities in Bangladesh within a dynamic framework with a strong emphasis on rural-urban migration and the informal sectors. The analysis pinpoints, among other things, from the social capabilities perspective, the need to build up productive and equitable delivery capacities in the health sector.

Keywords *Urbanization · Health Functioning · Smart Sustainable Cities · Migration · Bangladesh · Socially Embedded Intersectional Capabilities (SEIC) · Uneven Development · Informal Sector ·*

* John Evans Distinguished University Professor, Distinguished Senior Fellow, Policy Research Institute, Professor of International and Development Economics, Josef Korbel School of International Studies, University of Denver, Denver, Co. 80208, USA, hkhan@du.edu, Revised, June, 2021, Paper presented at the conference: British Academy Research Project on Inclusive, Smart and Sustainable cities

1. Introduction

According to some estimates, by 2030 the proportion of people living in cities globally will reach 61%, with almost 80% of urban dwellers living in less developed countries. It also appears that most of the world population growth will be absorbed by cities of the south over the next fifty years. Asian cities will play a major role in this "urban transition" (Roberts and Kanaely (2006)). Bangladesh which is a densely populated low income economy in Asia will not be an exception. Rather, with rapid growth of the cities, countries like Bangladesh will face exceptional challenges with regards to growth, infrastructure, employment, poverty reduction and well-being in terms of capabilities and functionings of the population both in urban and rural areas. This is mainly because of the interdependent "general equilibrium" effects of such an "urban transition".In this paper, for well-being assessments,we use Khan's extensions of Sen's capabilities approach to a Socially Embedded Intersectional Capabilities (SEIC) Approach or SEICA. (Khan 2020a,b: 2021a,b).

As Thorbecke (2007) points out in his magisterial survey of more than fifty years of thinking in development economics, after many twists the current thinking is based on both important progress in technical areas and also a clearer realization that human development is the ultimate goal of economic development. Taking into consideration the reality of globalization, this means that studying the consequences of rapid urbanization requires both a technical approach and an emphasis on human development as rigorously expressed via the capabilities approach to development. In this paper, I develop a theoretical approach based on earlier work which can organize the various disparate trends of urbanization and explore their implications for devising appropriate development strategies and policies from the capabilities perspective. As alluded to before, I also look at one particular South Asian country---Bangladesh---in order to explore the implications of urbanization for growth, employment, distribution and human well-being. Although the rate may be relatively slower than in Indonesia, Malaysia and other NIEs in Asia, a similar urban transition in Bangladesh by 2040 is not in doubt.

Like many other Asian developing countries, a rapidly increasing share of the population of Bangladesh already migrates to urban centers in search for employment opportunities outside agriculture in industrial enterprises or the services sector. We now know that in the first two decades of the 21st century we are witnessing a historical population and employment transition for low income countries like Bangladesh. For the first time in its history, the urban population in this group of countries is growing faster than the rural population, At the same time, the labor force in non-agriculture is growing faster than the labor force in agriculture. But the employment opportunities in either sector are not growing adequately.

The main purpose of this paper is to examine the causes and consequences -- in particular, the policy implications -- of this ongoing urbanization in Bangladesh, particularly in terms of capabilities in the health sector. After briefly presenting the

basic theoretical framework in section 2 below, I will discuss the driving forces behind rapid urbanization in Bangladesh in section 3, effects of rapid urbanization on employment and poverty with a focus on health in section 4, and implications for development strategy and policies in section 5. Section 6 offers some final conclusions.

2. The Theoretical Framework:

A Dual-Dual Approach with Endogenous Migration within a Capabilities Theoretical Framework

As the basic theoretical framework in this paper, I will use the capabilities approach developed by Sen, Nussbaum and others. Within this particular approach to human development and well being, I will use what can be called a "dual-dual" model (Svejnar and Thorbecke 1980, 1982; Khan 1982a,b, 1985, 1994, 1997, 2004a,b, 2006; Khan and Thorbecke 1988, 1989; Thorbecke, 1992,1994; Thorbecke and Santiago 1984; Thorbecke and Morrisson 1989)[1]. This corresponds to the characteristics of a developing economy with not only the traditional and modern sectors but also a kind of dualism within each of these sectors in terms of formal/informal dichotomy. More specifically, the process of development for economies moving from the lower income status to a higher level of development may modify the traditional sector further in the direction of a more market-based modern sector while the formal/informal dichotomy is accentuated within both the sectors. This is the most important move theoretically which is consistent with the stylized facts to be explained in this paper. Consequently, this approach reveals that for countries like Bangladesh which are at a lower level of income the theoretical possibility of uneven development of the formal and informal sectors both in the urban and the rural areas can indeed be empirically confirmed as well.

Thus, in this theoretical framework, the coexistence and distribution of modern and informal type of activities in both rural and urban areas are to be taken as basic structural features of the economy in question. The dual-dual approach integrates poverty analysis with rural-urban movements in an economy wide setting by endogenizing both migration[2] and intra-group income distributions and the nominal poverty line. Following this line of work leads to our ultimately being able to assess policy repercussions on both poverty specific to particular socioeconomic groups and on overall national poverty.

The starting point is the dual economy models of Lewis (1954) and Fei and Ranis (1964)[3]. These pioneering efforts, however, could not or did not take into account the co-presence of dualism within each sector of the two sector models of the dual economy. Erik Thorbecke first raised this issue in 1979 during the course of a National Science

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[1] Such a framework is also useful for formal general equilibrium modeling which is not pursued here. But it looms as a future research task.

[2] Within an overall trend towards rapid urbanization there can be migration in both directions. This can have important implications for poverty reduction policies, as Khan (2006) shows for South Asia.

[3] See Khan (1997) chapters 2 and 3 for a historical survey and a specific intertemporal dualistic model which is used to analyze the conflict between employment and output.

Foundation interdisciplinary project on technology and development and Svejnar and Thorbecke (1980, 1982) was the first published work on a prototype of dual-dual technology classification scheme. Khan (1982a,b) and Khan (1985) were applications of this scheme to the energy and textiles sectors in South Korea. Khan (1983) raised the issue of linking technological dualism to poverty theoretically, following an early observation of Pyatt and Thorbecke (1976). Khan and Thorbecke (1988, 1989) were further applications of technological dualism to Indonesia. Khan (1999) explores the connections between rural-urban dualism and migration and poverty in South Africa. Khan (2006) explores both rural-urban and reverse migration in a dual-dual model for South Asia.

In the current formulation, a rural/urban dichotomy is combined with traditional/modern technological dualism, leading to a fourfold classificatory scheme.[4] A further extension of the early dual-economy models is that the rural economic sector does not only include agricultural activities, but also non-agricultural activities including various off-farm industries and services:

1. *Rural traditional* is closely associated with informal activities, traditional labor-intensive technologies, family farms, food production for domestic consumption, and small-scale off-farm enterprises;
2. *Rural modern* is associated with formal activities, capital-intensive technology, large-scale farming, cash and export crops, and large-scale off-farm enterprises;
3. *Urban traditional* is associated with informal activities, including petit services such as shoe-shining and the provision of other ad-hoc services on a non-contractual basis;
4. *Urban modern* is associated with formal activities, with formal industrial enterprises, including textile factories with export-orientation, and modern services, such as banking, insurance, consultancy and telecommunications.

Poverty analysis in this dual-dual approach can be integrated with migration and various shocks that are important features of the urbanization process in general. In Bangladesh particularly, these shocks are assuming great importance.. The empirical sections described below illustrate this. For a formalization of the

[4] See Svejnar-Thorbecke (1980, 1982) and Khan (1983) for early developments. See also Khan (1997, 2006) and Stifel-Thorbecke (2003).

[5] As will be clear from the structure of the model, an empirical application utilizing the model fully and rigorously will require the use of a Social Accounting Matrix (SAM) and relevant econometric estimates of elasticities etc. in order to calibrate the Computable General Equilibrium (CGE) model. This is part of our future work on the subject. The model presented in the appendix is a one period model with migration equilibrium. A dynamic version also exists. According to Fontana and Wobst (2001)The 1993-94 IFPRI Social Accounting Matrix (SAM) for Bangladesh "… distinguishes 10 agricultural sectors-including two different kinds of rice technology-and 19 manufacturing sectors, out of 43 sectors in total. It also differentiates between twelve socio-economic groups, allowing detailed analysis of household welfare and poverty. The SAM has ten factors of production: one type of capital, one type of land and eight different types of labor, which are disaggregated by both level of education and gender. The innovative feature of the SAM is that it separates out female and male labor value-added for each educational level and in each sector of the economy, providing a base for gender-sensitive analyses of policy changes." This SAM can be a good starting point for both static and dynamic CGE modeling of urbanization in Bangladesh in the dual-dual framework.

dual-dual model, the reader is referred to the appendix.[5]

It can be mentioned here that from a metatheoretical perspective, the dual-dual approach with the theorization of the informal sectors in both the urban and rural areas falls within a certain kind of "Foucaultian" discursive practice. The purely descriptive ILO Kenya mission statement on the informal sector was a certain type of discursive practice that enunciated the changing "nodal point"--- to use Laclau and Mouffe's term--- of development discourse in the 1970s. The purpose was to identify and help poverty reduction policy making in particular from the perspective of development. In Foucaultian terms, the "governmentality" problem of poverty reduction is still salient today and will become more so with rapid urbanization. The dual-dual approach can be critically conceived as both an expression of this governmentality approach and a warning that there are limits to what can be done within the existing structure of international division of labor and power.

Putting the Dual-Dual Approach within the Broader Development as Freedom Framework----Development as a Complex Social- Economic-State Systemic Process:

Writing in 1926, in a biographical essay on Edgeworth, Keynes underlined some of the problems of complex human systems:

> *We are faced at every turn with problems of organic unity, of discreteness, of discontinuity--- the whole is not equal to the sum of the parts, comparisons of quantity fail us, small changes produce large effects, the assumptions of a uniform and homogeneous continuum are not satisfied.*[6]

If anything, the developing part of the world economy today shows to even a greater degree the kind of complexity captured in Keynes's words above. Fortunately, systems theory and economic theory have both made some progress since those dark days. Although we are far from a genuinely complete theory of complex economic systems, efforts are underway that have already borne some interesting fruit in several limited areas.[7] A review of even partially successful set of country experiences such as are contained in Fosu (2013) can be seen as case studies that reveal many facets of complex developing economies --each with its own sub-systemic characteristics to be sure, but also sharing some common strategic features. The purpose of this paper is to synthesize from a strategic perspective--- to the extent it is possible to do so--- the development experiences of the East Asia in particular and draw some appropriate lessons. The claim is that such an approach can lead to a theoretical view of an enabling developmental state that includes many features from the East Asian Developmental State model. But in our theory, we go beyond that model. In particular, it turns out that the theoretical basis of the East Asian Developmental State model must be crucially augmented

[6] Keynes (1971-9), Vol. X, p. 261

[7] See for example, Khan (2004a,b, 2003a,, 1998,1997) and the references therein.

by considerations of deepening of democracy during the developmental process. Furthermore, the systemic crises of accumulation and the deepening ecological crisis impose new challenges that the old East Asian Model did not address (Arrighi 1994, 2007, 2010; Khan 2010); Khan and Liu 2008; Li 2008)

However, at this point in our discussion, some clarification of the key term "development" is necessary in order to avoid ambiguities and confusions. In the rest of this paper, I will be referring to three concepts of development that are implicit in much of the discussion in the political economy of development literature. The first is the idea of development as growth with some structural change or at least the idea that this type of growth is the most crucial necessary condition for development. The second concept is derived by adding explicit distributional elements to growth--- particularly inequality and poverty. Both these ideas are shared by many development economists---- for example, many of the authors of the chapters in Fosu (2013) ---at least implicitly. Fields was one of the earliest in being explicit in discussing all three---growth, absolute poverty and inequality--- and his thoughtful model in the Quarterly Journal of Economics (Fields 1979) article alerts the reader to the performance of a developing economy in all three areas and derives--- at least partly--- a logic of further necessary reforms following from his cogent analysis of the three aspects of development in this sense. Warr (2008) is a more recent example for the case of Thailand. He concludes:

Not all aspects of the Thai development strategy have been similarly successful. Inequality has increased at the same time as absolute poverty has declined. The underlying causes of this increase in inequality are still not well understood. (Warr 2008, p.)[8]

The third--- and the broadest approach to development discussed here--- is in terms of Sen's idea of capabilities and its further extensions. In this view, development is really an extension over time and space of freedom, particularly the positive freedom to lead a certain type of life an individual has reasons to value. Sen and his coauthors have, of course, used this idea, and following Sen, many others have done so as well (Sen 1992, 1999, 2009; Nussbaum 1995, 2000; Khan 1998, 2014). Yet, in so far as there is a normative aspect about development being a " (public) good" that is a premise for the whole project such a view is consistent with the analyses of the East (and to some extent Southeast) Asian Development. Warr's essay on Thailand again is quite explicit in mentioning both the positive achievements and the shortcomings of Thailand's record and its strategy which can fit into this broad systemic capabilities approach. For Korea, Keun Lee has gone further. In fact, Keun Lee's perceptive comments on the possible role of democracy in development extends considerably the terrain of discussion in the direction of the "development as freedom" perspective when he writes:

> *We see obvious advantages in democracy, amongst which is the convenient feature that citizens are not subject to arbitrary arrest and torture.*

[8] See also Warr (1993,1999,2005) for nuanced analyses of the various aspects of Thailand's development experience and Jomo (2007,1995) for Malaysia..

> *Truly strong states get it wrong more often than they get it right. Thus the military dictatorships of Latin America left little in the way of legacy , whereas the military dictatorships in Korea and Taiwan (while not on anything like the same scale of brutality) left a powerful legacy of development. The difference lies clearly in strategic orientation and in institutional capacity in formulating and implementing a program of national industrial development. Our point is that this is an option available to the political leadership of any developing country today. On top of this, the key to the Korean or Asian success was institutional longevity. (Lee 2008, p. 13)*

It would seem, therefore, that there is an implicit agreement that development is "growth plus" other things (Khan and Weiss 2006). While the list of "other things" may vary somewhat, none of the thoughtful scholars of development would want to equate growth and development. Yet, as the East Asian experience shows, generating high growth may be a useful means towards development. But one must also pay careful attention to what can be called "the political economy and the well-being consequences of growth". Consideration of these factors leads inevitably to the role of state. The East Asian experience suggests that the role of states in their developmental process was "enabling" but the transition from an authoritarian to more democratic forms of state was slow. In terms of class character, these states are still bourgeois with accommodations for popular interests that are the results of long and hard struggles by the masses from below.[9] This suggests a change in strategic orientation for the progressives in the 21st century. Such an approach necessarily will need to take differences---particularly class, gender, racial-ethnic differences ---seriously in a critical theory of equalizing capabilities (Khan 2009, 2012a,b, 2014).

What precisely can be the character and role of such an "enabling" developmental state in the 21st century in Bangladesh specifically with respect to enhancing capabilities in health? We try to answer this question in the next section by first identifying the key factors behind rapid urbanization in Bangladesh.

3. Driving forces of rapid urbanization in Bangladesh

With an area of 147,000 square km, Bangladesh is a small, predominantly agrarian economy. However, it is experiencing a very high rate of urbanization. As table 1 below shows, in 1974, only 8.8 per cent of the population lived in urban areas.. By 2001, total urban population as a percentage of total population was 23.40.If we compare it to more recent years, the percentage of urbanization is now over 25 percent and growth rate is more than 3.5 per cent per year.

[9] Prashad (2014) presents a history of the global South. More importantly, the last chapter of Prashad (2014) discusses critically the details of the emerging movements in the global South and their transformational potential.

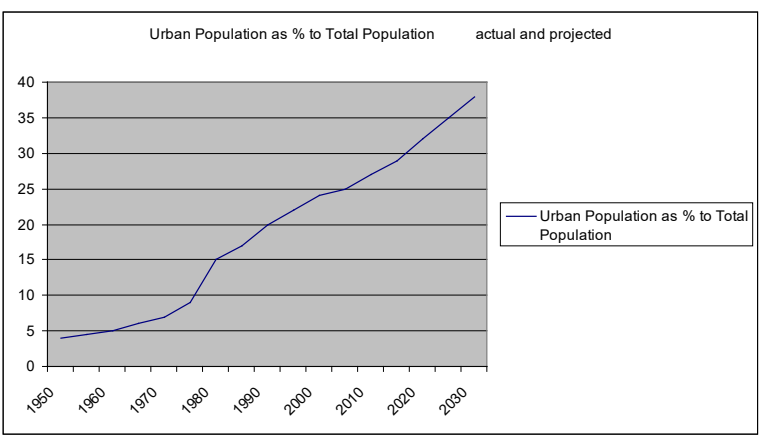
Table 1: Growth of Urban Population in Bangladesh, 1951-2001

Census year	Total National Population (million)	Annual Growth Rate of National Population (%)	Total Urban Population (million)	Urban Population as Percentage of Total Population (i.e. Level of Urbanization)	Decadal Increase of Urban Population (%)	Annual Exponential Growth Rate of Urban Population (%)
1951	44.17	0.50	1.83	4.34	18.38	1.58
1961	55.22	2.26	2.64	5.19	45.11	3.72
1974	76.37	2.48	6.00	8.87	137.57	6.62
1981	89.91	2.32	13.56	15.54	110.68	10.03
1991	111.45	2.17	22.45	20.15	69.75	5.43
2001	123.10	1.47	28.81	23.40	27.38	3.25

Source: *Government of Bangladesh Population Census 1981, Report on Urban Areas 1987 and Preliminary Report, Population Census 1991; and BBS 2005.*

Over the past decades the share of the urban population in the total population, as well as the share of the non-agricultural labor force in the total labor has persistently increased in Bangladesh. Fig.1 shows that by 2030 the urban population will be 40 per cent of the total. Thus an urban transition is already underway. Although it is in some respects less rapid than the average transition speed, given the population density and limited urban infrastructure, the challenges posed by urbanization trends in Bangladesh are at least as severe as some countries with a higher speed of urbanization. This observation is consistent with the characterization of the urban informal sector within the dual-dual model.

Figure. 1 : Urban Population --Actual and Projected---in Bangladesh



The growth of the urban population and labor force, relative to the rural population and labor force, has two main reasons, namely differences in birth and mortality rates between rural and urban areas or an increase of migration from rural to urban areas.In addition, there has also been and continues to be a territorial extension of existing urban areas and a change in the definition of urban areas. This paper focuses on rural-urban migration and in this context it discusses both push and pull factors. In the context of the dual-dual model, these factors contribute heavily towards the informalization of the urban labor markets and stresses on infrastructure, housing , water, health care and other areas of well-being indicators.

3.1 Push factors in Bangladesh

The classical dual-economy models (e.g., Lewis 1954; Fei and Ranis 1964) explain rural-urban migration by increasing productivity in the agricultural sector which leads to a decreasing demand for agricultural workers and subsequently enables agricultural workers to migrate to non-agricultural sectors. But a weak agricultural development can also act as a push factor for rural-urban migration. If the agricultural sector fails to provide sufficient employment for a growing number of workers, and/or if the agricultural sector fails to provide sufficiently high household incomes to cope with a growing number of dependents, people can be encouraged to seek employment outside agriculture. In case of Bangladesh, the rural to urban migration has contributed more than 40 per cent of the change in urban population. In some large cities, the figure is as high as 70 per cent (Islam 2006).

Data of the Food and Agricultural Organization (FAO) of the United Nations shows that the population is already living on and off fragile land in low lying coastal areas. This situation has not significantly changed in recent years as indicated by (i) small and decreasing farm size per capita, (ii) low and often decreasing productivity of agricultural workers, and (iii) low and often decreasing yields per hectare. Therefore , the push factor is even more critical today.

Data from the Bangladesh Bureau of Statistics show that between 1975 and 2004 agricultural land per agricultural worker has remained fairly constant. Over the same period, labor productivity of agricultural workers has not increased very much. Land augmenting technical progress has also yet to take place on a large scale.

Household surveys, which provide a more disaggregated picture, show considerable differences in the distribution of land between income groups although less so than some more heavily concentrated areas in neighboring India and Pakistan. The income surveys show differences in output per hectare between income groups, demonstrating the importance of land as the main productive asset in the rural areas. These surveys reveal a consistent picture in the sense that lower income groups have smaller plots of land and lower yields than higher income groups. A Social Accounting Matrix for Bangladesh needs to be built in order to show the relations between land holdings, income generation and consumption patterns of different

types of household for future applications of the dual-dual model for general equilibrium modeling of the rural sector in relation to the urban sector.

The low level of agricultural land and labor productivity in Bangladesh is closely associated with the unfinished business of the Green Revolution. Bangladesh has very low levels of fertilizer consumption, in comparison not only with more advanced developing countries but also with its Asian neighbors. Although showing a positive trend, the rates of adoption in Bangladesh on a year-to-year basis are much lower than in India or Pakistan.Moreover, with budget retrenchments in recent years, Bangladesh has decelerated or even reduced the spending on agricultural extension services,research and development even though public investment in agricultural activities was found to have relatively high social returns and poverty-reduction effects generally (Fan et al. 2004 and 2005).

The relationship between changes in the agricultural labor force and the changes in agricultural labor productivity can work in both directions. While it is plausible that an increase of agricultural labor productivity allows for a decrease of the agricultural labor force, it is equally plausible that an increase of the agricultural labor force results in a decrease of agricultural labor productivity, if the increase of the labor force is not matched by an increase of land, machinery, finance, seeds or fertilizers. Whereas the former line of causality may reflect the situation in more advanced countries, the latter may have been important in the least developed countries, where the size of agricultural land per agriculturalist is small and declining, and the use of agricultural machinery is very small as well. Indeed, the almost unlimited supply of cheap agricultural laborers itself may have discouraged increasing investment in agricultural machinery. The substitution of labor for capital however faces limits, especially if agricultural land is limited and agricultural inputs are not accessible or affordable. Furthermore, as Patnaik (2008) has shown policies affecting the small peasant holders adversely have retarded land augmenting technical change in this dominant subsector of agriculture.

Unlike early formulations of dual economy models, which focused on a positive agricultural development as a precondition for rural-urban migration, this analysis of countries like Bangladesh suggests that periodic negative agricultural shocks can be an equally powerful push-factor for rural-urban migration. This finding however requires further qualifications. Whether people migrate from rural to urban areas depends not *per se* on whether the agricultural sector is characterized by a positive tendency towards development, but it depends more specifically on whether the rural sector generates sufficient and sufficiently lucrative employment opportunities. While in practice rural economic activities are often synonymous with agricultural activities, for analytical purposes it is important to recognize that rural economic activities also include non-agricultural activities. Furthermore, agricultural- and non-agricultural activities can reinforce each other. In a virtuous reinforcement as in Taiwan (Khan 2004), rural industrialization can be a great absorber of local labor. Thus a weak development of the agricultural sector

can reinforce and can be reinforced by a weak development of rural industries, a strong development of the agricultural sector can be associated with a strong development of rural industries, which provide inputs and services for agricultural producers, or engaged in the processing of agricultural produce. The question here is of providing sufficient and strong backward and forward linkages. Thus a loss of employment due to growing productivity in agricultural may be offset by the creation of new employment opportunities in expanding industries in the rural areas. Because of such a favorable structural change in rural areas, strong agricultural development may actually be a weaker push factor for rural-urban migration than a bad agricultural development.[10]

In conclusion, a model with explanatory power beyond a specific context needs to realize that it is employment opportunities in the rural areas that ultimately determines migration to urban centers, and that the employment in rural areas depends as much on the development of the farm sectors as it depends on the development of the off-farm sector. Furthermore, failure of the different rural sectors to generate sufficient and sufficiently lucrative employment can be due to a positive development, which is associated with increasing agricultural productivity, or a negative development, which is associated with limited agricultural production. Although it is important to realize the complex interactions between push factors for rural-urban migration, it remains a relatively straight forward exercise to identify the principal push factors in the least developed countries. In Bangladesh, given that the rural economic activities are largely determined by agricultural activities, it is essentially the periodic weak agricultural development and lack of rural industrialization that encourages rural-urban migration.

3.2 Pull factors

In line with earlier Harris-Todaro type models it can be argued that rural-urban migration is also motivated by wage differentials. But it is important to specify that the wage differentials between rural and urban areas can be perceived as well as real, and that the higher wage levels in urban areas are often unattainable in practice. Herrmann (2006) and Herrmann and Khan (2008) show the differences in potential earnings between the agricultural sector/ rural areas and the non-agricultural sector/ urban areas by differences in labor productivity. Data from Bangladesh also conform to the pattern of an increasing divergence of labor productivity between different groups of countries since the early 1980s with Agriculture falling behind in the poorer countries. These differences in labor productivity and the associated differences in potential earnings also help to explain not only the rural-urban migration within Bangladesh but also the increase of international migration from poor countries like Bangladesh to more advanced countries. Similarly, the

[10] This finding also sheds new light on dual-economy models, which view a positive agricultural development as the main driving force for rural-urban migration.

differences in agricultural and non-agricultural labor productivity within the LDCs help to explain the increase of migration from rural to urban areas in the LDCs.

The difference in earning potential between agriculture and non-agricultural sectors is the principle pull factor for an increasing migration from rural to urban areas. But many people who migrate to urban areas will not be able to find a well paying job in the non-agricultural sector (Khan 1983, 1985, 2004, 2006; Stifel and Thorbecke 2003). Because of the shortage of formal-sector jobs – be it industry or services – the majority of urban populations will be more likely to end up working as shoes shiners at a street corner rather than a regular employee of a textile enterprise, for example.

4. Rapid urbanization, employment crisis, health capabilities and poverty in Bangladesh

As Khan (1994, 2004 a, b) and Davis (2007) among others have pointed out, urban poverty has been on the increase in Bangladesh. Nationwide, Bangladesh has achieved some success in reducing rural poverty. However, urban poverty has remained a major policy challenge. In particular, enclaves of poverty in slum areas raise serious questions of capabilities deprivation and of identifying and implementing the right set of capabilities-enhancing policies for poverty reduction in Bangladesh. Even basic functionings in areas such as such as life expectancy, nutrition and food intake, literacy etc. fall short of the requirements for a decent human life in the urban areas (Khan 1994, 2004 a and b, 2006 Davis 2007).

In Dhaka city alone from 1974 to 2005 slum population has jumped from 250,000 to 2,840,000 during the span of little over 3 decades. During these decades, the number of slums also increased from 500 to 4,300. While slum population has increased by more than 11 times the number of slums has increased 8.6 times during this period.

The causes for the increase of slum population are certainly complex. However, the major aspect is again related to the lack of well paying jobs in urban areas. There are also cases of downward mobility in urban areas of urban dwellers themselves. Although Bangladesh has been able to reduce urban poverty to some extent, there are pockets of chronic poverty in slums that seem very hard to overcome.

In contrast with rural poverty, most urban dwellers depend on market more extensively for food and other goods as there is no subsistence farming and transfers between households. Therefore, in a city regular money income is necessary for everyone including the poor. Urbanization generally weakens the corporate feeling of belonging in a neighborhood. To this must be added the relatively higher price level for both food and non-food items.

Furthermore, the urban poor experience a much higher level of exposure to different types of pollution . According to Khan (1997), accounting for this aspect

of urban situation increases poverty by at least ten percent.These poor come largely from among those who work in the urban ionformal sector. A CGE application of the dual-dual model by Khan (2004 a, b; 2006) shows for a model including all of South Asia that urban informal sector households are the worst affected by any negative shocks to the economy. With the projections discussed in section 2, urban poverty will indeed be the most serious form of poverty in Bangladesh by the year 2030 and beyond.

During adverse shocks there are also reverse incentives for migration. People who migrate from rural of urban areas, but are unable to find a formal sector job in non-agriculture, or lose their formal sector jobs, may have an incentive to migrate back to the rural areas an assume a job in the agricultural sector. However, as Stifel and Thorbecke (2002) and Khan (2004 a, b; and 2006) show, such reverse migration is more likely to result in a job in the rural informal sector or even involuntary unemployment. Employment in the informal sector, moreover, is not only associated with lower productivity and wages, it is often also associated with less stable employment and more dangerous employment conditions.

In sum, Bangladesh will be increasingly affected by rapid urbanization, and rapid urbanization will probably lead to massive un- and underemployment, associated with low household incomes and widespread poverty. While extreme poverty – measured by $1 per person and day adjusted for purchasing power parities (PPP) – remains higher in rural areas than in urban areas, the lack of significant increase in labor productivity in the non-agricultural sector suggests that poverty is now also increasing in the urban areas as well. Thus some of the predictions of the dual-dual model are empirically confirmed by the evolving situation in Bangladesh.

Urbanization and health capabilities in Bangladesh:

Health can be given a general definition for any living organism. In this sense health for any living organism can be defined as the level of functional and metabolic efficiency dynamically. For humans in particular, it is the capability of individuals or communities to adapt and self-manage when facing physical, mental, psychological and social changes with respect to the physical, social and economic environment. According to the World Health Organization (WHO) health in a broader sense can be defined as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity." This definition has been criticized as lacking operational value. In response other operationalizable definitions have been proposed which include classification systems such as the WHO Family of International Classifications, including the International Classification of Functioning, Disability and Health (ICF) and the International Classification of Diseases (ICD), are commonly used to define and measure the components of health. Thus operationalizing health is not a problem but rather choosing a few relevant and telling indicators out of a plethora

of indicators is the task facing human development and capabilities specialist.

One problem in looking at global rankings of health systems is that different sources give different rankings. Another problem is that rural/urban and group socio-economic status differences are rarely reported in detail.In what follows, I first look at two aggregate sources---one from the World Health Organization and the other from that reported in Lancet from a 2015 Global Burden of Disease (GBD) study. I then look at a third source which gives cost of living and healthcare status of specific cities in Bangladesh.

According to the WHO rankings among the South Asian countries, Bangladesh with a global rank of 88 does not look so bad. Only Sri Lanka has a better ranking at 76. With India at 112 and Pakistan at 122, Bangladesh does better than either of them. Nepal is at 150 and Myanmar comes in last at 190. However, even aggregate rankings that look initially favorable can be deceptive.

The 2015 Global Burden of Disease (GBD) study provides an analysis of 33 health-related SDG indicators based on the Global Burden of Diseases, Injuries, and Risk Factors. According to this report, Bangladesh rank is 151, trailing India (143), Pakistan (149) and specially Sri Lanka at 79. It can be argued that the GBD study is more comprehensive and carefully constructed than the WHO ranking above, in the context of the many health-related targets of SDGs. Nevertheless, the GBD study does not provide us with any information regarding the health status in the urban areas of Bangladesh. For this we turn to a third source. The following tables are created from the NUMBEO data base where data for health, income, consumption and other related variables are covered for Bangladesh as a whole and several urban areas including major cities like Dhaka and Chittagong.

Table 2: Bangladesh Healthcare

Data available for Country and Dhaka

Health Care System Index:

- Country – 44.86
- Dhaka – 39.43

Component of health care surveyed	Country		Dhaka	
	Satisfaction%	Level	Satisfaction%	Level
Skill and competency of medical staff	45.83	Moderate	41.13	Moderate
Speed in completing examination and reports	47.22	Moderate	44.35	Moderate
Equipment for modern diagnosis and treatment	55.15	Moderate	50.00	Moderate
Accuracy and completeness in filling out reports	45.83	Moderate	40.32	Moderate

Friendliness and courtesy of the staff	42.36	Moderate	37.10	Low
Satisfaction with responsiveness (waiting) in medical institutions	30.56	Low	25.00	Low
Satisfaction with cost to you	39.58	Low	32.26	Low
Convenience of location for you	57.64	Moderate	52.42	Moderate

Scrutinizing the table above, we first note that for the country, the score is about half of the highest scoring countries---predictably the advanced countries and East Asian ones--- out of a maximum of 100. However, when we turn to the capital city Dhaka, its score is about 11% lower than even the low country score. In all categories from skill and competency of the medical staff to convenience of location, Dhaka scores lower than the country as a whole. One possible explanation is that the wealthy receive much better care (and many regularly go to Bangkok and Singapore if not to the US and Europe); but it is the abysmally poor care the rest receive that brings the score down. My own field work in the slums of Dhaka and among the wealthy and middleclass in Dhaka and other parts of Bangladesh confirms this.

Table 3: Cost of Living

Cost of living in Bangladesh is 54.22% lower than in US. Rent is 86.14% lower than in US.

In Dhaka:

- Monthly cost for:
  - Four-person family without rent – USD 1,273.58
  - Single person without rent – USD 358.95
- Cost of living index in Dhaka is 63.5% lower than in New York City.
- Cost of living ranks 447th out of 511 cities in the world.
- Cost of living index – 36.50

Restaurants	Average (USD)				Range (USD)			
	Country	Dhaka	Chittagong	Khulna	Country	Dhaka	Chittagong	Khulna
Meal, inexpensive restaurant	2.23	2.48	1.99	1.06	1.24 – 2.86	1.86-3.72	1.55-3.72	0.87-1.24
Meal for 2 people, mid-range restaurant, 3-course	10.28	12.42	12.10	6.21	6.21 – 18.62	7.45-18.62	7.45-18.62	3.72-6.21

McMeal at McDonalds (or equivalent combo meal)	5.59	5.59	4.97	1.74	4.35 – 8.07	4.35-9.93	4.35-9.93	
Domestic non-alcoholic beer (1-pint draught)	3.10	3.10	3.10		2.48 – 4.35	2.48-4.00	2.48-4.00	
Imported non-alcoholic beer (11.2 oz. small bottle)	5.59	5.59	5.28		3.72 – 6.83	3.72-7.45	3.72-7.45	
Cappuccino (regular)	1.71	2.08	1.37		0.87 – 3.72	1.24-3.72	0.99-3.72	
Coke/Pepsi (11.2 oz. small bottle)	0.30	0.32	0.30	0.25	0.19 – 0.43	0.19-0.50	0.19-0.50	0.19-0.31
Water (11.2 oz. small bottle)	0.19	0.19	0.17	0.15	0.15 – 0.25	0.15-0.25	0.12-0.25	

Markets	Average (USD)				Range (USD)			
	Country	Dhaka	Chittagong	Khulna	Country	Dhaka	Chittagong	Khulna
Milk (regular), (1 gallon)	3.14	3.26	3.05	2.81	2.35 – 3.76	2.82-3.76	2.82-3.76	2.79-2.82
Loaf of fresh white bread (1 lb.)	0.48	0.51	0.50	0.39	0.28 – 0.56	0.39-0.68	0.23-0.68	0.22-0.56
Rice (white), (1 lb.)	0.27	0.28	0.28	0.25	0.20 – 0.33	0.25-0.34	0.25-0.34	0.23-0.27
Eggs (12)	1.23	1.29	1.25	1.07	1.12 – 1.49	1.12-1.49	1.12-1.49	0.93-1.19
Local cheese (1 lb.)	2.63	2.37	2.37		1.41 – 3.94	1.41-3.66	1.41-5.07	
Chicken breasts (Boneless, Skinless), (1 lb.)	1.36	1.52	1.24	1.37	0.87 – 1.97	0.90-2.25	0.90-2.25	
Beef round (1 lb.) (or equivalent back leg red meat)	2.61	2.69	2.69	2.52	2.14 – 2.82	2.37-2.82	1.97-3.10	2.25-2.79
Apples (1 lb.)	0.78	0.78	0.78	0.74	0.56 – 0.90	0.56-1.01	0.56-1.01	
Banana (1 lb.)	0.45	0.54	0.37	0.50	0.28 – 0.79	0.32-0.79	0.32-0.79	

Oranges (1 lb.)	0.77	0.82	0.76	0.74	0.56 - 1.13	0.56-1.13	0.56-1.13	
Tomato (1 lb.)	0.30	0.34	0.28	0.12	0.12 – 0.56	0.23-0.56	0.11-0.56	
Potato (1 lb.)	0.13	0.14	0.14	0.12	0.11 – 0.17	0.11-0.23	0.11-0.23	0.10-0.14
Onion (1 lb.)	0.20	0.19	0.19	0.21	0.12 – 0.34	0.14-0.28	0.11-0.28	
Lettuce (1 head)	0.35	0.35	0.34		0.15 – 0.62	0.15-0.62	0.15-0.62	
Water (1.5-liter bottle)	0.34	0.33	0.33	0.34	0.31 – 0.43	0.31-0.43	0.31-0.43	0.31-0.37
Bottle of non-alcoholic wine (mid-range)	13.66	14.90	10.55		8.69 – 24.83	8.69-31.04	8.69-31.04	
Domestic non-alcoholic beer (0.5-liter bottle)	2.44	2.30	2.30		1.86 – 4.35	1.49-4.35	1.49-4.35	
Imported non-alcoholic beer (11.2 oz. small bottle)	4.60	4.48	4.48		2.86 – 5.59	1.86-5.59	1.86-14.90	
Pack of cigarettes (Marlboro)	2.55	2.73	2.48		2.36 – 2.73	2.00-2.73	2.00-2.73	

Transportation	Average (USD)				Range (USD)			
	Country	Dhaka	Chittagong	Khulna	Country	Dhaka	Chittagong	Khulna
One-way ticket (local transport)	0.37	0.37	0.22	0.12	0.25 – 0.50	0.31-0.62	0.19-0.25	
Monthly pass (regular price)	12.42	12.42	17.38	6.21	6.21 – 18.62	6.21-14.90	12.42-22.35	
Taxi start (normal tariff)	0.99	1.00	1.00	0.37	0.50 – 1.24	0.50-1.24	0.50-1.24	
Taxi 1 mile (normal tariff)	0.68	0.80	0.60	0.62	0.40 – 0.80	0.50-0.80	0.40-0.80	
Taxi 1hour waiting (normal tariff)	2.48	2.36	2.36	1.24	1.49 – 3.10	1.49-3.00	1.49-3.15	
Gasoline (1 gallon)	4.19	4.07	4.07	1.24	3.67 – 4.70	3.67-4.65	3.67-4.70	
Volkswagen Golf 1.4 90 KW Trendline (or equivalent new car)	31,037.98	30,525.20	30,525.20		24,830.39 – 37,245.58	18,622.79-37,245.58	18,622.79-37,245.58	

Toyota Corolla 1.6l 97kW Comfort (or equivalent new car)	32,795.12	35,731.40	17,381.27		21,105.83 – 49,660.78	22,347.35-49,660.78	16,139.75-49,660.78	

Utilities (Monthly)	Average (USD)				Range (USD)			
	Country	Dhaka	Chittagong	Khulna	Country	Dhaka	Chittagong	Khulna
Basic (Electricity, Heating, Water, Garbage) for 915 sq. ft. Apartment	34.35	38.25	27.93	12.42	19.86 – 55.87	24.83-63.32	18.62-63.32	12.42-12.42
1 min. of Prepaid Mobile Tariff Local (No Discounts or Plans)	0.02	0.02	0.02	0.01	0.01 – 0.02	0.01-0.02	0.01-0.02	0.01-0.03
Internet (60 Mbps or More, Unlimited Data, Cable/ADSL)	26.75	24.51	24.51	31.04	12.42 – 62.08	12.42-49.66	12.42-62.08	

Sports and Leisure	Average (USD)				Range (USD)			
	Country	Dhaka	Chittagong	Khulna	Country	Dhaka	Chittagong	Khulna
Fitness Club, Monthly Fee for 1 Adult	19.73	24.52	12.42	8.69	8.69-37.25	12.42-49.66	6.21-24.83	
Tennis Court Rent (1 Hour on Weekend)	8.12	9.65	12.42	2.48	3.10-18.62	3.72-18.62		
Cinema, International Release, 1 Seat	4.35	4.35	3.72	1.71	2.48-5.59	3.10-6.21	2.48-6.21	1.55-1.86

Childcare	Average (USD)				Range (USD)			
	Country	Dhaka	Chittagong	Khulna	Country	Dhaka	Chittagong	Khulna
Preschool (or Kindergarten), Private, Monthly for 1 Child	50.35	53.54	24.83		24.83 – 74.49	24.83-74.49	24.83-74.49	

International Primary School, Yearly for 1 Child	16,218.03	16,218.03	16,218.03		4,779.85 – 24,009.93	4,779.85- 24,009.93	4,779.85- 24,009.93	

Clothing and Shoes	Average (USD)				Range (USD)			
	Country	Dhaka	Chittagong	Khulna	Country	Dhaka	Chittagong	Khulna
1 Pair of Jeans (Levis 501 Or Similar)	31.30	33.06	33.06	13.66	17.38 – 49.66	17.38- 55.87	17.38- 62.08	8.69- 19.86
1 Summer Dress in a Chain Store (Zara, H&M, ...)	27.10	28.69	20.69	27.31	18.62 – 49.66	18.62- 49.66	12.42- 49.66	
1 Pair of Nike Running Shoes (Mid-Range)	58.40	65.00	41.38	22.35	37.25 – 105.53	37.25- 124.15	31.04- 124.15	
1 Pair of Men Leather Business Shoes	44.83	45.94	45.94	27.31	27.31 – 74.49	29.80- 80.70	29.80- 80.70	

Rent per Month	Average (USD)				Range (USD)			
	Country	Dhaka	Chittagong	Khulna	Country	Dhaka	Chittagong	Khulna
Apartment (1 bedroom) in City Centre	122.20	146.83	102.43	49.66	62.08 – 198.64	86.91– 248.30	62.08 - 124.15	37.25- 62.08
Apartment (1 bedroom) Outside of Centre	66.51	81.73	58.97	31.04	37.25 – 124.15	49.66– 124.15	49.66 - 62.08	24.83- 37.25
Apartment (3 bedrooms) in City Centre	366.53	449.84	297.96	177.95	186.23 – 620.76	297.96– 744.91	248.30 - 372.46	99.32- 248.30
Apartment (3 bedrooms) Outside of Centre	200.16	235.89	176.30	62.08	124.15 – 310.38	124.15 – 372.46	124.15 - 248.30	

Buy Apartment Price	Average (USD)				Range (USD)			
	Country	Dhaka	Chittagong	Khulna	Country	Dhaka	Chittagong	Khulna
Price per Square Feet to Buy Apartment in City Centre	92.28	113.41	74.49	49.66	49.66 – 148.98	74.49 – 186.23	62.08- 99.32	

Price per Square Feet to Buy Apartment Outside of Centre	54.17	62.04	52.76	31.04	32.28 – 86.91	43.45 – 99.32	37.25-86.91	

Salaries and Financing	Average (USD)				Range (USD)			
	Country	Dhaka	Chittagong	Khulna	Country	Dhaka	Chittagong	Khulna
Average Monthly Net Salary (After Tax)	329.61	345.07	434.53	248.30				
Mortgage Interest Rate in Percentages (%), Yearly	12.06	11.67	11.67		0.11 – 0.19	0.10 – 0.19	0.10-0.19	

In the long table 3 above,it should be noted that comparisons between Dhaka and New York City can be deceptive. In the first place the average income in Dhaka is much lower and given the income inequality---a Gini index of over .45---the lower income groups receive comparatively much lower amount than in NYC. Secondly, Dhaka has very little social and economic services for the poor. Even the little that existed in the 70s and 80s was taken away through the implementation of neoliberal program in urban areas. Rural areas are largely served---when they are lucky--- by domestic and forein NGOs, esp. from Japan and the Scandinavian countries. Finally, Dhaka and other urban areas in Bangladesh have very little in the way of infrastructure that can serve the poor and connect them with healthcare facilities even where they are available and somewhat affordable.

Looking through the prices of necessities including daily food items, prices are almost always higher in Dhaka than even other cities like Chittagong. What is not captured is the combination of poor quality and high prices that the urban poor in Bangladesh face. Subjectively, many of the urban poor do not know enough about nutrition (see Pakravan et. al. 2017), to allocate their meagre budget optimally for achieving nutritional efficiency.

Property Prices

	Index			
	Country	Dhaka	Chittagong	Khulna
Price to Income Ratio:	11.96	13.68	7.88	8.75
Mortgage as Percentage of Income:	158.54%	177.03%	117.60%	
Loan Affordability Index:	0.63	0.56	0.85	
Price to Rent Ratio - City Centre:	28.66	28.96	28.09	34.12

Price to Rent Ratio - Outside of Centre:	30.85	29.45	34.02	46.99
Gross Rental Yield (City Centre):	3.49%	3.45%	3.56%	2.93%
Gross Rental Yield (Outside of Centre):	3.24%	3.40%	2.94%	2.13%

Rent per Month	Average (USD)				Range (USD)			
	Country	Dhaka	Chittagong	Khulna	Country	Dhaka	Chittagong	Khulna
Apartment (1 bedroom) in City Centre	122.20	146.83	102.43	49.66	62.08 – 198.64	86.91– 248.30	62.08-124.15	37.25-62.08
Apartment (1 bedroom) Outside of Centre	66.51	81.73	58.97	31.04	37.25 – 124.15	49.66– 124.15	49.66-62.08	24.83-37.25
Apartment (3 bedrooms) in City Centre	366.53	449.84	297.96	177.95	186.23 – 620.76	297.96– 744.91	248.30-372.46	99.32-248.30
Apartment (3 bedrooms) Outside of Centre	200.16	235.89	176.30	62.08	124.15 – 310.38	124.15 – 372.46	124.15-248.30	

Buy Apartment Price	Average (USD)				Range (USD)			
	Country	Dhaka	Chittagong	Khulna	Country	Dhaka	Chittagong	Khulna
Price per Square Feet to Buy Apartment in City Centre	92.28	113.41	74.49	49.66	49.66 – 148.98	74.49 – 186.23	62.08-99.32	
Price per Square Feet to Buy Apartment Outside of Centre	54.17	62.04	52.76	31.04	32.28 – 86.91	43.45 – 99.32	37.25-86.91	

Salaries and Financing	Average (USD)				Range (USD)			
	Country	Dhaka	Chittagong	Khulna	Country	Dhaka	Chittagong	Khulna
Average Monthly Net Salary (After Tax)	329.61	345.07	434.53	248.30				
Mortgage Interest Rate in Percentages (%), Yearly	12.06	11.67	11.67		9.00-15.00	8.00-15.00	10.00-15.00	

5. Strategic policy implications of rapid urbanization

Dijk (2006) describes urbanization – the agglomeration of households in confined space – in terms of a U-shaped curve. Initially rapid urbanization is associated with considerable challenges and costs, but if managed successfully these costs can be turned into opportunities and benefits. However, as the theoretical discussion of the dual-dual model of urbanization shows the persistence of informal sectors can pose some serious problems with regards to development strategy and policy. The empirical evidence provided for Bangladesh in this paper demonstrates that this will be a long run strategic issue here in addition to the short and medium run employment creation and poverty reduction challenges. The turn-around in the U-shaped curve which is associated with economies of scale and an increase of economic and ecological efficiency, among others – is not going to be an automatic process (UN-HABITAT 2007).This proposition seems plausible for Bangladesh as well. The move towards a turn around of the U-shaped curve will require a sound public management of urban agglomerations and, all else equal, this will depend on a vibrant economy in and around urban centers. A growing urban economy must ensure sufficient revenues for urban authorities, and it must create sufficient jobs for the urban population. Otherwise, urban centers will be confronted by a spread of poverty and slums, social exclusion and crime (UN-HABITAT 2007), and the urban authorities will lack revenues to finance necessary interventions and investment, including investment in housing, water, sanitation, electricity, waste management, transport, schools and health care facilities, as well as spending on welfare programmes, and law and order.

The data for Bangladesh examined in this paper show that urban centers have already witnessed a large influx of people, with consequent stress on infrastructure, employment opportunities and an increase in urban poverty. In fact, urban centers are characterized by a rapid increase of un- and underemployment, and associated with this a rapid increase of poverty and slums. To use the picture of the u-shaped curve of urban development, many cities are at the downward segment and the challenge is to encourage a transition to the upward segment. Although this transition requires a better management of urban centers,the policy perspective must go well beyond a narrow focus on the urban centers alone. It is important that the anti-urban bias, which has characterized development efforts in recent years, is not replaced by an anti-rural bias in the years to come.[11] Indeed, it can be argued that successful urban development is closely linked to and cannot be separated from successful rural development.This is where the general equilibrium dual-dual approach can also be helpful.

In line with this dual-dual dynamic general equilibrium argument it seems

[11] Lipton (1977) argued that development policies should focus on the rural rather than the urban areas, as the rural areas constitute the backbone of developing economies and home to the majority of the poor. In recent years, development and poverty reduction efforts have therefore underlined the importance of rural and especially agricultural development.

reasonable to encourage development policies to focus on the strengthening of the linkages between informal and formal enterprises in the urban areas, linkages between small-scale farms and large commercial farms in the rural areas, and finally linkages between farms and firms across geographic locations. The strengthening of these linkages is a complex challenge that cannot be adequately addressed in this paper. It is possible however to outline the necessary directions and changes of current development policies.

The principal objective of development policies, as well as related efforts to sustainably reduce poverty, should be to increase the absorption of the labor force by creating more and more productive employment opportunities, which generate sufficiently high household incomes (UNCTAD 2006; Hope 1999). The creation of employment opportunities in the rural areas of Bangladesh is necessary to decrease migration to urban centers, and the creation of employment opportunities in the urban centers is necessary to address the challenges of rapid urbanization for Bangladesh outlined here.

The creation of more and more productive employment opportunities requires the development of productive capacities across sectors and industries. According to UNCTAD (2006) the development of productive capacities requires a strengthening of production linkages (between enterprises and sectors), a strengthening of productive resources (factors of production), and a strengthening of entrepreneurial capabilities (managerial, technical and technological skills). Entrepreneurial capabilities can be thought of as the necessary capabilities to effectively use the factors of production in order to convert raw inputs into competitive outputs (see also Gore and Herrmann 2008a).

The development of productive investment in Bangladesh will require public and private investment in physical and social infrastructure, as well as a strengthening of institutions. While Bangladesh and its development partners are placing increasing focus on strengthening public institutions – as reflected, for example, by a considerable increase of aid for governance-related purposes – it is equally necessary to think of possibilities to strengthen private-sector support institutions. These include private financial intermediaries, agencies for investment and trade promotion, chambers of industry and commerce, and producer associations, but they also include public development banks, investment and marketing facilitation capabilities. The latter have been weakened or closed during structural adjustment programmes. While it is important to recognize that many of these institutions suffered from corruption and inefficiencies, it is equally important to recognize that these institutions governed properly can serve important functions during the urban transition period in particular. The institutional void that resulted from the dismantling or weakening of such institutions has not been, contrary to the expectations of the reformers, filled by private sector initiatives. It is necessary to rebuild such institutions, while taking account of past experiences. Enterprises in Bangladesh in particular will require public or quasi- public-private

institutions that support innovations, and provide help with respect to adaptation and adoption of new technologies and diversification, storage and shipment, finance and insurance, as well as market intelligence and marketing.

Despite the need for productive sector development, productive sector development has not received adequate attention. In recent years, official development assistance (ODA) committed to Bangladesh has been characterized by two important shifts. The first is a shift in overall aid from development-oriented aid to emergency assistance; the second is a shift in development-oriented aid from economic-sector development to social-sector development. Although it is necessary to have these expenditures, if resources are drained from developmental expenditures, these trends can negatively affect the economic development of countries like Bangladesh and lead to even more "fire-fighting" type aid to be necessary in the future. (Khan 1995, 1997, 2003; Gang and Khan1999). Between 1998--2000 and 2003—2005 aid commitments for social infrastructure and governance increased from about 8% to more than 12% of total aid commitments – mostly due to an increase of aid for government and civil society – whereas aid commitments for economic infrastructure and production decreased from 6% to about 4% of total aid commitments (UNCTAD 2007). Although some social sector aid can be used to enhance capabilities and hence future productivity, it requires careful planning and development of institutions. What is crucial is to provide adequate development-oriented aid to properly motivated recipient policy makers (Khan 2002, 2003, 2004c; Gang and Khan 1999).[12]

The agricultural sector is particularly hard hit by the decline of aid in the productive sector more generally. Between 1998-2000 and 2003-2005 aid for agricultural research, extension and education decreased from about 1% to less than 0.5% of total aid commitments. The aid committed to agriculture is little in absolute terms, but it is even smaller, if compared against the fact that agricultural sector continues to account for the larger part of Bangladesh's GDP, and that the rural areas still continue to host more than 70% of the population.. Furthermore, the decline of aid for agricultural development rests uneasily with the finding that agricultural investment in LDCs – particularly investment in agricultural research and development, and investment in rural infrastructure, including feeder roads – is characterized by relatively higher social rates of return (Fan et al. 2004 and 2005). The decline of aid for agricultural development is paralleled by a slight increase of aid for industrial research and development. But measured as a share of total aid commitments, the aid commitments for industrial research and development have also remained low (UNCTAD 2007).

[12] UNCTAD (2007), as well as Gore and Herrmann (2008b) show that contrary to what the common believe may be, investment in science, technology and innovation is important even in LDC-type economies. These economies however do not require foundation research that pushes the global technology and knowledge frontier, they require rather applied research and development which helps in very concrete ways to improve production processes and products. Looking at Bangladesh data confirms these broad trends and implications.

6. Conclusions

In this paper I have attempted to analyze the emerging trends and patterns of urbanization in Bangladesh within a dynamic dual-dual framework with a strong emphasis on rural-urban migration and the informal sectors. The analysis pinpoints, among other things, the need to build up productive capacities in order to create adequate employment and incomes for the rapidly growing population---particularly in the urban areas.The development of productive capacities, which is a precondition for the creation of productive employment opportunities, is a central element of viable poverty reduction strategy for Bangladesh as well.

As part of an overall poverty reduction strategy and for reducing urban poverty in particular, creation of mid-size cities and townships need to be pursued actively. Such small townships will create employment and offer opprtunities to the employers to create new productive capacity. It is important to formulate a coherent plan for creating such townships in geographically balanced strategic locations throughout Bangladesh.

Without significant poverty reduction as part of a sustainable development strategy, it is impossible to think of viable urbanization in this poor country. Bangladesh should develop a corresponding focus in its development strategy. Both for independent ecological reasons and for the implications of ecological damage for rising inequality and poverty, such a strategy will have to be ecologically sustainable in the long run. The donors, especially the OECD/ DAC countries, should provide the necessary financial backing for such a sustainable and equitable development strategy for Bangladesh.

It is necessary to reverse the trends in aid, and to provide a much larger share of aid for productive sector development, including the development of rural and urban areas, and the development of agricultural and non-agricultural sectors in line with the perspective of the dual-dual model. Although urban centers mostly host non-agricultural industries, sustainable urbanization also strongly depends on what happens in the agricultural sectors. Productive employment opportunities in rural areas are important in order to combat an unsustainable migration from rural areas to urban centers, and productive employment opportunities in urban centers are essential to absorb the rapidly increasing labor force in the non-agricultural sector.

Only if the rapidly rising urban populations in the urban agglomerations in Bangladesh find productive employment will they benefit from urbanization and development with rising household incomes. Only then will they be able to move out of slums, afford better access to water and sanitation, better access to health care and schools and live in a safe environment free from crime in the urban centers. In Sen’s terminology, the capabilities enhancement for the urban poor in LDCs are intimately connected with both the means and the ends of development in the suggested strategy of development for Bangladesh in light of the facts and trends of rapid urbanization.

Finally, from a metatheoretical perspective, the dual-dual approach with the theorization of the informal sectors in both the urban and rural areas pursued here falls within a certain kind of "Foucaultian" analysis of discursive practice as well. The purely descriptive ILO Kenya mission statement on the informal sector was a certain type of discursive practice that enunciated the changing "nodal point"--- to use Laclau and Mouffe's term--- of development discourse in the 1970s. The purpose was to identify and help poverty reduction policy making in particular from the perspective of development. The "governmentality" problem of poverty reduction is still salient today. The dual-dual approach can be seen as a critical theory that articulates both the "governmentality" approach and a warning that there are limits to what can be done within the existing structure of international division of labor and power.

Appendix:
Formal Representation of Dual-Dual Model

For the interested reader, the formal representation of the dual-dual model with Constant Elasticity of Substitution (CES) Production Functions is given below. The readers interested in following the equations in detail are referred to section 4 "Notation and symbol explanation" below, which describes the model in greater depth.

Production and Labor Market

$$X_{fc} = A_{fc}\left[\beta_K^{fc}\overline{K}_{fc}^{\frac{\mu_{fc}-1}{\mu_{fc}}} + \beta_{LS}^{fc}LS_{fc}^{\frac{\mu_{fc}-1}{\mu_{fc}}}\beta_{LU}^{fc}LU_{fc}^{\frac{\mu_{fc}-1}{\mu_{fc}}}\right]^{\frac{\mu_{fc}}{\mu_{fc}-1}} \quad \text{.....(1)-(2)}$$

$$X_{ic} = A_{ic}\left[\beta_K^{ic}\overline{K}_{ic}^{\frac{\mu_{ic}-1}{\mu_{ic}}} + \beta_{LU}^{ic}LU_{ic}^{\frac{\mu_{ic}-1}{\mu_{ic}}}\right]^{\frac{\mu_{ic}}{\mu_{ic}-1}} \quad \text{.....(3)-(4)}$$

$$i_{ic} = \frac{P_{ic}X_{ic}}{LU_{ic}} \text{.....(5)-(6)}$$

$$wu_{ex} = \frac{P_{ex}\beta_{LU}^{ex}X_{ex}}{LU_{ex}} \text{.....(7)}$$

$$wu_{ex} = i_{food}(1+\delta) \text{.....(8)}$$

$$i_{srvc} = \frac{P_{im}\beta_{LU}^{im}X_{im}}{LU_{im}} \text{.....(9)}$$

$$w_{im} = i_{srvc} + \gamma \frac{\Pi}{LU_{im}} \text{.....(10)}$$

$$\Pi = P_{im} X_{im} - i_{srvc} LU_{im} - ws_{im} LS_{im} \text{.....(11)}$$

$$wu_{ex} = (1 - \frac{hLU_{im}}{LU_{srvc} + LU_{im}}) wu_{srvc} + (\frac{hLU_{im}}{LU_{srvc} + LU_{im}}) wu_{im} \text{.....(12)}$$

$$ws_{fc} = \frac{P_{fc} \beta_{LS}^{fc} X_{fc}}{LS_{fc}} \text{.....(13)} - \text{(14)}$$

$$ws_{im} = \left[\frac{1 - \beta_{LU}^{im}}{(1-\theta)\beta_{LU}^{im} + \theta(1 - \beta_{LU}^{im})} \right]^{1/1-\theta} ws_{ex} \text{.....(15)}$$

Disposable income and savings

$$I_{rih} = i_{food} LU_{food} \text{.....(16)}$$

$$I_{ruh} = wu_{ex} LU_{ex} \text{.....(17)}$$

$$I_{rsh} = ws_{ex} LS_{ex} \text{.....(18)}$$

$$I_{rlh} = P_{ex} X_{ex} - ws_{ex} LS_{ex} - wu_{ex} LU_{ex} - S_{ex} \text{.....(19)}$$

$$I_{uih} = i_{srvc} LU_{srvc} \text{.....(20)}$$

$$I_{uuh} = ws_{im} LU_{im} \text{.....(21)}$$

$$I_{ush} = ws_{im} LS_{im} \text{.....(22)}$$

$$I_{ukh} = P_{im} X_{im} - ws_{im} LS_{im} - wu_{im} LU_{im} - S_{im} \text{.....(23)}$$

$$I_{bch} = tM \text{.....(24)}$$

$$S_{fc} = \lambda_{fc} [P_{fc} X_{fc} - ws_{fc} LS_{fc} - wu_{fc} LU_{fc}] \text{.....(25)} - \text{(26)}$$

Demand

$$C_c^h = \frac{\alpha_c^h I_h}{P_c} \text{.....(27)} - \text{(49)}$$

Foreign Trade

$$M = \sum\nolimits_h C_{im}^h + \frac{S_{im}}{P_{im}} - X_{im} \text{.....(50)}$$

$$EX = X_{ex} - \frac{S_{ex}}{P_{ex}} \text{.....(51)}$$

Equilibrium Conditions

$$\sum_{c} LU_{c} = LU \text{.....(52)}$$

$$\sum_{fc} LS_{fc} = LS \text{.....(53)}$$

$$X_{ic} = \sum_{h} C_{ic}^{h} \text{.....(54)} - \text{(55)}$$

$$P_{im} \equiv 1 + t \text{.....(56)}$$

$$P_{ex} \equiv 1 \text{.....(57)}$$

The production sectors are specified as CES with the choice of nonunitary[13] elasticities of substitution for the two formal sector commodities in equations 1 and 2. The informal sector commodities also have CES specifications. All commodities are produced under capital constraints. Thus, capital, K, in each sector has an upper bound denoted by a bar above K. The assumption that capital stock is fixed in each sector may be relaxed, but it is in fact, a fairly standard assumption for developing economies.

In the informal sectors each worker receives her average revenue product. Rural small holders may work on common land and these rural farming households may share the total income equally among all the family members. Urban informal workers supply all their labor at the prevailing wage rate. Thus leisure is not an argument in their objective function. This may be defended as an extreme assumption when people are at the margins of subsistence. Equations 5 and 6 show the informal sectors' income determination.

The total income per unit includes logically the returns also to non-labor assets for those who own land or capital. Hence, the relevant measure of income is total income per unit from all sources.

The profit maximizing rural large landholders ensure that under competitive conditions wages for unskilled workers in the export sector are equal to the marginal revenue product of the unskilled labor they have to hire. Equation 7 reflects this condition. Equation 8 shows the equilibrium allocation of unskilled labor in the rural informal sector. In equilibrium, the rural sector wage rate is below the wage rate in the formal sector by a fixed factor. This reflects the assumption that there are transactions costs in working in the rural formal sector that is captured by this mark up.[14]

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[13] The Stifel-Thorbecke paper uses Cobb-Douglas production functions with elasticities of substitution restricted to a value of 1.

[14] Alternatively, one could also postulate that there is an 'insider' market wage equilibrium in the formal sector, and those unskilled workers lucky enough (or more likely, because they know someone already working in the formal sector) to get a job in the formal sector can enjoy this wage premium. This is not a hypothesis the authors consider, but the data will be consistent with this hypothesis as well.

Turning now to the import sector, for unskilled workers in the urban area the assumption here is that they get the income per unit of labor in the urban services sector (shown in equation 9) plus a share of the profits as given in equation 10. The profit determination itself is shown in equation 11.

The Harris-Todaro model features regarding rural-urban migration are captured in equation 12. Here, in equilibrium, rural wage must equal the expected wage in the urban sector. In equation 12, the probability of getting a job in the import sector is given by the share of the urban uneducated labor force in that particular sector multiplied by a scale parameter, *h*.

Skilled workers are employed only in the formal sectors. Their wages are determined in equations 13 and 14 by their marginal revenue products. We now turn to the determination of incomes for the households.

1. Household Income Determination

There are nine types of households. Two in the rural area are landowning households--- large and small. There are also urban capitalists and bureaucrats. The other five are households where the main source of income is from labor.

The rural informal households which are really rural small holders receive their total revenue from production as shown in equation 16. Rural unskilled and skilled households receive their wage incomes as shown in equations 17 and 18 respectively. Equation 19 gives the incomes of the rural large land holders.

Equations 20- 24 show the incomes of the urban households. The working class households receive wage income and the capitalists the profit incomes, in general. The bureaucratic households capture part of the rents from imports by colluding with the rent seekers.[15] The formal sector employers (rural large land owners and urban capitalists) are the only savers in the model. They each save a constant fraction of their nominal incomes.

Household demand functions are captured by maximization of Cobb-Douglas utility functions subject to their income constraints. There are 23 such equations (equations 27-49) because the four rural household groups have access to only food and importables. This gives us eight equations. Each of the urban groups has access to three commodities--- food, importables and urban services. This gives another 15 equations. The prices for the three commodities can be used to define an overall deflator.

2. Foreign Trade

Imports in this model are the difference between domestic demand and production of import competing sector. Exports can be supplied at the prevailing price up to any quantity under the small country assumption. Thus exports are equal to total output less the savings in the form of exportables of the rural large landholders. Equations 50 and 51 show the import and export demand functions respectively.

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[15] Salaries are excluded in equation 24. The reasoning is that these are invariant to exogenous shocks.

3. Equilibrium conditions for the model as a whole and Causal Depth

There are two sets of equilibrium conditions in the model. First, the labor market equilibrium conditions are given by equations 52 and 53. There is disguised unemployment, as discussed before, but no formal involuntary unemployment. The second set of equilibrium conditions given by equations 50 and 51 is that the domestic demand for the informal sector goods and services is matched by domestic supply. Prices in the formal sectors are set by the world market prices. The export price is normalized to one. The import price is equal to 1+t, where t is the tariff rate. Exchange rate is held fixed during the particular modelling period. It is clear that the current account balance must be exogenous. This balance is equal to foreign savings which are assumed to be zero here. Hence current account balance is assumed to be zero.[16] This completes the description of the formal model. It is clear that this model has greater causal depth than the standard neoclassical optimizing model since the households and firms can optimize here but within a deeper socio-economic structure. In addition to the standard *explananda* common to the concerns of the two rival models, these structural features allow the social scientist to explain other phenomena such as poverty, migration and their interactions among other things.

4. Notation and symbol explanation

Production and Labor Market

$$X_{fc} = A_{fc}\left[\beta_K^{fc}\overline{K}_{fc}^{\frac{\mu_{fc}-1}{\mu_{fc}}} + \beta_{LS}^{fc}LS_{fc}^{\frac{\mu_{fc}-1}{\mu_{fc}}}\beta_{LU}^{fc}LU_{fc}^{\frac{\mu_{fc}-1}{\mu_{fc}}}\right]^{\frac{\mu_{fc}}{\mu_{fc}-1}} \quad \text{.....(1)-(2)}$$

Eqn 1-2: output of formal sector [superscript/subscript; fc=formal sector commodities]

X=output in formal sector; A=Technology coefficient; K=Fixed capital; β=share of input in output; LS= skilled labor; LU=unskilled labor; μ=elasticity of substitution;

$$X_{ic} = A_{ic}\left[\beta_K^{ic}\overline{K}_{ic}^{\frac{\mu_{ic}-1}{\mu_{ic}}} + \beta_{LU}^{ic}LU_{ic}^{\frac{\mu_{ic}-1}{\mu_{ic}}}\right]^{\frac{\mu_{ic}}{\mu_{ic}-1}} \quad \text{.....(3)-(4)}$$

Eqn 3-4: output in informal sector [superscript/subscript; ic=informal sector commodities]

[16] Implicitly, this amounts to claiming for a reforming economy (see section 5 above) that the stabilization policies indeed succeed in restoring the external balance.

X=output in formal sector; A=Technology coefficient; K=Fixed capital; β=share of input in output; LS= skilled labor; LU=unskilled labor; μ=elasticity of substitution;

$$i_{ic} = \frac{P_{ic} X_{ic}}{LU_{ic}} \text{.....(5)} - \text{(6)}$$

i_{ic}=income in informal sector (wage in informal sector is determined)

$$wu_{ex} = \frac{P_{ex} \beta_{LU}^{ex} X_{ex}}{LU_{ex}} \text{.....(7)}$$

wu_{ex}= unskilled labor wage in export sector [subscript ex is used for export sector representation]; β=share of input in output

$$wu_{ex} = i_{food}(1+\delta) \text{.....(8)}$$

δ= Transaction costs of work in rural formal sector (export) instead of working in food sector (for unskilled labor) ; i_{food}=income in food sector

$$i_{srvc} = \frac{P_{im} \beta_{LU}^{im} X_{im}}{LU_{im}} \text{.....(9)}$$

i_{srvc}=income in service sector of unskilled workers

$$w_{im} = i_{srvc} + \gamma \frac{\Pi}{LU_{im}} \text{.....(10)}$$

w_{im}= wages in import competing industry; γ=profit share ratio for unskilled labor in import competing sector; Π=profits;

$$\Pi = P_{im} X_{im} - i_{srvc} LU_{im} - ws_{im} LS_{im} \text{.....(11)}$$

Π=profits of capitalists; ws_{im}=skilled labor wage;

$$wu_{ex} = (1 - \frac{hLU_{im}}{LU_{srvc} + LU_{im}}) wu_{srvc} + (\frac{hLU_{im}}{LU_{srvc} + LU_{im}}) wu_{im} \text{.....(12)}$$

h= scale parameter

$$ws_{fc} = \frac{P_{fc} \beta_{LS}^{fc} X_{fc}}{LS_{fc}} \text{.....(13)} - \text{(14)}$$

ws_{fc}= skilled wage in formal sector

$$ws_{im} = \left[\frac{1-\beta_{LU}^{im}}{(1-\theta)\beta_{LU}^{im} + \theta(1-\beta_{LU}^{im})}\right]^{1/1-\theta} ws_{ex} \text{.....(15)}$$

ws_{im}= skilled wage in import competing sector; θ= relative risk aversion of skilled workers

Disposable income and savings

$$I_{rih} = i_{food} LU_{food} \text{.....(16)}$$

I_{rih}= disposable income of rural informal household

$$I_{ruh} = wu_{ex} LU_{ex} \text{.....(17)}$$

I_{ruh}= disposable income of rural unskilled household

$$I_{rsh} = ws_{ex} LS_{ex} \text{.....(18)}$$

I_{rsh}= disposable income of rural skilled household

$$I_{rlh} = P_{ex} X_{ex} - ws_{ex} LS_{ex} - wu_{ex} LU_{ex} - S_{ex} \text{.....(19)}$$

I_{rlh}= disposable income of rural large landholders household

$$I_{uih} = i_{srvc} LU_{srvc} \text{.....(20)}$$

I_{uih}= disposable income of urban informal household

$$I_{uuh} = ws_{im} LU_{im} \text{.....(21)}$$

I_{uuh}= disposable income of rural unskilled household

$$I_{ush} = ws_{im} LS_{im} \text{.....(22)}$$

I_{ush}= disposable income of urban unskilled household

$$I_{ukh} = P_{im} X_{im} - ws_{im} LS_{im} - wu_{im} LU_{im} - S_{im} \text{.....(23)}$$

I_{ukh}= disposable income of urban capitalist household

$$I_{bch} = tM \text{.....(24)}$$

I_{bch}= disposable income of bureaucrat household

$$S_{fc} = \lambda_{fc}[P_{fc} X_{fc} - ws_{fc} LS_{fc} - wu_{fc} LU_{fc}] \text{.....(25)} - (26)$$

S=savings of formal sector employers (urban capitalists and rural large landholders)

Demand

$$C_c^h = \frac{\alpha_c^h I_h}{P_c} \text{.....(27)} - (49)$$

α=budget share of commodities; I=household income; C=consumption of commodities by households; P=price of commidites;

Foreign Trade

$$M = \sum_h C_{im}^h + \frac{S_{im}}{P_{im}} - X_{im} \text{.....(50)}$$

M=import; C= demand for imported commodities; S=savings of capitalists; P=price of imported commodities; X=output in import competing sector;

$$EX = X_{ex} - \frac{S_{ex}}{P_{ex}} \text{.....(51)}$$

EX=export; X=output in export sector; S=savings of rural capitalists (large landholders); P=price of export commodities;

Equilibrium Conditions

$$\sum_c LU_c = LU \text{.....(52)}$$

$$\sum_{fc} LS_{fc} = LS \text{.....(53)}$$

$$X_{ic} = \sum_h C_{ic}^h \text{.....(54)} - \text{(55)}$$

$$P_{im} \equiv 1 + t \text{.....(56)}$$

P=price of imports; t= tariff rate

$$P_{ex} \equiv 1 \text{.....(57)}$$

P=price of exports

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Willingness to Pay for Improving River Water Quality: Do Households' Environmental Attitudes Matter?

Md. Ariful Islam[*]
Md. Mijanur Rahaman[**]
Siti Aznor Ahmad[***]

Abstract

This paper investigates the determinants of a household's willingness to pay for improving the water quality of an impaired urban river by employing the contingent valuation method (CVM) in a developing country like Bangladesh. For this study, primary data are collected through an in-person survey of the households in Dhaka city. Using the logit model, this analysis focuses on the relationship between environmental attitudes and willingness to pay for improving river water quality. The outcomes indicate that respondents with stronger environmental attitudes are more likely to pay, while those with weaker attitudes are less likely to pay for hypothetical contingent valuation (CV) scenarios. Some of these results support the motivation for non-use value that people place on non-marketed goods and can be employed to enhance CV reliability as the National Oceanic and Atmospheric Administration (NOAA) recommended. This study also suggests that the government increase people's understanding and attitude toward environmental preservation so that people will willingly pay for the preservation effort.

Keywords *River · Water Quality · Environmental Attitudes · Willingness to Pay · Contingent Valuation*

[*] Lecturer, Department of Economics, Islamic University, Bangladesh. Email: arif.eco.iu986@gmail.com
[**] M.Phil. Research Scholar, Department of Economics, Islamic University, Kushtia- 7003, Bangladesh. Email: rahmanmijanur86@gmail.com
[***] School of Economics, Finance and Banking, University Utara Malaysia, Sintok, Kedah, Malaysia. Email: siti736@uum.edu.my

1. Introduction

Clean and quality surface water offer a wide range of market and non-market benefits (Halkos & Matsiori, 2017; Halkos & Matsiori, 2018; Woodbury *et al.,* 2018). Water resources provide various benefits; therefore, severe damage to such resources curtails the welfare of society. Henceforth, the deterioration of natural resources due to anthropogenic activities has raised different challenges regarding environmental resource protection and consciousness in individual behaviour (Gutiérrez-Cánovas *et al.,* 2019). However, to overcome these challenges, ecological economists urged integrating human-environment relations in valuing such natural amenities (Witt *et al.,* 2019). Accordingly, the decision-makers and resource managers are eager to examine motivational factors that affect an individual's decision to support natural resource conservation.

Framing a sound management policy for improving river water quality needs reliable information about the total economic value of clean water (Zhao *et al.,* 2019). The method that can efficiently calculate the total economic value of such natural resources is the contingent valuation method (CVM), which derives both the use and non-use value of the said goods by directly questioning people through a survey (Mitchell & Carson, 2013; Boyle, 2017). However, suggestions have been made that the design of CVM has to strive for a better understanding of the attitudes and behaviours of how individuals respond to valuation questions related to non-market goods and services (Sarvilinna *et al.,* 2018). Incorporating individuals' environmental attitudes in CVM is thus to understand the underlying motivations and belief systems to value environmental goods (Kotchen & Reiling, 2000; Sarvilinna *et al.,* 2018). On the other hand, controversy regarding contingent valuation leads the economists to seek the actual motivations of the respondents to answer in the first place. Thus, understanding the behavioural intention, such as stated willingness to pay, requires a comprehensive investigation of psychological factors (Spash *et al.*, 2009; Sarvilinna *et al.,* 2018).

Although it is argued that environmental quality improvements must acknowledge respondents' attitudes and perceptions (Arrow *et al.,* 1993), the complicated relationship is still poorly understood in contingent valuation studies (Bartczak, 2015). Moreover, in empirical research, attitudes are often confused with the related concepts of perceptions, beliefs, and values, which raise questions about what has been analysed (Luzar & Cosse, 1998). Therefore, a proper elicitation of environmental attitudes can be worthwhile to measure willingness to pay is contingent valuation study to explain the valuation response and underlying motivation (Spash *et al.,* 2009; Bartczak, 2015).

In recent decades, researchers have focused on comprehending the non-economic motivations of individuals to place value on environmental goods. For instance, the environmental attitude has been identified to influence the willingness to pay for the protection and conservation of natural resources (Spash et al., 2009; Bartczak, 2015; Sarvilinna *et al.*, 2018). Likewise, Sarvilinna et

al. (2018) examined the environmental attitudes on people's willingness to pay using an attitude-behaviour framework. Their findings validate the non-economic motives of willingness to pay. Dunlap (2008), on the other hand, developed a scale to explain the environmental attitude that can explain individuals' behavioural intention toward natural resource protection.

While contingent valuation studies on valuing non-market goods confirm that willingness to pay is significantly associated with income and education level (Balana *et al.,* 2013; Grazhdani, 2015; Tilahun *et al.,* 2015; Voltaire, 2017; Islam *et al.,* 2019), several studies found low intention to pay and protest responses despite having the constructs income and education (Choe *et al.,* 1996; López-Mosquera *et al.,* 2014; Lo & Jim, 2015). In addition, the predictor variables, such as education, often failed to explain the individuals' stated willingness to pay (Ahmad & Hanley, 2009). On the contrary, socio-economic and demographic predictors often provide mixed results in measuring WTP. Therefore, the individual's motivation for a monetary contribution to an environmental improvement program is deemed essential to be explored by incorporating psychological factors that still are in disguise (Filippini & Martínez-Cruz, 2016).

While the body of academic work on these themes has become a topic of interest among academics and policymakers in developing countries, there remains a lack of theoretical work and even less empirical work to engage with the findings from other contexts and explore their relevance to the river improvement framework in Bangladesh. This article is thus motivated to understand the relationship between psychosocial variables and their influence on WTP for water quality improvement. This paper adopted a new ecological paradigm (NEP) scale to measure individuals' environmental attitudes to predict stated willingness to pay. To the authors' best knowledge, this is the first attempt which used NEP involving water quality improvement in developing countries to understand further how attitudinal measures may contribute to the contingent valuation methodologies. This paper uses CV responses from urban households of Dhaka. It investigates the relationship between environmental attitudes and willingness to pay for a hypothetical project that addressed improving the Buriganga River's water quality and impaired urban freshwater resources in Dhaka, Bangladesh.

2. Review of Literature

The present study hypothesised that environmental attitude could predict respondents' willingness to pay for river water quality improvement. Typically, an environmental attitude may determine the behaviour which influences the human action toward the utilisation and preservation of the environment (Gifford & Sussman, 2012). Gifford and Sussman (2012) also concluded that people with pro-environmental attitudes showed some degree of support for environmental improvement action. The current study used the New Ecological Paradigm (NEP) to measure environmental attitudes developed by Dunlap and Van Liere (1978).

This scale aimed to gauge a new worldview about human-environment relations on the notion that humans were the measure of all values and earth's natural resources were for human needed. Among the 15 items of NEP, 12 items showed a high degree of internal consistency and were easily understood by environmentalists and the general public (Dunlap & Van Liere, 1978). The environmental attitude was linked with a score on NEP scales; higher NEP scores indicated high pro-environmental attitudes.

Can the environmental attitude predict the intentional behaviour of an individual for willingness to pay? It has been studied on a limited scale under non-market valuation literature. Using the NEP scale, Kotchen and Reiling (2000) explored the relationship between environmental attitude and non-use value for endangered species. Their study found that respondents with higher NEP scores were more likely to respond 'yes' in a hypothetical CV scenario, while those with low NEP scores were less likely to answer 'yes' to the offered bid amount. Using Choice Modeling, Choi and Fielding (2013) found environmental attitudes as the significant motive behind the willingness to pay response to endangered species conservation. Their study supported the NEP scale as a predictor for eliciting WTP.

People's willingness to pay for environmentally-certified products has been examined by Husted *et al.* (2014), and their study summarised that individuals with pro-environmental attitudes showed more likeliness to pay the premium for products with eco-certification. Association between NEP and WTP was also significant in a study of marine biodiversity protection and coastal zone improvement (Halkos & Matsiori, 2017). However, Suziana's (2017) study on preference for wetland conservation in Greece identified four latent classes, which integrated NEP components with the scale-adjusted latent class (SLC) model. Despite showing flooding preference, many respondents were against wetland protection and did not refer to any of the NEP components, while others showed a biocentric attitude.

Despite some research in environmental economics that examined the effect of environmental attitudes on policies related to environmental goods, like the protection of endangered species (Kotchen & Reiling, 2000; Choi & Fielding, 2013) or wetland conservation (Halkos & Matsiori, 2017; Gkargkavouzi *et al.*, 2019), it is rare to find research that studied the relationship between environmental attitudes and willingness to pay for river water quality improvement, particularly in developing countries. Keeping several of the insights from previous studies on attitude and willingness to pay, the present study adopted this framework into a hypothetical water quality improvement project to know whether environmental attitude could predict respondents' WTP for clean water. Therefore, the primary objective of this study is to investigate the linkage between environmental attitudes and willingness to pay in the case of river water quality improvement in a developing country like Bangladesh.

3. Research Methodology

3.1 Survey Instrument

A written questionnaire was administered to 298 households in Dhaka city between May and September of 2017 to collect responses to primarily closed-ended questions. The survey respondents were male or female household members above 18 years old. The survey questionnaire was divided into three sections: 1) household information including socio-demographic characteristics; 2) environmental overview including knowledge and attitude about the good to be valued; 3) household willingness to pay for the improvement of the water quality Buriganga river under a hypothetical management scenario. The survey consisted of multiple-choice, dichotomous yes/no, and ordered-rank responses. Survey questions were written in basic English and translated into the local language to maximise response rates and respondent understanding. A paragraph explains that the improvement of the water quality of Buriganga relies solely on wastewater treatment plants, which will worsen the condition of Buriganga. Accordingly, households must pay for its installation, maintenance, and operation to improve water quality and conserve the river Buriganga preceded the WTP question**.** Since the current water bill in Dhaka city is extremely low-priced compared to another Asian metropolis (Arfanuzzaman and Rahman, 2017), the management authorities believed the current water bill of USD 0.12 per 1000 litre to be low and were contemplating raising it. More importantly, the increased water bill could provide more funds to install additional wastewater treatment plants, which will make better the water quality of Buriganga. Respondents then presented a referendum-type WTP question asking if they would be willing to pay a specific amount in the form of a high water bill. Ten bid amounts were assigned randomly, one bid amount for each survey: BDT 15, 20, 25, 30, 35, 40, 50, 60, 80, and 100.

3.2 Hypothetical Scenario

This study adopted the dichotomous choice type elicitation technique to estimate residents' willingness to pay for the surface quality improvement of river water quality in Dhaka, Bangladesh. To construct a suitable hypothetical market scenario, this study followed the guidelines of the NOAA panel on contingent valuation (Arrow *et al.,* 1998). The NOAA panel advocates that a contingent market should be presented to the respondents sufficiently by delineating the goods and services to be valued without a well-structured market. Since surface water quality has no well-defined market, the hypothetical scenarios were presented to the respondents by describing them in detail to know what they would be paying for.

> *The river Buriganga is currently polluted and contaminated due to sewage and industrial waste. If no action is taken to improve its water quality, the river is expected to have deteriorated permanently in the next few years. These include a complete loss of freshwater availability, no fish population, an increase in*

waterborne and skin diseases of the people residing nearby, no recreation activities, and a significant land and housing price reduction. Water pollution must be controlled to improve water quality, ensure people's water demand and function river biodiversity. One way to improve surface water quality is by removing some or all contaminants, making it fit for reuse or discharge back to the environment, which requires building more "wastewater treatment plants". This will lead to improved water quality, increased freshwater availability, augmentation of the fish population, and more recreational activities. The overall city life will improve through water quality restoration.

The hypothetical scenario was developed to understand the respondents and what they paid for.

3.3 Sampling

Without a credible list of the population and the extensive study area, this study employed a multi-stage cluster sampling to select desired households, as in Barrow (2009). Dhaka city[1] was primarily divided into four zones due to the large study area, and two Zones were randomly chosen. One Ward was randomly selected from each Zone. From each Ward, two Mahallahs were randomly chosen. Finally, about 400 households were targeted for the sample survey using proportionate simple random sampling. However, around 7% of samples proved to be business addresses, leaving approximately 372 households. The response rate was about 80% (from the 372), meaning that the sample consisted of about 298 households. The rationale for using multi-stage sampling in this study was that a complete list of all members of the population did not exist. In such a situation, a multi-stage sample was deemed appropriate.

3.4 Contingent Valuation Method

The CVM is an approach to value non-market resources using a direct technique by cautiously designing a sample survey and administering it to individual respondents (Arrow *et al.,* 1993; Hanemann, 1994). In our case, CV methods have two major benefits over other assessment techniques: 1) CV methods can assess an individual's willingness to pay (WTP) for hypothetical changes in water quality, and 2) they can reliably value water quality regardless of whether the installation of wastewater treatment plants in question is the primary or secondary purpose for the overall water quality improvement program. Strong criticism of CV is that answers from surveys relying upon hypothetical propositions are subject to various biases (Diamond & Hausman, 1994). The primary sources of bias identified in the

[1] According to latest census of 2011, Dhaka city consists of 41 Thanas, 92 Wards, 841 Mahallah, and 1576746 households (see http://en.banglapedia.org/index.php?title=Dhaka_District). Currently, the Dhaka municipality is divided into two city corporations, the Dhaka South City Corporation (DSCC) and Dhaka North City Corporation (DNCC). Thana is the first layer administrative unit which comprises with one or more Wards. A Ward has several Mahallah which is the lowest administrative unit in the city corporation.

literature include design bias, which involves subjectivity in the establishment of initial bids or payment vehicles; operational bias, which refers to unfamiliarity with the good to be valued; hypothetical bias, usually an upward bias in WTP based on the fact that expectations of having to submit an actual payment may not be present; and strategic bias, which is related to individuals' intention not to reveal their true preferences, comparable to the free-rider problem (Hanemann, 1994). While specific sources of potential bias cannot be entirely removed from the method, each can be controlled to a certain degree through careful study design, allowing for reasonably reliable results (Arrow *et al.,* 1993).

In this study, we designed the CV survey to simulate as closely as possible a real market. We minimised design and operational biases by establishing bids based upon the pre-existing water price and using it as a familiar vehicle for payment. In this way, respondents had a real-world baseline and example on which to base their responses. A referendum-type question was employed to present respondents familiar with discrete choices in market transactions with easy response categories (Hanemann, 1994). Hypothetical bias was addressed by suggesting to residents that water quality improvement may consider raising the water price. While strategic bias may be impossible to eliminate, we have no reason to suspect a uni-directional bias in the study. Some respondents may have minimised their WTP by fearing paying it. In contrast, others may have maximised it to reflect a desire to demonstrate environmental solid or cultural values associated with the river Buriganga.

3.5 Logit Regression

We used logit regression to model the relationship between the binary dependent variable (WTP) and independent variables. A statistical summary and explanation of all variables included in the model are provided in Table 2. This study hypothesised that older respondents with higher income and education levels and pro-environmental solid attitudes would be willing to pay higher water prices than others. Most of the variables tested have shown significant predictability in other contingent valuation studies regarding natural resources. The following equation was estimated:

$$\text{Probability (WTP)} = \alpha + \beta_1 \text{ bid amount} + \beta_2 \text{ age} + \beta_3 \text{ education} + \beta_4 \text{ income} + \beta_4 \text{ nep} + \beta_5 \text{ att} + \text{error} \quad (1)$$

where α is the constant and βi are the coefficients of the explanatory variables. The model's goodness-of-fit was estimated using a series of statistical measures, such as link-test, collinearity, and ROC analysis. Using the 'lroc' command in STATA, we obtained that the area under the curve was approximately 0.88, indicating acceptable discrimination for the model. We also performed the link test and found that the prediction squared did not have the explanatory power

indicating the model was fit with the required covariates. The explanatory variables also passed the collinearity diagnostics; therefore, our model specification was as good as we expected.

3.6. WTP Econometric Model

The WTP question presented a dichotomous response option. The respondents were asked if they would or would not be willing to pay a given bid amount A. Households were assumed to maximise their utility while expressing their willingness to pay the specified bid amount in exchange for access and improved experience. Following Hanemann (1994), the probability that a respondent would be willing to pay a given bid amount is assumed to follow a standard logistic variate:

$$\text{Prob (YES)} = \left(1 + e^{-(\alpha+\beta A+X\varphi)}\right)^{-1} \qquad (2)$$

Where α is a constant parameter, β is the coefficient of the bid variable A, X is the vector of other explanatory variables influencing the response, and Φ is the vector of the corresponding slope parameters. Using estimated parameters of Eq. (2), the mean WTP amount was computed as,

$$\text{WTP} = \frac{\alpha+\bar{X}'\varphi}{\beta} \qquad (3)$$

Table 1: A Summary of Variables Used in the Logit Regression Model

Variables	Description	Mean ± SD
Age	Ratio scale: respondents were asked to write their actual ages based on calendar years	40.6 ± 10.52
Education	Ordinal scale (0 to 5): no degree achieved = 0, Secondary education = 1, higher secondary = 2, bachelor's degree = 3, master's degree = 4, doctorate degree = 5.	3.70 ± 1.28
Income	Ratio scale: households were asked to write their monthly income in Bangladeshi currency (BDT).	43750 ± 12882
	Ordinal: weaker = 1, moderate = 2, stronger =3. Firstly, respondents were asked to rate 15 statements on a 5-point scale from strongly disagree (1) to strongly agree (5): whether they were revealed their environmental overview under five broad issues such as reality to limits of growth, anti-anthropocentrism, fragility of nature's balance, anti-exceptionalism, and possibility of an eco-crisis. An index was developed by summing the responses to each statement. The summated scores were then divided into three categories to represent the respondents having weaker, moderate, or stronger pro-environmental attitudes.	

Variables	Description	Mean ± SD
Environmental Attitude (NEP)	Weaker attitudes are those with NEP scores of 50 or below, moderate is those greater than 50 and less than 59, and stronger are those 59 or greater. Boundaries are determined that approximately one-third of all respondents are included in each category (see for details, Kotchen & Reiling, 2000). Reliability analysis revealed Cronbach's α= 0.89, suggesting a valid index. Theoretically, the index score can range from different values (depending on the scale). Higher scores indicate a greater pro-environmental attitude.	1.92 ± 0.67
Environmental Attitude (ATT)	Ordinal: weaker = 1, moderate = 2, stronger =3. Following the NEP scale, ATT was constructed where higher scores indicate greater environmental concern toward reducing, reusing and recycling household waste. Reliability analysis revealed Cronbach's α= 0.82, suggesting a valid index.	1.81 ± 0.60
Bid amount	Ratio scale: the bid amount ranged from 15 to 40 BDT.	27.51 ± 8.56
Willingness to pay	Binary: willing to pay = 1, not willing to pay = 0.	0.56 ± 0.49

4. Results and Discussions

4.1 Sample Characteristics

Of 298 respondents, 3% had no formal education, 19% completed high school, 26% had higher secondary degrees, 28% had bachelor's degrees, and 17% had master's degrees. Concerning the respondent's age, most respondents fell within the age bracket of 31-40, constituting 32% of all samples. The following highest categories were those whose age fell in 41-50 (29% of total samples). The household's total income was calculated from all sources after paying tax. About 22% of the respondents had an income below the national average of BDT31,883. However, this finding showed that they were still earning higher than the sampled population of Dhaka city. The PPRC Governance and Economy Survey 2015 showed that Dhaka city's bottom 40 per cent population had a monthly average income of BDT14,421. Notably, the higher percentage of the samples (55%) fell within the income range of BDT30,000 - BDT49,999. The finding showed some convergence toward a monthly average income (BDT37,323) of the middle 50% of the population in Dhaka city.

4.2 New Ecological Paradigm (NEP)

The new ecological paradigm scale (NEP scale) is a set of questions to measure the respondent's environmental beliefs, attitudes, and values (Dunlap *et al.*, 2008). The NEP scale items are summarised in the Appendix. The reverse-ordered items were four items such as item2, item8, item10, and item12. The mean values were computed after each item was reverse-scored to obtain a maximum score. The range of mean values was between 2.9 and 4.4, indicating a good ecological

worldview (Xiao, Dunlap & Hong, 2019). A high NEP score shows a more positive pro-environmental attitude of the individuals. The higher NEP scores also describe the high ecocentric orientation of the individuals. The NEP scale comprised 15 items, having a scale reliability coefficient of approximately 0.90 greater than that (α=0.83), consistent with the results of Cooper, Poe, and Bateman (2004). This scale is further classified into three groups: strong, moderate and weak in terms of individual environmental attitudes, following Kotchen and Reiling (2000).

4.3 Analysis of Environmental Attitude and WTP

This section presents the empirical findings of the contingent valuation survey and discusses the result obtained. To estimate the association between WTP and environmental attitude, we applied the logit model, which took the following explanatory variables: bid, income, education, age, and environmental attitude measured by the NEP scale in three different groups (strong, moderate, weak) and attitude scale for reducing, reuse and recycle household waste. Table 3 presents the logit regression result, which indicates that income and education were statistically significant at 1 and 5 per cent significance levels, respectively, and the sign was positive as expected. It suggests that the higher the income and education level, the higher the probability of willingness to pay. As shown in Table 3, the more robust and moderate groups were statistically significant at a 1 and 5 per cent significance level, respectively. The result in Table 4 supported a statistical difference between the mean WTP estimate of the 'weak' group and the other two groups at the 1 per cent significance level.

The analysis of willingness to pay using the logit model showed that NEP positively affected WTP, meaning that respondents with a higher pro-environmental attitude were more likely to pay for the water quality improvement. This result supports previous studies on the NEP-WTP relationship. For example, Aldrich *et al.* (2007) found a high correlation between willingness to pay and NEP for preference heterogeneity study in a contingent valuation study. A similar association was also investigated by Dunlap (2008), Halkos and Matsiori (2018), and Taye *et al.* (2018). These studies demonstrated that NEP significantly affected households' willingness to pay for nature conservation.

Using the NEP scale was to measure residents' environmental attitude and understand how environmental attitude shapes the residents' preferences and willingness to pay for water quality improvement. This paper also aimed to test the theoretical validity by incorporating environmental perspectives in a CV study, as recommended by the NOAA panel (Arrow et al., 1993). By successfully integrating the NEP scale in analysing CV responses, the theoretical validity of this study was confirmed. The replication of NEP into our CV study was consistent with the attitude-behaviour theory of Kil *et al.* (2014). While the study of Kotchen and Reiling (2000) found respondents with stronger pro-environmental attitudes were more likely to respond 'yes' to a referendum CV question about protecting

an endangered species, the current study also found that stronger environmental attachment tends the respondents to pay more for the water quality improvement program.

Table 2: Results of Logit Regression on WTP

Variables	**β**	**β** with margin
BID	-0.0450***	-0.00886***
	(0.00948)	(0.00156)
AGE	-0.00426	-0.000
	(0.0301)	(0.002)
UNIV	0.523**	0.033**
	(0.568)	(0.039)
INCOME	3.159***	0.128***
	(1.012)	(0.082)
NEP (Strong)	1.719***	0.353***
	(0.419)	(0.0746)
NEP (Moderate)	1.655**	0.239**
	(0.551)	(0.109)
ATT (Strong)	0.128	0.0255
	(0.400)	(0.0802)
ATT (Moderate)	-0.300***	0.0598***
	(0.541)	(0.109)

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Since previous studies confirm the association between environmental attitude and willingness to pay in other valuation fields, we found NEP scores could also predict the WTP for water quality improvement. The average marginal effect shows that stronger NEP was found to have a higher impact than weaker NEP, suggesting that households with a more robust pro-environmental attitude were ~35% more likely to pay for the improvement in water quality than Buriganga, the more vulnerable group. We further test how different groups of NEP scores predict mean WTP with the logit model. Currently, the Dhaka Water and Sewerage Authority (DWASA) has fixed a new tariff for the household, and that is BDT 21.04 (=$0.25) for 1000 litter of water use which includes both sewer and water (BDT 10.52 + BDT 10.52) consumption. In our study, the mean WTP from the DBDC model was 45.54 BDT (=$0.54) for 1000 litters. Moreover, we found respondents who had more substantial NEP scores were willing to pay BDT 53.54 (=$0.65), whereas respondents with weaker NEP scores were willing to pay BDT 15.33 (=$0.31), which is half of the overall mean WTP (see Table 3).

Table 3: Mean WTP for Strong, Moderate and Weak NEP score

	Coef.	Std. Err.	z	P>z	95% Conf.	Interval
Mean (include all covariates)	45.54355	2.53598	17.96	0.000	40.57312	50.51398
Strong	53.53256	12.51524	4.28	0.000	29.00313	78.06198
Moderate	34.43189	9.392711	3.67	0.000	16.02252	52.84127
Weak	15.33123	8.260413	1.86	0.063	.8588856	31.52134

Note: Here, coefficients are the mean WTP

5. Conclusion

This study seeks to derive the relationship between environmental attitude and WTP under a hypothetical management scenario in a developing country context. We found environmental attitude measured by NEP was statistically significant in predicting WTP. More substantial NEP scores showed more influence than average NEP scores, meaning that respondents with pro-environmental attitudes were more likely to pay for the environmental good. These findings are consistent with Kotchen and Reiling (2000) and Choi and Fielding (2013), suggesting that the NEP scale can be a good predictor in a CV study. Respondents with weaker, moderate, or stronger pro-environmental attitudes reveal significantly different ways of participating in referenda and CV scenarios involving improving river water quality. Those with stronger pro-environmental attitudes are more likely to pay for the improvement scheme, while those with weaker attitudes are more likely to ignore the improvement scheme.

Even though this study did not contribute to methodological advances, it has important implications for policymakers. The policymakers should consider this study to design a sound river improvement program. The residents showed that protecting the river, especially its water quality, should be prioritised, which could be seen from the willingness to pay. In addition, the residents were willing to pay more than the current water price to improve the water quality of rivers in Dhaka city, offering a solid basis for generating environmental improvement funds to facilitate the installation and operation of more sewerage treatment facilities in Dhaka city.

Furthermore, the results of the CVM survey imply that the residents of Dhaka placed a substantial value on the water quality of the river Buriganga and were willing to pay for and participate in a program to improve it. Since CVM is one of the few ways to value a good that is otherwise wholly unknown, this study allows policymakers essential information to make informed decisions that affect the residents who depend on water resources for drinking water, the municipal water supply, and recreation. The fund can be generated by aggregating WTP and allocated for surface and groundwater protection and overall river management planning in Dhaka city.

Finally, this attitude–behaviour and economic valuation literature would help understand how psychological considerations may improve valuation methodologies when water resources are in reference. Therefore, this study integrates attitudinal measures (e.g., NEP) and the CV method to understand better the influence of environmental attitudes on WTP for river water improvement programs. Accordingly, this study supports the motivation for people's value on non-marketed goods and can be employed to enhance CV reliability as recommended by the National Oceanic and Atmospheric Administration (NOAA).

Overall, this study suggests that the government increase people's understanding and attitude toward environmental preservation so that people will willingly pay for the preservation effort.

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Appendix

Item	SA	SWA	U	SWD	SD	Mean	Std. Dev
We are approaching the limit of the number of people the earth can support.	54.4	31.2	13.2	0.54	0.54	4.4	0.8
Humans have the right to modify the natural environment to suit their needs.	4.2	11.5	25.4	26.4	32.5	3.3	1.3
When humans interfere with nature it often produces disastrous consequences.	37.8	35.2	14.3	8.3	4.4	4.2	1.2
Human ingenuity will ensure that we do not make the earth unlivable.	14.4	22.9	30.3	19.1	13.3	3.0	1.1
Humans are severely abusing the environment.	36.2	39.6	11.2	7.5	5.5	4.1	1.2
The earth has plenty of natural resources if we just learn how to develop them.	35.1	38.9	12.4	10.6	3.0	2.9	1.1
Plants and animals have as much right as humans to exist.	54.1	31.5	6.4	4.3	3.7	4.2	1.1
The balance of nature is strong enough to cope with the impacts of modern industrial nations	2.6	12.7	16.3	33.1	35.3	4.0	1.1
Despite our special abilities, humans are still subject to the laws of nature.	47.6	40.4	5.7	4.3	2.0	3.8	1.0
The so-called 'ecological crisis' facing humankind has been greatly exaggerated.	6.8	17.9	25.6	25.4	24.3	3.4	1.2
The earth is like a spaceship with very limited room and resources.	28.3	30.7	17.5	14.0	9.5	3.6	1.2
Humans were meant to rule over the rest of nature.	6.9	14.1	10.5	31.5	37.0	3.7	1.3
The balance of nature is very delicate and easily upset.	38.3	34.7	11.5	10.6	4.9	4.0	1.2
Humans will eventually learn enough about how nature works to be able to control it.	6.4	17.8	25.3	32.4	18.1	3.3	1.2
If things continue on their present course, we will soon experience a major ecological catastrophe.	23.6	30.2	28.6	11.4	6.2	3.4	1.1

Note: [a]SA=strongly agree, SWA=somewhat agree, U=unsure, SWD=somewhat disagree, SD=strongly disagree. [b]Frequencies may not sum to 100 due to rounding.

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Understanding Income Inequality in Rural Bangladesh: Evidence from Household Level Survey Data

Md Mijanur Rahaman*

Abstract

Rising economic inequality through the distribution of income, consumption, wealth or assets is a significant challenge. There is considerable concern in Bangladesh about the growing income inequality. Available household-level information suggests that the distribution of income is considerably more unequal than the distribution of consumption. This paper attempts to understand income inequality among survey households in rural Bangladesh. A purposive sampling technique has been used to collect sample households from three Upazilas in the Kushtia district of Bangladesh. Study findings show that the overall Gini coefficient of income inequality is 0.404, whereas the Gini coefficient of consumption expenditure is 0.32. The study recommends the removal of barriers faced by poor households in assessing better off-farm employment opportunities to have an equalizing effect on income distribution.

Keywords *Income · Consumption · Income Inequality · Gini-coefficient of income · Gini-coefficient of consumption · Rural Bangladesh*

1. Introduction

Income inequality is a pervasive problem around the globe that is rising at an alarming rate nowadays (Alvaredo & Gasparini, 2015). According to new research conducted by Oxfam, the richest 1 percent bagged 82 percent of wealth created last year while the poorest half of humanity got nothing (Oxfam, 2018). Bangladesh has achieved remarkable economic progress in recent decades as a developing country. However, household-level information in Bangladesh suggests that income distribution is much more unequal than the distribution of consumption (Matin,

* M.Phil. Research Scholar, Department of Economics, Islamic University, Kushtia
Email: rahmanmijanur86@gmail.com

2015). A recent report shows that, in Bangladesh, the top 5% of rich people have taken over 95% of total wealth, indicating an uneven distribution of wealth (Byron & Rahman, 2021). While Bangladesh is emerging as one of the most promising economies in the 21st century, the incidence of poverty and income inequality is very high among Asian countries may hinder its way of economic growth.

Poverty and income inequality have a strong relationship, while income inequality leads to poverty (Babatunde, Olorunsanya, & Adejola, 2008). As an exceptional case, economic growth causes a reduction in income inequality, reducing poverty. However, if income inequality exists despite economic growth undoubtedly induces the incidence of poverty (UNU/WIDER, 2000). On the other hand, the trickle-down economic theory claims that the benefits of wealth or growth trickle down to everyone else. However, the growing income inequality in Bangladesh poses a considerable challenge to development agencies and policymakers. Furthermore, in designing poverty reduction, expert mainly stresses only income growth while redistribution of income and inequality remains untouched (Babatunde et al., 2008).

Extant literature suggests that income inequality has risen in recent decades in developing countries (Babatunde et al., 2008; Sehrawat & Giri, 2018). In Bangladesh, the upward trend in income inequality at all levels has also been observed since independence which is a significant policy concern for Bangladesh Government (Mahedi, 2018). For instance, the Household Income and Expenditure Surveys 2011 conducted by the Bangladesh Bureau of Statistics (BBS) shows that in 1973-74 the national level Gini coefficient was found to have 0.36, whereas, in 2010, it was 0.46. The annual increase over that period was almost 1% per year. Rural inequality increased from 0.35 (Gini coefficient) in 1973-74 to 0.43 (Gini coefficient) in 2010. Likewise, in the urban area, the value of the Gini coefficient increased from 0.38 in 1973-74 to 0.45 in 2010. From these results, we can say that more income inequality and its impact exist in urban areas than in rural areas.

Moreover, the income share of the bottom 40% of the households decreased from 18.30 per cent in 1973/74 to 14.32 per cent in 2010. The overall decrease in income share for the period has been 3.98 percentage points, and the annual average rate of decrease has been 0.60 per cent. Therefore, the growing inequality is a primary concern for Bangladesh and needs to be appropriately addressed.

Scholars have identified several reasons behind the poverty and income inequality in Bangladesh. The most significant causes of income inequality and poverty are identified as low and negative net farm income from agriculture (Mahedi, 2018), food inflation (Hossain & Mujeri, 2020), lack of financial access (Aziz & Naima, 2021), alternative income opportunities (Ali, 2019), environmental stress (Omar & Hasanujzaman, 2021), and climate change effect (Alamgir et al., 2021). Although these studies have attempted to show the causes of income inequality and poverty, limited studies have been conducted to understand the income distribution and income inequality of households and the composition of their income sources (Matin, 2015;

Mahedi, 2018). To fill this research gap, the present study used the Gini coefficient to measure income and consumption inequality to provide an in-depth scenario of inequality among rural households in Southwestern Bangladesh. A popular measure of income inequality is the GINI coefficient, which has been substantially used in the last few decades. The study intends to achieve mainly an objective, i.e., to provide a descriptive analysis of the composition of household income from different sources and estimate the overall income and consumption inequality.

The paper is organized as follows. Section 2 represents the objective of the study; section 3 delineates the methodology and the measures of inequality; Section 4 discusses the empirical results, while section 5 concludes with policy implications.

2. Objective of the Study

The main objective of the study is to assess the inequality situation of the rural household based on field data. To attain the main objectives the specific objectives are as follows:

- To measure the income inequality status of the rural household.
- To compute the consumption inequality status of the survey households.
- To make comparison between income inequality and consumption inequality based on study findings.

3. Methodology

The study is based on primary data collected through a field investigation survey of three Upozillas in the Kushtia district. A detailed structured questionnaire was used for the analysis. Mainly descriptive statistics have been used for the study. Lorenz curve and Gini coefficient have been used to measure inequality.

3.1 Measuring Inequality

Inequality is a broader concept than poverty in that it is defined over the entire population and does not only focus on the poor. The most straightforward measurement of inequality sorts the population from poorest to richest. It shows the percentage of expenditure (or income) attributable to each fifth (quintile) or tenth (decile) of the population. The poorest quintile typically accounts for 6-10% of all expenditure, and the top quintile for 35-50%. Statisticians have long been interested in finding a single numerical measure that adequately expresses the degree of overall inequality in income distribution. The most frequently used measure, the Gini concentration ratio is derived from the Lorenz curve, which sorts the population from poorest to richest, and shows the cumulative proportion of the population on the horizontal axis and the cumulative proportion of expenditure (or income) on the vertical axis. The theoretical range of the Gini ratio is from zero (perfect equality) to one (perfect inequality).

Table 3.1 : Gini Index of Bangladesh from 1973 to 2016

Year	Per Capita Income (Thousand TK)	GINI Index
1973	9.9	0.36
1981	10.3	0.39
1983	10.8	0.36
1985	11.1	0.38
1988	11.7	0.38
1991	12.4	0.39
1995	13.9	0.43
2000	16.6	0.45
2005	20.5	0.47
2010	27.1	0.46
2016	36.8	0.48

Source: *BBS, 2017*

3.2 Gini Coefficient

The Gini coefficient can be considered a better measure than the Hoover index, possibly the country's most known measure of income inequality. Like the Hoover index, it scores 0 when everyone has identical incomes and 1 when all the income is concentrated in only one person. By normalizing the cumulative share of income and the cumulative population, the measure is not very sensitive to how the income is distributed, but rather only to how income varies relative to the other population members. One of its problems is that it cannot tell where the inequality is stronger or weaker in the distribution, which means that two very different distributions can share the same Gini coefficient.

3.3 The Lorenz Curve

The Lorenz Curve is a graphical representation of income and wealth distribution, so it can offer good visualization of where the population inequality lies. On the X axis, we put the cumulative share of people from lowest to highest incomes; on the Y axis, we put the cumulative share of income earned or wealth. The curve always starts at (0,0) and ends at (1,1), which is 100% of both cumulative shares. We compare this curve with the "perfect equality" curve, a 45º straight line that starts and ends touching the Lorenz Curve. From it, we can calculate the Gini coefficient as the ratio of the area between the line of perfect equality and the Lorenz Curve to the area between the line of perfect equality and the line of perfect inequality.

To examine the income inequality among households, we use the Gini coefficient. This coefficient is also defined as a ratio of the areas on the Lorenz curve. If the area between the perfect equality line and the Lorenz curve is ***A***, and the area under the Lorenz curve is ***B***, then the Gini coefficient

is, $G = \frac{A}{A+B}$

For measuring the Gini ratio, we used the following equation;

$$G = \frac{\sum_{i=1}^{n}(2_i - n - 1)x_i}{n^2\mu}$$

where, i = 1, …, n individuals (ascending order),

x_i = income for individuals ($x_1 \leq x_2 \leq \cdots\cdots \leq x_n$),

n = Total number of individuals, and

μ = mean income.

3.4 Data and Household Survey

The study is based on primary data collected through a household survey in the Kushtia district in Bangladesh. Data used in this paper are from household-level income and expenditure surveys in the Southwestern district (Kushita) of Bangladesh. The survey was conducted in October-December 2019. Kushtia district was chosen because of the fact the district was ranked as the richest district, with 96.4 percent of people living above the poverty line according to Poverty Maps of Bangladesh 2010 jointly unveiled by BBS, World Bank and United Nations World Food Programme (WFP). Despite being the richest district of Bangladesh, many people of Kushtia continue to face economic hardship due to river erosion. All possible, solid reasons for choosing the study area were evident during data collection from the sample areas. Three Upazillas of the Kushtia district, namely, Kushtia Sadar Kumarkhali and Mirpur, were chosen to collect final household income and consumption data. After careful screening using inclusion and exclusion criteria, 120 samples seemed useable for the analysis to achieve study objectives.

4. Results and Discussions

4.1 Profile of the Sample Households

Table 4.1: Selected Household Characteristics

Variable	Description	Mean	Std. Dev	Min	Max
Age	Age of the household head (in years)	46.80	10.81	25	76
Gender	Dummy for the gender of household head (1=male, 0= female)	6.71	1.55	5	10
Family size	Number of households member	0.61	0.49	0	1
Education	Dummy for education (1= have formal education up to 8 years, 0= have no formal education)	0.58	0.54	0	1

Variable	Description	Mean	Std. Dev	Min	Max
Occupation	Dummy for occupation (1= employed, 0= unemployed)	0.54	0.53	0	1
Land ownership	Amount of land	3.67	3.43	0	22
House type	Dummy for house type (1= tin-shade, 0=otherwise)	0.78	0.41	0	1
Total Income	Total household income	11430.82	4104.542	5000	24000

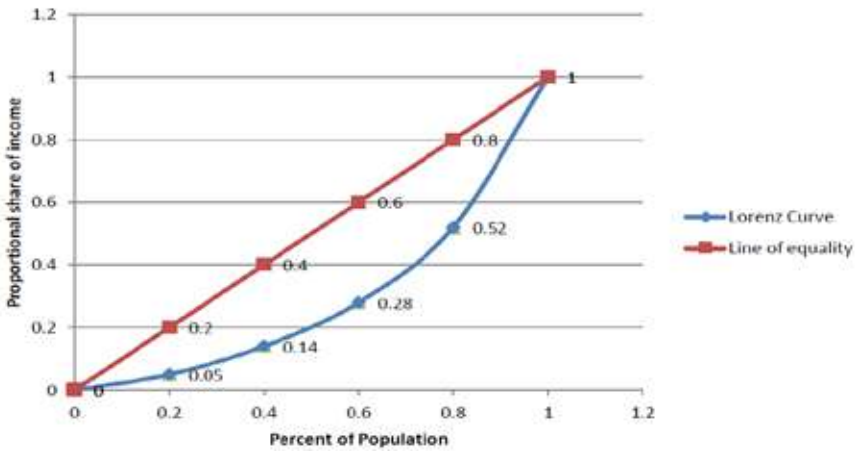
Source: *Field Survey, 2018*

Table 4.1 shows the socio-demographic and economic profile of the households. The mean age was found to have about 47 years. About 55% of the respondents were found to fall in the age group between 25-35, indicating sample populations were young. About half of the respondents were found to have female. Education variable only contains information about whether respondents have formal education, i.e., basic level of education up to 8 years. The table shows that around 60% of respondents have formal education. While looking at the occupation dummy, only 54 per cent of people were found to have engaged in work, whereas more than 45 per cent were found to have no work. Due to income status, most households have low-cost tin-shade houses, representing about 80% of the house type. The average income was about 11500 taka, more than the poverty line income. In the central part of the households, which is almost 40 per cent of the total sample size, monthly income is between 5001 to 15000 taka. The high-income group, which ranges from 25001 to above 30000 taka, comprises 28% of total households.

4.2 Gini-Coefficient of Income

Scholars in academia always show their continuous interest in measuring income inequality besides poverty. A popular measure of inequality is the Gini coefficient. We found income Gini coefficient of the study area is 0.404, which is less than our national Gini coefficient ratio (i.e. 0.46) according to the last BBS survey in 2010. We know from past data that there is a difference between rural and urban inequality. Urban inequality always maintains a higher rate than in rural areas. Since our study area consists of a non-urban community, our findings support past data on BBS. Though the income level of the rural community is much lower than urban people, rural inequality is much less than urban inequality. The Gini coefficient $G = \frac{A}{A+B}$ is derived from the Lorenz curve illustrated in the figure 4.2.

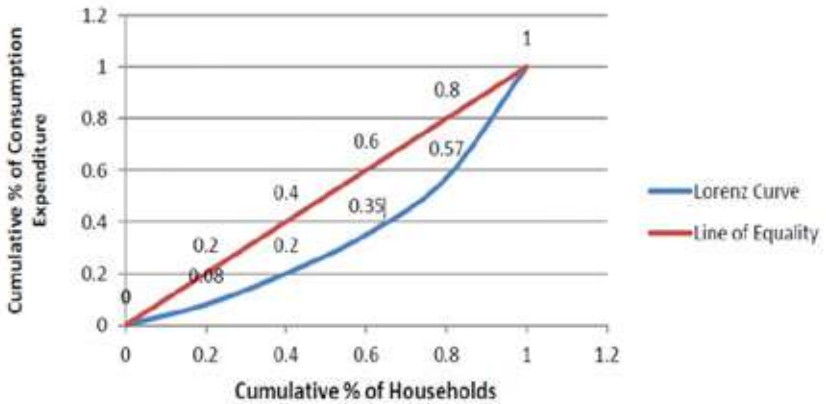
Figure 4.2: Gini-Coefficient of Income



4.3 Gini-Coefficient of Consumption

From our collected field data, we have found that the Gini coefficient of consumption expenditure is 0.32, much higher than the national Gini coefficient of consumption expenditure (i.e. 0.27) according to the last BBS survey in 2010. Moreover, BBS data exposes that the values of the Gini concentration ratio for consumption expenditure are lower than the corresponding values of the Concentration ratio for income in rural and urban areas. This study also reaffirms this truth. From this, it can be said that the analysis provides convincing evidence that there is less consumption expenditure inequality than income inequality. This would compel us to rethink our policymaker since the expenditure Gini ratio increases. From this fact, we can assert that the lower-income group suffers from consumption deficiency. Figure 4.3 shows the Gini concentration ratio for consumption expenditure.

Figure 4.3: Gini-Coefficient of Consumption



The main aim of this study was to assess the inequality situation based on field reality. In order to study the baseline status of the respondents, we used descriptive statistics for our survey data where we can see that the majority percentage of respondents, which is 60%, are middle-aged (i.e., 35 years to 54 years). Most of the income accrued to that group. The housing status of our study area is not so good. 20% of households still possess mud (kutcha) houses, and almost 80% of houses are made of low-cost tin shade. This brings the message that the upper-income class has the exclusive ability to build a structured house. This means that the overall quality of life remains under average level. From the literacy status of the respondents, we measured that illiteracy (58%) having education of up to 8 years of schooling.

In contrast, more than 40 per cent have no education, which might be the main reason for income inequality. Fifty-eight per cent of the respondents are involved in regular work, whereas the rest were found to have temporary work. It does not match our national employment statistics, which may be due to the small sample size. We have found that almost 90 per cent of respondents have less than ten decimals of land ownership in the study area. This outcome expresses the pertinent fact of inequality in our country. We have also explored that 10 per cent of households' income is less than 5000 taka per month in our study area. This pinpoints a bleak picture in our country, where the per capita income of Bangladesh is above 1909 dollars, and already we have reached the lower middle-income group.

Moreover, a significant portion of the households, almost 40 per cent of the total sample size, have a monthly income between 5001 to 15000 taka. It does not carry good news for us, and from this, we can say that the situation of income distribution and inequality remains stagnant. We have computed the Gini ratio to capture the inequality situation in our study area. We found income Gini coefficient of the study area is 0.404, which is less than our national Gini coefficient ratio (i.e. 0.46) according to the last BBS survey in 2010.

Our obtained Gini-coefficient of consumption expenditure is 0.32, which is higher than the national Gini-coefficient of consumption expenditure (i.e. 0.27) according to the last BBS survey in 2010. This study reaffirms that the income Gini coefficient always remains higher than the consumption Gini coefficient. The upsetting picture of the consumption Gini coefficient is that it is increasing, which means that lower-income groups have suffered from consumption deficiency.

5. Conclusion and Recommendation

Based on the study findings, we forward the following recommendations. Bangladesh will need to maintain income growth, which continues to be one of the two key drivers of poverty reduction. This will require public investments to help increase agricultural productivity and promote growth in the demand for salaried

work in manufacturing and services. Critically important for this are immediate investments in improving transport, power and gas, supporting entrepreneurship by reducing business transaction costs and strengthening the transparency and accountability of both the public and private sectors. Bangladesh should cater more aggressively to the skills development of its growing youth population to fully harness the "demographic opportunity". Bangladesh can better use its vast social safety net expenditures through improvements in program design to emphasize human capital accumulation (such as child nutrition and cognitive development, education and skills) and productive employment. Targeting these benefits and services to the poorest people and improving the timing of safety net responses to mitigate the effects of various natural disasters and global shocks will ensure that growth remains inclusive. Redistribution of income and wealth is necessary for the favour of lower-income groups. One way this may be implemented is through a safety net programme. Here we can employ the Marxist view that the only commanding authority is government, and this government will solely act in the best interests of lower-income groups. Political motivation is needed first for these activities. We know major economic indicators of our country are evolving simultaneously; credit market distortions and poor quality education (i.e. education is not need-based) remain major hindrances to our development. This should be adequately tackled. We discovered that illiteracy is still a dominating factor in unequal income distribution. To resolve this problem, government spending on education should be targeted at those classes. It would result in double dividends. In the short run, inequality will decrease, and the prolonged effect will be breaking the poverty trap as more poor children are given a chance at formal education. This would elicit a better future. To increase the income of the bottom class, macrocosmic and structural reforms are needed so that the peripheral classes are given priority to break the existing bottleneck.

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Protein Price Change in Bad Event and A Hedge Against Loss in Agribusiness

Rezaul Hoque*

Abstract

Uncertainties unleashed by COVID-19 affected people in agribusiness. Consumers also suffer in such a disaster. This article first tries to probe changes in protein consumption and change in prices of protein during disaster years. Then it tries to show how to protect poultry farmers in times of uncertainty using game theory.

JEL Classification *C780 · Q130 · Q180*

Keywords *Nash bargaining · Sequential bargaining · Negotiation · Agribusiness · Agricultural commodities · Agricultural markets · Agricultural cooperative · Animal husbandry · Agricultural policy · Food policy · Farm aid*

1. Introduction

Though agriculture is a vital sector and has garnered lots of attention and money from the government, people engaged in agriculture sustain losses in any bad event. We have often seen news items like farmers dumping tomatoes on the street or milkmen washing the streets with milk after failing to secure prices for their products. The bad spell also touches the consumers. During a bad event, when pockets get squeezed, consumers cut their consumption or switch to products they consume less during normal times. So agriculture is shaping the lives of producers and consumers alike.

Agriculture has strategic importance in ensuring food demand, job creation, value addition and saving hard-earned currency in a turbulent time. The unfolding global crisis reminds us again about the crucial role of agriculture. I would like to see how a bad spell influences the protein consumption of consumers, and I would also try to devise a means to secure the producer's interest, in this case, the poultry farmer.

* Rezaul Hoque is an independent researcher. Email: mrh4478@gmail.com

2. Analysis and policy implications

Coronavirus stretched its shadow over poultry farming, dairy farming and other agribusinesses. News reports say gloomy dairy farmers sold milk much below the market price. Mobile egg sellers sold eggs at Tk 75/dozen. In normal times, a dozen would cost Tk 120 (Market prices prevailed before April 2020). Evidently, poultry and dairy farmers bore the full brunt of the falling demand, compounded by the indefinite lockdown.

Poultry and dairy farming are 100% value-adding economic activities. Money was often drawn from local cooperatives, relatives, microfinance institutions, and public banks. Any bad spell on farming activities will make informal and institutional investors ill. So in a broader sense, many investors' money may be lost if poultry and dairy projects fail because of Coronavirus. If poultry and dairy farmers are not duly compensated for the loss, we may see a production slump in the subsequent years, adding further woes to the consumers by raising the prices of eggs and milk. The egg is the cheapest source of protein. Any supply shock or price hike in fish or meat leads to consuming more eggs. As it appears, this Coronavirus may also make a dent in our protein consumption.

I did a little analysis of the impact of disaster years on egg prices for 2012-2018. I gathered data for fish (Rui) and egg prices for the given period. Data gleaned from BBS Statistical Pocket Book 2016 and 2018 (Bangladesh Bureau of Statistics, 2016,2018).

It was assumed that fish and egg secured the bottom places in the protein ladder in terms of price for ordinary citizens. So, apart from supply and demand-side factors, egg price depends on fish price to some extent. It was also assumed that eggs were sold at Tk 95 per dozen in 2017 as the year's data was unavailable.

A semi-logarithmic regression with a dummy variable was chosen to observe the change in egg price compared to fish price. The dummy variable captured the effect of the disaster year on price change. D is 0 for calm years and 1 for disaster years.

The following regression function was constructed:

$\ln Egg_t = a + b\ Fish_t + c\ D_t$

where $\ln Egg_t$ = log natural of Egg price at t,

$Fish_t$ = Fish price at t,

D = 1 for disaster years (any kind),

= 0 for calm/ normal years.

Due to the data's time-series nature, the Durbin-Watson test was carried out to check the autocorrelation. The Durbin-Watson statistic reported no autocorrelation at a 5% level of significance for seven observations and one explanatory variable (d = 2.345). After running the regression, I got the following result:

$\ln Egg_t = 4.97 - 0.0012\ Fish_t + 0.00616\ D_t$ (F= 1.153, p = 0.402)

(t=18.64, p= 0.000048) (t= -1.48, p= 0.211) (t= 0.117, p=0.91)

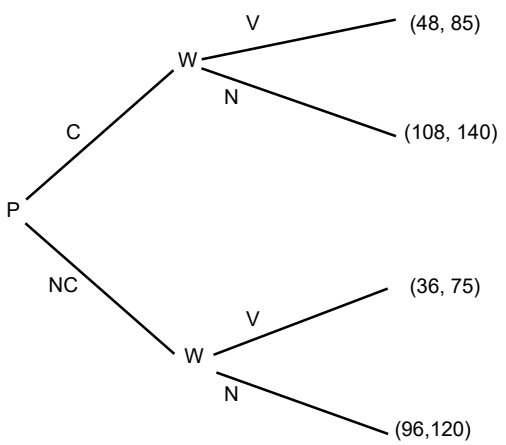
Except for the intercept, neither the model nor the slope coefficients turned out to be significant. If the coefficient of the dummy variable were substantial,

we would say that egg prices during disaster years were 0.62% higher than those during calm years.

For 2020, we witnessed egg prices hit an all-time low in the last ten years. Unfortunately, our market conspicuously lacks a mechanism for hedging against volatility. Moreover, in a corrupt country like ours, disaster compensation may often fall into the wrong hands, mocking the steps to aid victims. As noticed, microcredit borrowers often receive compensation during bad times due to their attachment to institutional lenders. By the same token, if we develop some institution in the farming and agribusiness model, we will ensure just prices for our farmers and insulate them from any volatility from man-made or natural disruption.

Game theory helps us better grasp this point. Here, I present a sequential game. Pairs of numbers in the game tree represent payoffs to poultry farmers (P) and wholesalers (W). Poultry farmer has two choices to make: to make a contract with an institutional distributor to sell their eggs at a negotiated price in the future (C) or not to make the contract with an extensive distributor (here, "distributor" and "wholesaler" are synonymous) and rely on the usual middlemen (NC). Meanwhile, wholesalers choose to offer the normal market prices (N) or the volatile market (V), reading the market demand.

Figure 1: Game Tree



Source: *Author's estimation*

The first number in the pair represents the price received by the poultry farmer by selling dozens of eggs. The second number represents the payoff to the wholesaler by selling a dozen of the egg.

Two critical criteria for determining the outcome of the game are (Khalil,2006):

- Provided that what the others have chosen, a player's decisions must be optimal.

- At the time decisions are taken, they are optimal for the decision-maker.

Looking at the game tree, we realise that for two subgames, there are two Nash equilibria (Varian,1992). If a poultry farmer chooses no contract with a big distributor, then the wholesaler's optimal decision will be to offer the normal market price. (96,120) is the equilibrium here. Because Tk 120 is greater than Tk 75 for the wholesaler. If the poultry farmer contracts with a big distributor, then the wholesaler's response will be to go for a normal market price offer. Here the Nash equilibrium is (108,140).

For a poultry farmer, a present decision depends on his future returns. He will compare his returns under two states. He will notice that a contract will fetch him Tk 108, and no contract will get him Tk96. Moreover, volatile prices (Tk 48 > Tk 36) are higher under contract. Since Tk 108 under contract-normal market price is higher than Tk 96 under no-contract –normal market price, his optimal decision will be Tk 108. So poultry farmer looks forward but reasons backwards. When the poultry farmer chooses the contract, th e wholesaler will go for the normal market price, Tk 140. So (108,140) is the subgame perfect equilibrium here.

Underlying assumptions here in this discussion are— there are many big distributors (including the government-backed-one) apart from middlemen; returns under contract with distributors are higher than those under no-contract. Moreover, if the government wants to send compensation for any disaster, it can do so through the distributors.

Anyone could become a big distributor. Egg cooperatives, TCB, a public listed company or a big local group, could easily vie for a big distributor. Govt has to ensure that there are many of these distributors and they operate under specific laws.

The key takeaway of this discussion is that big distributors are needed in agribusiness to protect the farmers from volatility and uncertainty. Their presence will ensure just prices for the farmers and flawless help distribution of compensation in a disaster-like situation.

3. Limitations and conclusion

Though my attempt to see the change in consumption and prices of protein during disaster years has not turned out to be a success, adding more data to the effort could lead to a different outcome. The Game Theory has underscored the big distributor's role in minimising risk in the crisis. But the idea of big distributors should be preceded by new laws or fine-tuning of existing ones. Laws demarcate do's and don'ts for the parties in a crisis-like situation and dispel any ambiguity. Value-adding nature of agribusiness and the involvement of informal investors calls for more excellent government protection. Laws should be attuned to these ground realities.

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Revisiting the Existence of J-Curve Effect Between Bangladesh and USA

Mohammad Shafiur Rahman Chowdhury*

Abstract

This study attempts to revisit the existence of the J-curve effect between Bangladesh and the USA, one of its major trading partners of her, by using annual data from 1986-to 2020. The J-curve phenomenon states that currency depreciation initially decreases before increasing the trade balance. In this study, the Co-integration test shows a long-run association between trade balance, exchange rate, domestic income, and foreign income. OLS is applied to estimate the impact of the exchange rate on the trade balance. The calculated result shows that domestic currency depreciation negatively affects the trade balance, which means that depreciation does not improve the trade balance in the long run.

On the other hand, negative domestic and foreign income affect the trade balance. An increase in domestic income worsens the trade balance, and an increase in foreign income improves it. This study finds no J-curve effect in Bangladesh.

Keywords *J-curve · Exchange rate · Trade balance · Depreciation · Co-integration · OLS*

1. Introduction

Bangladesh economy has been undergoing a trade balance deficit because of a large number of imports since 1976. The trade deficit is the leading cause of her current account deficit. In January 2020, the trade balance deficit was recorded at USD18.8 billion. Trade balance refers to the value of exported goods minus imported goods. The trade balance is a surplus when the export is more than the import, and the trade balance is a deficit when the import is greater than the export. The Trade regime was changed many times. After1971 independence, the import was not easy due to the lack of import financing. Initially, it gave importance to

* Assistant Professor of Economics, Department of Accounting, University of Chittagong. Email: shafiur@cu.ac.bd

importing substitutes and restricting imports. Government policy was changed in the laissez-fair economy. The coming of foreign aid increased, and imports from Bangladesh also increased. In the 1990s, Bangladesh liberalised the trade policy, removed the restriction and significantly decreased import tariffs. Since that, the trade balance of Bangladesh has been passing through deficits (Mostofa and Rashid 2015).

One of the factors related to trade balance is the exchange rate. The exchange rate refers to the amount of one currency per unit of another currency. Bangladesh has followed an exchange rate policy since 1971, which was changed several times from 1972 to 2002. Bangladesh has followed the floating exchange rate since 2003. However, at present, demand and supply determine the exchange rate. In Bangladesh, the exchange rate is used to improve her trade balance deficit (Chowdhury and Younus 2015).

J-Curve phenomenon suggests that depreciation of currency primarily worsens the trade balance, but after passing of time trade balance will be improved, which resembles the shape J. Depreciation of currency will successfully improve the trade balance if it holds Marshall-learner condition. This condition implies that depreciation will improve the trade balance if the sum of export and import price elasticity is greater than 1. It works in two way-First, currency depreciation will cheaper the export than before. The exporters will get more money when converting foreign currency into domestic currency, and the exporter will encourage exporting more. Second, currency depreciation will be more expensive for the import than before. The Import of foreign goods will require more money than before, and the importers will discourage and import less. After the depreciation, the export will increase, and imports will decrease. As a result, the trade balance will be developed in the long run (Piskin 2014).

In the short-run, currency depreciation will increase the import price, while the export price will stay constant, and the trade balance will worsen. The quantity of export and import will adjust with price and improve the trade balance in the long run. The price effect will exacerbate the trade balance, and the volume effect will increase the trade balance creating the “J- curve” effect.

2. Review of Literature

Author	Data	Sample	Methodology	Country	Variables	Findings
(Halicioglu 2008)	Quarterly	1980-2005	ARDL	Turkey	Trade balance, Real effective exchange rate, Industrial production of the industrial country, industrial production of turkey	The long-run relationship between trade balance and exchange rate, the short-run bi-directional relationship between two variables.
(Piskin 2014)	Quarterly	1987:1-2013:3	ARDL, ECM of ARDL	Turkey	Trade balance, Real effective exchange rate, Foreign income, Domestic income	The long-run relationship among all the variables, In Short-run, no j-curve effect.
(Baek, Mulik et al. 2006)	Quarterly	1989:1-2004:4	ARDL	USA	US trade balance, Bilateral real exchange rate, US real income, the Real income of the trading partner	j-curve does not exist for US agricultural trade with the trading partner, but the J-curve effect exists for US non-agricultural trading with Canada and Japan, not for Mexico
(Petrović and Gligorić 2010)	Monthly	2002:1-2007:9	ARDL, ECM	Serbia	Trade balance, Real effective exchange rate, GDP	J-curve effect exists in the short-run, and trade balance improves in long-run
(Hsing 2008)	Quarterly	1994:2-2007:3,	Cointegration, ECM	Argentina,	Trade balance, Real exchange rate, the Real income of the home country, Real income of US	J-curve exists for Chili, Ecuador, and Uruguay but not for Argentina, Brazil, Peru, Colombia
		1995:3-2007:3		Brazil		
		1980:4-2007:3		Chili		
		1995:3-2007:3,		Colombia		
		1991:4-2007:3,		Ecuador		
		1992:3-2007:3,		Peru		
		1993:1-2007:3		Uruguay		

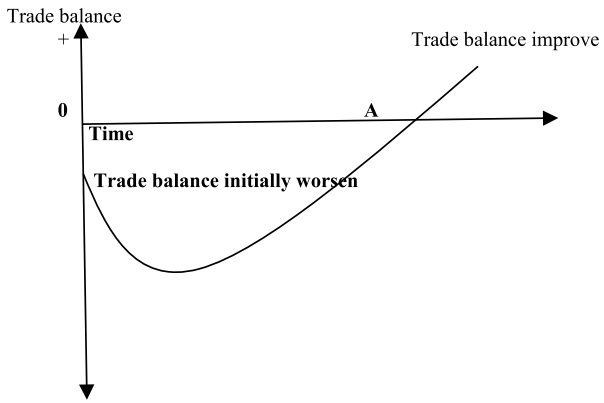
Author	Data	Sample	Methodology	Country	Variables	Findings
(Thom 2017)	Quarterly	2001:1-2015:4	VAR	Vietnam	Trade balance, Real effective exchange rate	J-curve does not exist in long-run
(Bahmani-Oskooee, Economidou et al. 2006)	Quarterly	1973:1-2001:3	ARDL, ECM	UK	UK trade balance, Real GDP of UK, Real GDP OF trading partner, Bilateral exchange rate	J-curve not exist for most countries except for two country
Bahmani-Oskooee, Iqbal et al. (2017)	Annual	1980-2013	ARDL, ECM	Pakistan, EU	Trade balance for industries, Real GDP of Pakistan, Real GDP of EU, Real bilateral exchange rate	Of 77 industries, J-curve does not exist in most industries
(Khalid 2017)	Annual	1975-2013	ARDL, ECM	Pakistan	Trade balance, Real GDP of Pakistan, Real GDP of the trading partner, Real bilateral exchange rate	No evidence of J-curve
(Masih, Liu et al., 2018)	Monthly	2005:8-2016:7	Causality test, VAR	China	Trade balance, Real effective exchange rate	J-curve does not exist
(Bahmani-Oskooee, Rahman et al. 2017)	Quarterly	1985:1-2015:4	ECM, ARDL	Bangladesh	Bangladesh's trade balance, Real GDP of Bangladesh, Real GDP of trading partners, Bilateral exchange rate	From 11 partners, the effect of the J-curve exists only with 3 trading partner

3. Theoretical Framework

After depreciation, the trade balance will initially worsen and improve over the years. In the short-run, import prices will increase more rapidly than export prices, but initially, export volume remains unchanged after devaluation. Despite imports being more expensive, import volume will not decrease much. In the long- run, currency depreciation will improve the trade balance, and the export volume will increase, but import volume will decrease. The domestic consumer will shift from expensive foreign goods to domestic goods, assuming equivalent goods exist in

the country. On the other hand, the foreign consumer will shift from expensive domestic goods to cheaper exported goods. After the depreciation of a country's currency initially deteriorate and then improves the trade balance over time, Economist called this the J-curve effect (Dominick 2012).

Figure 1: J-curve effect after depreciation



The figure shows that after depreciation, a country's trade balance initially decreases from 0, and after time A, the trade balance improves.

4. Data and Methodology

Time Series data for the 1986-2020 period has been used in this study. The data that have been used are from Bangladesh bank, WDI (World Development Indicators) database, United States Census Bureau. In this study, the trade balance is the dependent variable and exchange rate, foreign income, and domestic income are the independent variables. Here, trade balance refers to export minus imports and data on trade balance has been taken from the United States census bureau. The exchange rate means the amount of taka per unit of the dollar. This study tested the following hypothesises.

H_0: J-curve effect exists in Bangladesh.
H_1: J-curve effect does not exist in Bangladesh.

5. Empirical Model

By following Bahmani-Oskooee, Iqbal et al. (2017), Narayan and Narayan (2004), and Halicioglu (2008) model, the following model has been estimated to check the effect of exchange rate on the trade balance and also domestic income and foreign income effect on the trade balance.

$$\text{Ln}\,(TB_t) = B_1 + B_2\text{Ln}\,(EXC_t) + B_3\text{Ln}\,(Y_{BDt}) + B_4\text{Ln}\,(Y_{USt}) + e_t$$

Here,
Ln (TB_t) = natural Log of trade balance
Ln (EXC_t) =nature Log of exchange rate
Ln (y_{BDt}) =nature Log of Bangladesh income
Ln (Y_{USt}) =nature Log of US income
All variables are transformed into the natural logarithm.

e_t" is an error term and the subscript "t" indicates time series data. It is anticipated that B_2 will be positive, which means currency depreciation will improve the trade balance. B_3 will be negative, which means imports will increase if Bangladesh's income increases. B_4 will be positive, meaning exports will increase if US income increases.

In addition, this study tested the following hypothesises:

1. H_0: Bangladesh's income does not affect the trade balance
   H_1: Bangladesh's income affects the trade balance
2. $H_{0:}$ US income does not affect the trade balance
   H_1: US income affects the trade balance

6. Empirical Results

6.1 Unit Root Test

In the case of time series analysis, it is essential to check the stationary of data to avoid spurious regression. Over the period, if the mean and variance of time series variables are constant, then the time series variables are considered stationary. Augmented Dickey-Fuller (ADF) unit root test is used to test the stationary of data.

Here,
H_0: variable is not stationary.
H_1: variable is stationary.

If the P-value of the ADF test>0.05, then the null hypothesis will not be rejected. If P-value <0.05, then the null hypothesis will be rejected.

Table 1: ADF test result for unit root on level and first difference

Variables	ADF test	P-value	5% critical value	Decision
Ln (TB_t)	-2.03	0.56	-3.56	Non-stationary
Δ Ln (TB_t)	-8.06	0.000	-2.96	Stationary
LN (EXC_t)	-2.83	0.20	-3.64	Non-stationary
Δ (EXC_t)	-2.94	0.067	-3.11	Stationary
Ln (Y_{BDt})	-1.02	0.92	-3.56	Non-stationary
Δ Ln (Y_{BDt})	-4.47	0.006	-3.56	Stationary
Ln (Y_{USt})	-1.64	0.75	-3.56	Non- stationary
Ln (Y_{USt})	-3.40	0.018	-2.96	Stationary

Note: Δ indicate the first difference

6.2 Co-integration Test

Co-integration test is used to check the long-run association among the variables in a regression model. Co-integration test is used to determine whether the variables used in the model are co-integrated. Johansen co-integration test has been used to check whether there is a long-run association between trade balance, exchange rate, Bangladesh's income and US income.

Here,
H_0: no co-integration among variables.
H_1: co-integration among variables.
The null hypothesis will be rejected if the P-value is less than 5%.

Table 2: Result of co-integration test

Hypothesized		Trace	0.05	
No. of CE (s)	Eigenvalue	Statistic	Critical Value	Prob.**
None*	0.726399	61.89942	47.85613	0.0014
At most 1	0.430482	26.90518	29.79707	0.1040
At most 2	0.326284	11.70513	15.49471	0.1716
At most 3	0.037842	1.041576	3.841466	0.3075

Here, the null hypothesis is rejected because P-value is less than 0.05. Eigenvalue and trace statistic test indicate that P-value is less than 0.05, suggesting a long-run relationship between variables. This test demonstrates that the OLS result of this study is not spurious.

6.3 Autocorrelation Test

The null and alternative hypothesises are-
H_0: No autocorrelation in residual
H_1: Autocorrelation in residual
Here, the Breusch-Godfry Lm test has been used to check whether there is a serial correlation or not.

Table 3: Autocorrelation test result Serial_1

F-statistic	0.470622	Prob. F (1,26)	0.4988
Obs*R-squared	0.551150	Prob. Chi-Square (1)	0.4578

Table 4: Autocorrelation test result Serial_2

F-statistic	0.318878	Prob. F (2,25)	0.7299
Obs*R-squared	0.771146	Prob. Chi-Square (2)	0.6801

Table 5: Autocorrelation test result serial_3

F-statistic	1.893168	Prob. F (3,24)	0.1577
Obs*R-squared	5.932194	Prob. Chi-Square (3)	0.1150

If the P-value> 0.05, the null hypothesis cannot be rejected. It implies that there is no autocorrelation in the residual. Here, P-value is more than 0.05 in the 1st, 2nd, and 3rd order serial correlation. So, it is said that there is no autocorrelation. The model has no 1st order, 2nd order and 3rd order serial correlation.

6.4 Normality Test

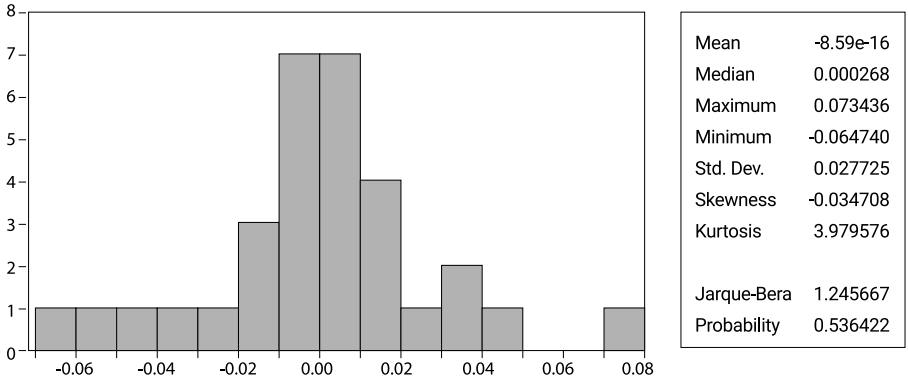
A normality test is used to check whether a group of data or a data set is well-modelled or data set is normally distributed or not. If the data set is not normally distributed, the acquired t-ratios are below the required standard, and illations will not be valid.

Jarque-Bera test formula is

$$JB = \frac{N}{6}\left[S^2 + \frac{(k-3)^2}{4}\right]$$

Here, S = Skewness, K =Kurtosis, N = Sample size
In the normal distribution,
Skewness will have 0.
Kurtosis value will have 3.
Here, The Null and Alternative hypothesises are-
H_0: Residuals are normally distributed.
H_1: Residuals are not normally distributed.

Figure 2: Jacque- Bera test for normality of data



The above figure shows that Skewness is -0.034704, Kurtosis is 3.979576, and the JB value is 1.245667. According to the JB test, the Null hypothesis cannot be rejected. So, it is said that data are normally distributed, and illations are correct. We can also infer from the p-value. Since the p-value is greater than 0.10, the null hypothesis of normality could not be rejected, suggesting the normality of the residuals.

6.5 Ramsey Test

Table 6: Ramsey test result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LRATE	-0.274933	0.159620	-1.722420	0.0969
LBS	-6.243650	3.601687	-1.733535	0.0948
LYS	1.447929	0.823184	1.758937	0.0904
C	68.08761	36.94851	1.842770	0.0768
FITTED^2	-0.424222	0.277694	-1.527660	0.1387

The statistic and associated P-value show that the coefficient of the fitted square is insignificant. Therefore, the model is not miss-specified.

6.6 Ordinary Least Square Method (OLS)

To estimate the equation, OLS has been used in this study. This study has used the auto-correlation and Ramsey tests to check the reliability of OLS estimation. This study found that residuals were not auto-correlated after using the auto-correlation test, and the Ramsey test has implied that the model was not miss-specified.

If P-value is less than 0.05 or equal to 0.05, then the independent variable significantly affects the dependent variables. If P-value is more than 0.05, it is said that the independent variable does not significantly affect the dependent variable or is insignificant.

Table 7: OLS result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LATE	-0.033681	0.023783	-1.416190	0.1682
LBS	-0.741868	0.042780	-17.34165	0.0000
LYS	0.198789	0.097334	2.042346	0.0510
C	11.65526	0.793531	14.68784	0.0000
R-squared	0.983910	Mean dependent var		8.959519
Adjusted R-squared	0.982122	S.D. dependent var		0.218573
SE of regression	0.029225	Akaike info criterion		-4.107693
Sum squared resid	0.023060	Schwarz criterion		-3.922663
Log-likelihood	67.66925	Hannan-Quinn criter.		-4.047378
F-statistic	550.3612	Durbin-Watson stat		2.111931
Prob (F-statistic)	0.000000			

Table 7 shows that the exchange rate coefficient is insignificant, implying that the trade balance does not improve with the exchange rate rise. We could not find J-curve in Bangladesh during our study period. The coefficient of LBS is negative and significant. It implies that if Bangladesh citizens' income increases, the import and trade balance worsens because the export and import gap increases. Again, the coefficient of LYS is positive and significant. This suggests that if US citizens' income increases, Bangladesh's exports increase and the trade balance improve because the export and import gap decrease.

7. Conclusion and Recommendations

This study revisits the J-curve effect between Bangladesh and the USA. The results of this study found that there is a long-run association between the trade balance, exchange rate, and foreign and domestic income. On the other hand, the OLS result found that currency depreciation did not improve the trade balance in the long run. The depreciation of currency negatively affected the trade balance instead of positively affecting the trade balance. In the long run, trade would worsen instead of improving. This study could not find the j-curve effect for Bangladesh from 1986-to 2020. OLS also found that Bangladesh's income negatively affected the trade balance of Bangladesh. If Bangladesh citizens' income increases, imports

would increase, and the trade balance would worsen. On the other hand, US income positively affected the trade balance of Bangladesh. If US citizens' income increased, export would increase, and the trade balance would improve.

Bangladesh mainly imports essential goods, machinery, and raw materials. So, because of depreciation, the import will not decrease more. These imported goods and machinery will be used to produce exported goods and the country's industrialisation. So, in the case of Bangladesh's policy making, exchange rate change will not play a role in improving Bangladesh's trade balance. In the case of Bangladesh, the trade deficit is favourable. It mainly imports Raw materials and machinery and converts them into exportable goods. The export will increase, and export earnings will also increase, which is favourable for Bangladesh.

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Impact of FDI on Exports and Employment in Bangladesh

Md. Mamun Miah[*]
Shapan Chandra Majumder[**]

Abstract

FDI is an essential determinant to any country as it boosts economic growth through increasing technological knowledge, managerial skills, and efficiency of resources. The primary purpose of this study is to seek out FDI's impact on exports and employment in Bangladesh. This study conducts with two models. The first one is FDI and its impact on Export in Bangladesh with the time range of 1972 to 2017. The industry value added is the control variable, the dependent variable is exported, and FDI is considered the independent variable. The impact of FDI on employment in Bangladesh with the time range of 1991 to 2017 is the second model where GDP growth and exports are the control variables. ARDL BT approach and Error Correction Model (ECM) are applied to determine the long-run and short-run association among the variables. The ARDL result of the 1st model shows that it has a long-run relationship among the variables. The Bound testing approach indicates a long-run association among variables. The coefficient of the ECM-ARDL Model is negative and significant. The ECT (error correction term) is -0.430 reveals that adjustment is corrected from the short run to the long run by 43% towards the equilibrium of exports. The Granger causality test result shows the bidirectional causality between industry value-added and exports. The ARDL approach reveals the long-run association between dependent and independent variables at a 1% significance level in the second model. FDI's coefficient indicates a 1% increase in FDI will increase employment by 0.01% on average, which is statistically significant. From the pair-wise Granger causality test result, the study has found bidirectional causality between GDP growth and employment. Unidirectional causality is detected between FDI and employment, exports and jobs, and FDI and exports.

Keywords *Bangladesh · Employment · ECM-ARDL · FDI*

[*] (Corresponding Author), MSS Thesis Student, Department of Economics, Comilla University, Cumilla-3506. Email: mamunmiah2033@gmail.com
[**] Associate Professor, Department of Economics, Comilla University, Cumilla-3506
Email: scmajumder_71@yahoo.com

1. Introduction

Foreign Direct Investment (FDI) is a critical determinant to any country as it boosts the economy's growth through increasing technological knowledge, managerial expertise, and efficiency of resources. FDI is regarded as an effective means of increasing exports of host countries. FDI is also crucial for growing countries like Bangladesh. During the last decade, Bangladesh attracted an excellent figure of FDI with 8.1% GDP growth. FDI helps the host country's investors know about international market linkage; as a result, they can learn a more potent way to increase market share and earnings. FDI significantly contributes to the host country's employment. It is augmenting local human capital.

FDI comes with high technological knowledge, executive power, and international market knowledge. It is also essential for both growth and development in any country. Bangladesh needs foreign investment as it alone cannot cope with its vast population. To increase its domestic savings, exports, and employment, it must increase its FDI. Due to FDI, multinational companies open their outlet in our country and higher our labour forces, thus creating jobs and growing our exports of goods and services.

Bangladesh alone can't accrue sufficient domestic savings isn't possible for Bangladesh after transacting all the basic needs, so it is argent to inflow FDI from other countries to our country (Ahmed 2014). We are endowed with less FDI as we are in a developing country. So, to increase our job sector, wage, supply chain, and advance innovation, we have to attract FDI. It is empirically proved that FDI increases and increases economic growth and GDP as they appear with better marketing techniques, new products, new production techniques and generating revenue (Haq 2012). FDI has increased worldwide since the late 1980s and the 1990s (Mahmoodi and Mahmoodi 2016). Nowadays, Bangladesh can attract a colossal FDI from developed countries like America, Australia, Canada, Japan, China, etc.

To seek out FDI's impact on exports and employment in Bangladesh is the primary purpose of this study. Besides, it tries to show the relationship between export and industry value-added. Also, try to establish an employment relationship with GDP growth and export.

The UNCATD'S 2019 World investment report shows that FDI inflows to Bangladesh closed at 3.61 billion USD in 2018, equivalent to 5.9% of the country's GDP. FDI inflows in Bangladesh in the last few years are mentioned below.

Table 1 below shows the inflows of FDI in Bangladesh from 2005 to 2018. In 2005 it was $803.78 million, and gradually it increases. In 2009 it was $960.59 million. But in 2014, it decreased compared to 2013. In 2015, 2016, 2017 and 2018 FDI inflows were respectively $1833.87, $2003.53, $2454.81 and $2580.44 million.

Table 1: FDI Inflows (In million USD) from 2005 to 2018

Year	FDI	Year	FDI
2005	803.78	2012	1194.88
2006	744.61	2013	1730.63
2007	792.74	2014	1438.49
2008	768.69	2015	1833.87
2009	960.59	2016	2003.53
2010	913.09	2017	2454.81
2011	779.04	2018	2580.44

Source: *Bangladesh Bank*

We can look at the line diagram below for the FDI inflows trend in Bangladesh, showing FDI inflows were comparatively slow from 2005 to 2011. Then it increases significantly except in 2014, and it is upward trending.

Figure 1: FDI Inflows (In million USD) trend from 2005 to 2018

Source: *Bangladesh Bank*

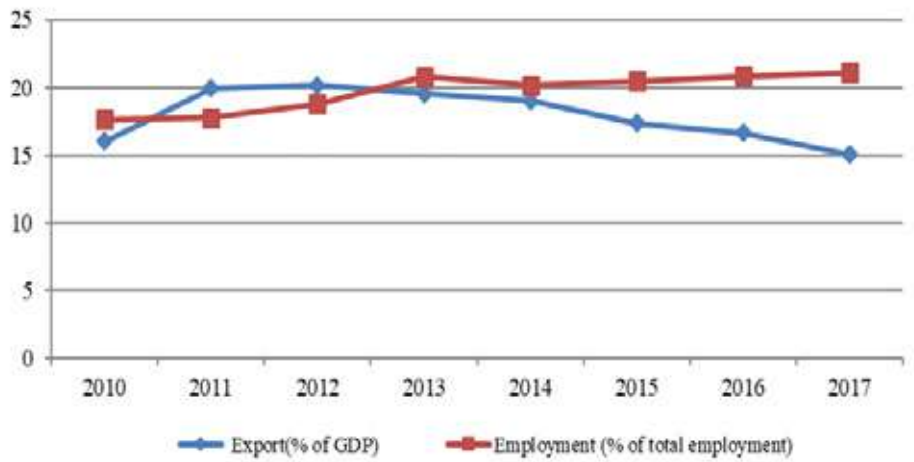
Table 2 shows the data of WDI for 2010 to 2017 for Exports (% of GDP) and employment (% of total employment), and the line diagram below show these two data trend, where export is a little slower and denoted by the blue line. But employment is upward trending, as indicated by Bangladesh's red line from 2010 to 2017.

Table 2: Export (% of GDP) and Employment (% of total employment) from 2010 to 2017

Year	Export (% of GDP)	Employment (% of total employment)
2010	16.02411269	17.62700081
2011	19.92207496	17.73600006
2012	20.16158886	18.78800011
2013	19.53787411	20.78899956
2014	18.98966	20.16600037
2015	17.33667379	20.45999908
2016	16.64971496	20.83799934
2017	15.03610763	21.08499908

Source: *WDI, 2017*

Figure 2: Export and Employment trend from 2010 to 2017



Source: *WDI, 2017*

In this paper, the section gives the study's problem statement, section 3 shows the literature review, and the paper's objectives are provided in section 4. The significance of the study, methodology, results and discussions, and conclusions and recommendations are described in sections 5, 6, 7 and 8, respectively.

2. Problem Statement

After the liberation war, the situation of Bangladesh was a beggar description, but now it turns itself into a better position where the contribution of inward FDI can't be denied. Many policymakers and researchers now work with FDI, contributing to economic growth, GDP, gross national savings, exports, imports, and employment.

For Bangladesh, it's necessary to know the contribution to FDI exports as it increases production techniques and low production costs and employment for unemployed people. This country's people are now enjoying a better standard of living and per capita income. FDI increases the efficiency of our human capital as they provide various training which is not possible by our government. Theoretically, FDI may have increased job opportunities. But empirically need to justify the employment generation in Bangladesh.

3. Literature Review

Theoretical Framework

When investment in one country occurs from other countries is called FDI. In the case of FDI, the exposure of some developing and transition countries ascertain that the developing countries are more attractive than developed countries (UNCTAD 2011). FDI is usually different from portfolio investment (Sabra 2012). Compared to export, FDI may provide Ownership, Location, and Internalization (Dunning 1977, 1979 and 1981).

FDI is two types. Vertical FDI is FDI when the company geographically disengages the stages of production. It builds on the theory of capital flows. The second is horizontal FDI, where the company produces similar goods or services in several locations (Sabra 2012).

Exports of goods and services generally include haulage, merchandise value, policy, transport, travel, and other services like communication, financial information, and Govt services. Exports of goods and services for Bangladesh were 44,168 million (USD) in 2018. Between 1999 and 2018, exports in Bangladesh grew significantly from 6,235 million to 44,168 million US dollars 2010 to 2018. Bangladesh mainly exports to the American and EU countries, followed by Asian, Middle East and African regions (Moniruzzaman 2002).

Employment is explained as working-age persons engaged in any activity to produce goods or services. Due to establishing forward and backward linkages with the host country's firm, FDI inflows can affect employment. For example, when foreign firms purchase locally produced goods, demand addressed to upstream industries guides potential job creation in host countries (Jude & Silaghi 2016).

Literature Review Related to FDI and Exports

Across the world, there are massive studies on this topic. Some of them are included here. We have here some of them in this section.

Conducting the relevance between FDI, imports demand and export supply for Pakistan by using ECM and co-integration tests revealed that FDI has a positive association in the long run with real exports (Tabassum *et al*., 2012). Research on

exports and FDI in India, where the time range was 1980 to 2010, found a stable long-run relationship between FDI and export growth. Unidirectional causality ensures through VECM for exports and FDI inflow. In the short run, there is no Granger cause between FDI inflow and export (Sultan 2013). Applying the OLS method to find the influence of FDI on exports, the results revealed a positive impact of FDI on export growth (Muzurura et *al.*, 2012). A long-run association among variables was found using the ARDL approach from 1980-to 2018 (Mukhtarov *et al*., 2019). A significantly positive impact of FDI on export is also noticed.

Mahmoodi and Mahmoodi (2016) examined the causal relationship between FDI, exports and economic growth. Panel-VECM causality is employed in the paper. The result of the article indicates a bidirectional causal relationship between exports and economic growth in the short run. They also detect long-run causality from export and FDI to economic growth and export to FDI for both panels. Haq (2012) showed the statistically significant positive impact of FDI on exports in Pakistan. Dritsakia and Stiakaki (2014) explored the relationship between FDI, exports, and economic growth in Croatia. They used the ARDL BT approach and also the ECM-ARDL model. Bidirectional causality between exports and growth was found for both the long and short run. Bouras and Raggad (2015) also showed positive relationships between FDI and exports.

Zhang's (2002) estimation indicates that FDI positively influenced export performance in China; its export-promoting effect is much more significant than domestic capital. Selimi *et al.* (2016) examined the FDI and export in Western Balkan countries. They also investigate the fixed effects and individual heterogeneity across countries and years. The econometric analysis found that FDI's impact positively impacts export in the sample countries. Barua (2013) shows a positive relation between FDI, GDP, and Exports through simple regression and multiple regressions.

Literature Review Related to FDI and Employment

FDI inflows are expanding employment in all economic sectors where FDI positively affects employment in two EU areas (Marelli *et al.* 2014). Ayumu (2012) has examined the influence of FDI on the domestic employment of Japanese three sectors like manufacturing, wholesale, and service sector firms. The empirical results imply the positive effects of FDI on employment. Malik (2018) has examined the employment effects of FDI in the manufacturing industries of India. They have employed 54 three-digit industries. In the paper estimating an extended dynamic labour demand model through the GMM Method, he had not observed any considerable impact on the employment of FDI. Craigwell (2006) showed the result by employing panel data methods. Recommending that increase in FDI increases employment. Employment is most significant in the first year due to foreign direct investment and broadens when trade policies, absorption, and financial development are considered. Efficiency-seeking FDI may be caused by

more unemployment due to export substitution and reimports. The employment effect of FDI on home countries is positive (Agarwal 1996). Çolak and Alakbarov (2017) analysed FDI's impact on employment. The paper's findings reveal a long-run positive association between FDI and employment but the limited employment-generating effect of FDI. Chen (2012) explored the relationship between employment and FDI in China. The paper showed a positive relationship between current and past data on employment and FDI in China. Abbas and Xifeng (2016) work with tourist investors and conduct research questionnaires and interview methods. A positive influence of FDI on employment in Zanzibar was found.

4. Objectives of the Study

The paper's main objective is to determine the impacts of FDI on exports and employment in Bangladesh.

The specific objectives are the following:

1. To investigate the impact of industry value-added on exports in Bangladesh
2. To examine the relationship between exports and employment in Bangladesh
3. To show the impact of GDP growth on employment and develop an ARDL MODEL with the relevant variables

5. Significance of the Study

This article shows the impact of FDI on export and employment in Bangladesh. Due to various reasons, Bangladesh cannot incur a lucrative FDI. As FDI is a potential origin for influencing the economy's growth, the government should try to increase various steps to convince developed countries. Otherwise, Bangladesh cannot cope with the modern world. Through this paper, we can learn the importance of FDI to increase exports in our country as FDI changes production techniques and the efficiency of raw materials. We can also understand the importance of FDI on employment generation in our country. Research on this topic and ARDL and ECM-ARDL models in Bangladesh are scarce. This paper may help for further research. It may be helpful for the existing literature gap. It may help policymakers decide about FDI, export, and import.

6. Methodology

Data and Sample

We conduct here with two models. The first one is the impacts of FDI on exports; the second model is on employment in Bangladesh. These two models are conducted with secondary data collected from WDI (World Development Indication, 2017).

Model Specification

Model 1:

$$Exports = f(FDI, Industry\ value\ added)$$

By taking the natural logarithm, the final econometric model is

$$lnEx_t = \alpha + \beta_1 lnEx_{t-1} + \beta_2 lnFDI_t + \beta_3 lnIVA_t + \beta_4 lnIVA_{t-1} + \mu_1$$

Here, Ex_t= Exports (% of GDP), Ex_{t-1} = Export of one year lag, IVA_t = Industry value added (% of GDP), IVA_{t-1} = Industry value added of one year lag. It is necessary to mention that there are various studies on this topic with these variables. There are notable studies on the data of exports and FDI (Barua 2013; Bouras and Ragged 2015; Dike 2018; Sultan 2013 and Dritasaki and Stiakakis 2014). Industry value added is also used in the same topic by Selimi *et al*. 2016.

Model 2:

$$Employment = f(FDI, GDP\ growth\ , exports)$$

The final econometric model is,

$$lnEm_t = \alpha + \beta_1 lnEm_{t-1} + \beta_2 lnFDI_t + \beta_3 lnEx_t + \beta_4 lnGDPG_t + \mu_2$$

Here, Em_t = Employment (% of total employment), Em_{t-1} = Employment of one year lag, FDI_t = FDI (Current US$), Ex_t = Exports of goods and services (% of GDP), $GDPG_t$ = GDP growth (% annual). Various authors also conduct with the following data (Maitah et al. 2014; Nguyen 2015; Chen 2012).

7. Empirical Results and Discussion

Result Discussion for Model 1

Unit Root Test

The Augmented Dickey-Fuller test is used to test the stationarity of variables. According to Hill, Griffiths, and Judge (2001), data must be stationary for time series analysis. Results of the unit root test show exports are stationary at I (1), FDI is stationary at I (0), and industry value added is stationary at I (0).

Table 3: Unit Root Test (ADF) Results

Variable	Level	1st difference	Decision
	t-statistics	t-statistics	
LnEx	-0.884	-7.498***	I (1)
LnFDI	-6.170 ***	-5.163 ***	I (0)
LnIVA	-6.537 ***	-11.235 ***	I (0)

N. B: *, **, ***. indicate 10%, 5%, 1% significance level.

As all variables are stationary in mixed order, the ARDL approach tests the long-run relationship among variables. So, the next step is to find out the appropriate lag.

Lag-Length Criteria

Lag order is an essential criterion for the ARDL method. We apply LR, FPE, AIC, SC and HQ information criteria to select the appeasement lag. From table 4, we ensure that the applicable lag is 3 for showing the co-integration relation among variables.

Table 4: Lag Length Criterion

Lag	LogL	LR	FPE	AIC	SC	HQ
0	43.58	NA	1.84e-05	-2.387034	-2.252355	-2.341104
1	129.80	152.1454	1.97e-07	-6.929134	-6.390419*	-6.745417
2	143.36	21.53648	1.53e-07	-7.197370	-6.254618	-6.875865
3	156.35	18.34218*	1.25e-07*	-7.432216*	-6.085427	-6.972923*

** indicates lag order selected by the criterion*

Based on the previous study, we select appropriate lag with the help of AIC (Akaike information criterion), as AIC provides cogent and trusty information compared to other criteria.

ARDL Bound Testing

The ARDL BT procedure in Table 5 shows variables' long-run association.

Table 5: ARDL BT Estimation Result

K	F-stat	Significant	Lower bound, I (0)	Upper bound, I (1)
		10%	3.17	4.14
		5%	3.79	4.85
		2.5%	4.41	5.52
2	5.77	1%	5.15	6.36

In this paper appropriate lag order is 3 for the ARDL model. Model is running with constant and no trend, where the result of this estimation shows F- statistics is 5.77, exceeds lower bound I (0) and upper bound I (1) in 5% and 10% significance level. Our expected model is (1, 0, 1). So, there exists a long-run relationship in the model.

ARDL Model

Table 6 shows the coefficient of the ARDL model. The coefficient of one-year lags exports is positive and significant at a 1% level. FDI also has a positive and

significant coefficient at the 5% level, implying that if FDI increases by 1%, then 0.041% increases exports in Bangladesh.

The coefficient of industry value added is 1.253, meaning if the IVA increases by 1%, then exports will increase by 1.253% on average. Then the coefficient of one-year lag IVA is positive and significant. The R-square value is 0.94%, which means this is well-fit data in the model.

Table 6: ARDL Model Estimates

Variable	Coefficients	Standard error	Probability
$LnEx_{t-1}$	0.570	0.109	0.0000***
LnFDI	0.041	0.017	0.0233**
LnIVA	1.253	0.278	0.0001***
$LnIVA_{T-1}$	-0.571	0.181	0.0032***
Constant	-0.804	0.189	0.0001***
R square		0.942	
Adjusted R square		0.936	
Durbin Watson value		1.139	

Short-run Estimation of ARDL Model

Table 7 shows a short-run analysis where FDI has a positive and significant coefficient, meaning that a 1% increase in FDI leads to increased exports by 0.041%. Again, if the value-added industry rises by 1%, exports will increase 1.253% on average. We see that IVA is an essential indicator for exports.

From the short run-ARDL model, ECM_{T-1} indicates the speed of adjustment, which is negative and significant. Error correction term (ECT) is -0.430, showing the adjustment is corrected by 43% towards the equilibrium of exports.

Table7: ECM-ARDL Model

Variable	Coefficient	Standard error	Probability value
Δ LnFDI	0.041	0.017	0.0233**
Δ LnIVA	1.253	0.278	0.0001***
ECM_{t-1}	-0.430	0.109	0.0003***

Breusch–Godfrey Serial Correlation LM Test

Table 8 shows the Breusch –Godfrey Serial Correlation LM test where F statistics is 0.164 and probability value is 85%, indicating no serial correlation.

Table 8: Breusch–Godfrey Serial Correlation LM Test

F-stat	Probability
0.164	0.8493

Heteroscedasticity Test

Table 9 shows the Breusch-Pagan-Godfrey Heteroscedasticity test. Where F stat is 1.251 and probability value is 0.3064, indicating no heteroscedasticity.

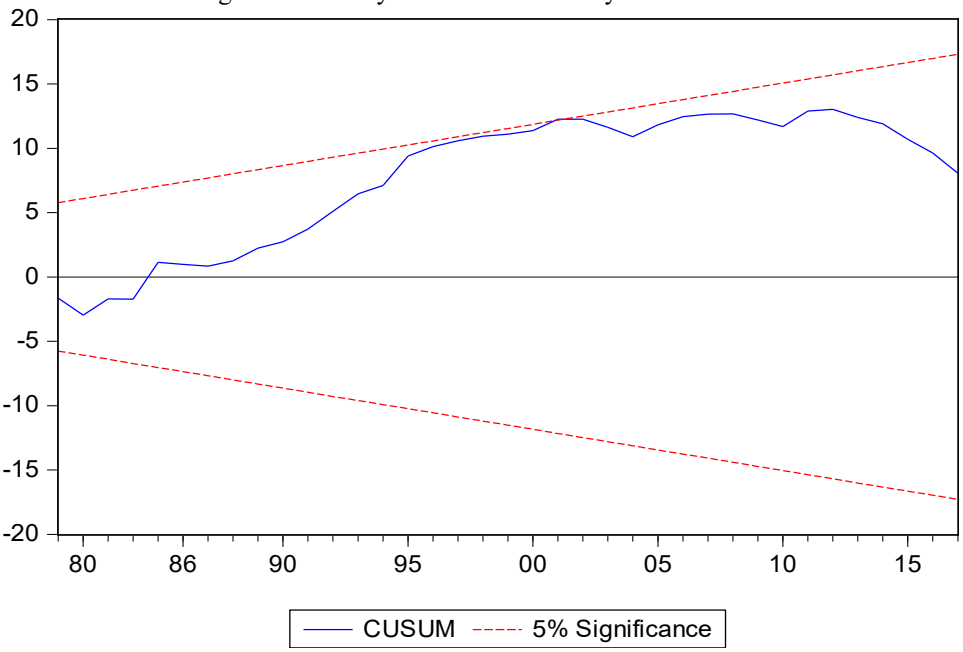
Table 9: Breusch-Pagan-Godfrey

F-stat	Probability
1.251	0.3064

Stability Test

We apply the CUSUM test to know the stability of the model. This ECM-ARDL model shows the model is stable through the CUSM test in the figure below, where the colour of the blue line doesn't exceed the red line. So we can say that model is stable in the long run. We can use this model for future policy implications in our country.

Figure 3: Stability Test of the Model by CUSUM Test



Granger Causality Test

From the test of pair-wise Granger causality, we find bidirectional causality exists between industry value-added and export. The study also found no causal relation between FDI and exports, and no causality has detected any relationship between IVA and FDI.

Table 10: Granger Causality Test

Hypothesis	Obs	F-stat	Prob.
LnFDI does not granger cause LnEx.	34	0.69	0.57
LnEx does not granger cause LnFDI.		0.83	0.16
LnIVA does not granger cause LnEx.	34	2.72	0.05
LnEx does not granger cause LnIVA.		7.77	0.00
LnIVA does not granger cause LnFDI	34	0.27	0.84
LnFDI does not granger cause LnIVA.		1.95	0.15

The result from the discussion for Model 2

Unit Root Test

The Augmented Dickey fuller test is used to test the stationarity of variables. Results of the unit root test ensure that employment is stationary at I (1), FDI is stationary at I (1), exports are stationary at I (1) and GDP growth is stationary at I (0). All these variables are displayed in Table 11.

Table 11: Unit Root Test (ADF)

Variable	Level	First Difference	Decision
	t-stat	t-stat	
lnEm	0.724	-2.912**	I (1)
lnFDI	-2.089	-4.554***	I (1)
lnEx	-2.562	-4.421***	I (1)
ln GDPG	-2.786*	-6.979***	I (0)

N.B: 10%, 5%, and 1% level of significance are denoted with *, **, ***.

Our related variables are stationary in mixed order. We can apply the ARDL BT to find the long-run association within variables. So our following is to find the appropriate lag.

Lag Length Criteria

We apply LR, FPE, AIC, SC, and HQ information criteria to select the appeasement lag. Table 12 indicates appropriate lag 1 for F-statistic among variables to express co-integration. Based on the previous study, we choose appropriate lag with the help of AIC (Akaike information criterion), as AIC provides cogent and trusty information compared to other criteria.

Table 12: Lag Length Criterion

Lag	LogL	LR	FPE	AIC	SC	HQ
0	80.77631	NA	2.53e-08	-6.142105	-5.947085	-6.088015
1	159.7658	126.3833*	1.67e-10*	-11.18127*	-10.20617*	-10.91082*
2	173.8284	18.00010	2.19e-10	-11.02627	-9.271093	-10.53946

* indicates the lag order selection by the criterion

ARDL Bound Testing

Table 13 shows the ARDL bound test to show the long-run association among variables. In this model appropriate lag is 1 for the ARDL Model. Model is running with the constant and no trend, where the result of this estimation shows F- statistics is 7.04 exceeds lower bound I (0) and upper bound I (1) at 1%, 2.5%, 5% and 10% significance level. Our expected model is (1,0,0,0). So there is a long-run relationship in the model.

Table 13: ARDL Bound Test Estimates

K	F-stat	Significance	I (0) Bound	I (1) Bound
3	7.04	10%	2.72	3.77
		5%	3.23	4.35
		2.5%	3.69	4.89
		1%	4.29	5.61

ARDL Model Estimation

Table 14 shows the coefficient of the ARDL Model. Where the coefficient of one year lags employment is positive, and at a 1% level, it is significant. The coefficient of FDI is positive and significant at the 5% level, implying that if FDI increases by 1%, then 0.019% increases employment in Bangladesh.

Table 14: ARDL Model

Variable	Coefficient	Std-error	Prob.
$LnEM_{t-1}$	0.905	0.046	0.0000***
$LnFDI_{t}$	0.019	0.007	0.0076***
LnEx	0.081	0.053	0.1368
LnGDPG	-0.109	0.060	0.0850
Constant	-0.058344	0.032729	0.0891
R-squared	0.98		
Adjusted R-squared	0.98		
F-statistics	0.0000		
Durbin Watson value	1.65		

N. B: *, **, *** denote 10%, 5%, 1% significance level.

The coefficient of exports is 0.081, meaning that if exports increase by 1%, employment will increase by 0.081%, but it is statistically insignificant. Then GDP growth's coefficient is negative but significant at the 10% level. The R-square value is 0.98%, which means these fit the model's data well.

Short-run Estimation of ARDL Model

Table 15 shows FDI possessed a positive and significant coefficient at a 5% level. If FDI increases by 1%, employment will increase by 0.019%. Again, if exports rise 1%, employment will increase by 0.08% on average, but it is statistically insignificant. We also see that GDP growth has a negative but significant coefficient. From the short-run ARDL model, ECMt-1 is negative and significant. The ECT is -0.095, showing that the adjustment is corrected by 9.5% from the short to the long run towards the employment equilibrium.

Table15: ECM-ARDL Model

Variable	Coefficient	Std. Error	Prob.
Δ LnFDI	0.019403	0.006568	0.0076
Δ LnEx	0.081345	0.052576	0.1368
Δ LnGDPG	-0.109048	0.060325	0.0850
ECM_{t-1}	-0.095122	0.045705	0.0498

Breusch-Godfrey Serial Correlation LM Test

Table 16 shows the Breusch–Godfrey Serial Correlation LM test. Where F statistics is 0.397403 and probability value is 68%, indicating no serial correlation in the model.

Table16: Breusch–Godfrey Serial Correlation LM Test

F-statistic	Probability
0.397403	0.6775

Heteroscedasticity

Table 17 shows the Breusch-Pagan-Godfrey Heteroscedasticity Test. Where F stat is 1.778585 and probability value is 0.1709 indicating no heteroscedasticity in the model.

Table17: Breusch-Pagan-Godfrey

F-statistic	Probability
1.778585	0.1709

Stability Test

CUSUM and CUSUM Squares tests prove that our ECM-ARDL model is stable. The results are given in the figure below, where the colour of the blue line doesn't cross the red line. So we can conclude that in the long run, this model is stable.

Figure 4: CUSUM Test

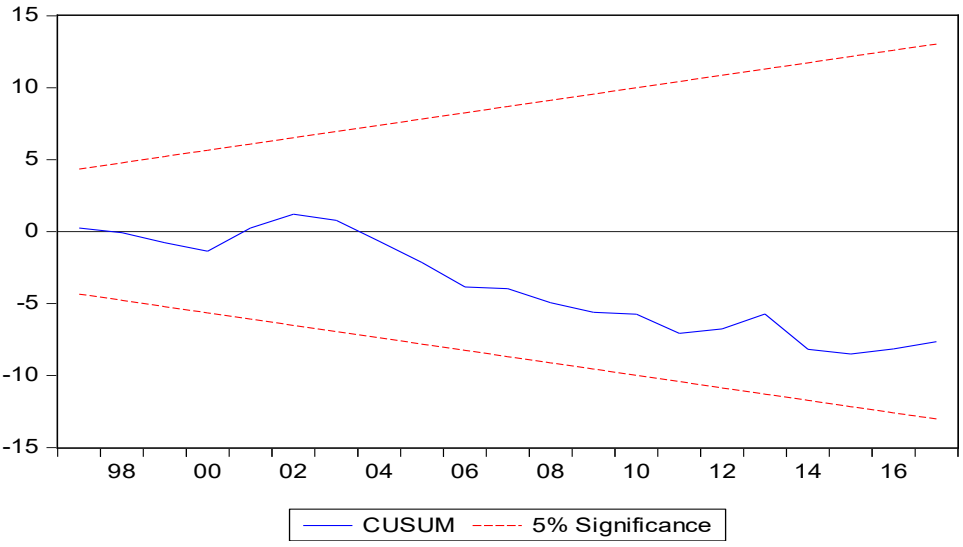
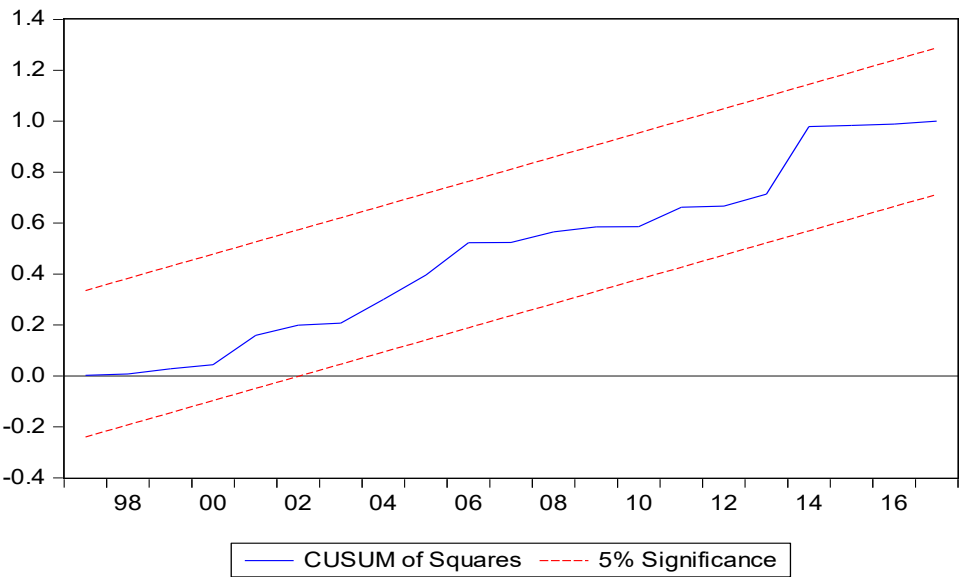


Figure 5: CUSUMSQ Test



Granger Causality Test

The Granger causality test finds bidirectional causal relation between GDP growth and employment and unidirectional causality between FDI and employment, exports and employment, and FDI and exports. Also, no causality is found between GDP growth and exports.

Table 18: Granger Causality Test

Hypothesis	Obs	F-Statistic	Prob.
LnFDI does not Granger Cause LnEm	26	21.8038	0.0001
LnEm does not Granger Cause LnFDI		0.64637	0.4296
LnEx does not Granger Cause LnEm	26	22.4277	0.00009
LnEm does not Granger Cause LnEx		0.32080	0.5766
LnGDPG does not Granger Cause LnEm	26	2.88179	0.1031
LnEm does not Granger Cause LnGDPG		11.3355	0.0027
LnEx does not Granger Cause LnFDI	26	2.21327	0.1504
LnFDI does not Granger Cause LnEx		6.27089	0.0198
LnGDPG does not Granger Cause LnFDI	26	0.64692	0.4295
LnFDI does not Granger Cause LnGDPG		5.59015	0.0269
LnGDPG does not Granger Cause LnEx	26	0.99817	0.3281
LnEx does not Granger Cause LnGDPG		1.24428	0.2762

8. Conclusion and Policy Recommendation

FDI boosts exports of host countries. The paper explores the impact of FDI on exports and employment in Bangladesh. We use the ARDL and ECM-ARDL models. Various authors also utilise this model (Ditasaki and Stiakalis 2014; Abu and Nuruddeen 2017; Lee *et al.* 2011). We find a positive and significant long-run association between FDI and exports and between FDI and Bangladesh's employment.

From the result of the ARDL model, we find that exports depend not only on FDI and industry value added but also on one-year lagged exports. The coefficient of one-year lag export is positive and also statistically significant. Positive and significant coefficient of FDI at a 5% level, indicating that 1% increase in FDI, exports will increase by 0.04% on average. Again the coefficient of industry value added is significant and suggests that if it increases by 1%then export will increase by 1.25%, so that we can hold it as an essential determinant of increasing export from Bangladesh. The value of R square is 94%, and we can remark that there is a good fit of data. Pair-wise Granger causality testing reveals the bidirectional causality between IVA and exports. It also found no causality between FDI and exports, industry value added and FDI. The bound test result shows the long-run association of variables at 5%and 10% levels. From ECM-ARDL Model, we find that the coefficient of ECMt-1 is negative. The ECT is -0.430 showed that the adjustment is corrected by 43% towards the equilibrium of exports, and no autocorrelation and heteroscedasticity are found. Finally, the CUSUM test shows the stability of our model.

In the second model, due to the mixed order unit root test, we apply both ARDL and ECM-ARDL Models. We find that our optimal lag is 1 based on the AIC information criterion from the lag order selection. ARDL BT approach reveals that there exist long-run association among variables at 1%, 2.5% .5% and 10% level. The ARDL Model shows that the real coefficient is positive except for GDP

growth. The coefficient of one-year lag employment is positive and statistically significant. FDI coefficient indicates that if FDI increases by a 1% increase in FDI, employment will increase by 0.01% on average and is statistically significant.

The pair-wise Granger causality test result found bidirectional causality between GDP growth and employment and unidirectional causality between FDI and employment; exports and employment. There is no causality between GDP growth and exports, FDI and export and industry value added and FDI. From the ECM-ARDL model, our ECMt-1 (speed of adjustment) is -0.095122, which is statistically significant. We ensure no autocorrelation and heteroscedasticity in the model through the Breusch Godfrey LM test and Breusch-Pegan-Godfrey test. The model's CUSUM and CUSUM Squares test show that our model is stable.

We find a positive association between FDI, exports, and employment in Bangladesh. If the government looks at this area, Bangladesh will benefit greatly. To attract FDI, the Government should provide more facilities, security, and utility in the EPZ for foreign companies. If necessary, the areas of EPZ should be broad. As FDI creates employment, the Government should be trained female and illiterate people. As a result, they can engage themselves in this area, thus reducing the unemployment rate in Bangladesh.

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Push and Pull Factors of Women Entrepreneurship Development in Bangladesh: A Principal Component Analysis

Nasrin Islam[*]
Foyasal Khan[**]

Abstract

Over the last three decades, Bangladesh has made substantial progress in economic growth and social development. In this development achievement, the role of women's involvement in economic activities cannot be overemphasized. Female labour force participation has increased significantly, and women's presence is visible in almost all sectors of the economy. However, the Covid-19 pandemic has adversely affected the economy of Bangladesh on many fronts. The biggest concern is rising unemployment, and wage cuts have become a regular phenomenon in all formal and informal job sectors. Even though both men and women lose their jobs because of the pandemic, the impact on women is much worse since they mainly depend on male members for their livelihoods. The involvement of women in entrepreneurial activities has increased in recent decades. However, the magnitude and momentum of women's entrepreneurship are still shallow. Moreover, women entrepreneurs face many barriers when planning a new business. Against this backdrop, this paper aims to identify the push and pull factors which influence a woman to become an entrepreneur. For this, 41 women entrepreneurs were interviewed using a structured questionnaire for running a Principal component analysis (PCA). Findings of the study show that 'Family Hardship' is the main push factor and 'Self-Employment and Economic Freedom', and 'Strong willpower to do something on own' are the primary pull factors. Moreover, according to our PCA result, 'financial support from the government' could be a dominant pull factor. Based on the result, this study recommends that only financial support from the government is not enough for the development of women's entrepreneurship.

[*] Assistant Professor, Department of Economics, Varendra University, Rajshahi, Bangladesh. Email: nasrin@vu.edu.bd; islamnasrin059@gmail.com
[**] Research Coordinator, MOMODa FOUNDATION, Dhaka, Bangladesh. Email: foyasal.khan@ momodafoundation.org; foyasal.khan@gmail.com

Instead, building an entrepreneurial ecosystem for women is very important, encouraging more women to unleash their immense potential entrepreneurial capabilities.

Keywords *Women entrepreneurship · Principal Component Analysis · Bangladesh*

1. Introduction

1.1 Background

In 1971, Bangladesh inherited a poor and undiversified economy. Due to British colonial exploitation for nearly 200 years and the misrule of Pakistani governments in terms of applying two economic theories as mentioned by several noted Bangladeshi economists, including Professor Rehman Sobhan, Professor Nurul Islam, and Professor Anisur Rahman in the 1960s, the economy was stuck in the vicious cycle of multidimensional poverty and extreme form of inequality. Despite such unfavourable circumstances and constraints on physical and human resources, Bangladesh's spectacular economic and social progress over the last five decades has earned global recognition. Noted economist Nobel laureate Amartya Sen said openly that Bangladesh's performance in some social indicators is better than India's. Professor Wahiduddin Mahmud calls it 'Bangladesh surprise' to achieve better performance compared to the similar economies when we started our journey as an independent nation.

Its Gross Domestic Production (GDP) growth rate has been impressive. On average, Bangladesh's GDP rose from about 3 per cent in the 1970s to 7 per cent in the 2010s and had crossed 8 per cent just before the Covid-19 pandemic set in. Though the pandemic has slowed Bangladesh's growth, its GDP growth is projected to rise faster than other countries. High growth has pushed per capita income upwards by 23 times in 2020, from where it was in 1973. The characteristics of a modern economy—graduation from being agriculturally dependent to growing through the industry and services sector—are also gradually observed. Women were included in the national development project in ways that recognized how their vulnerability and lack of power bred poverty and deepened gender inequalities; programs and policies were designed to reach them in ways that amended, without radically transforming, gender relations.

Women in Bangladesh constitute half of the population of humans. However, they are practically invisible when owning and operating their business enterprises like many other developing countries. Admittedly, women have made significant inroads in the recent years (ever since the formation of the Beijing Platform of Action for women) globally as well as in Bangladesh in different areas of economic activities and professional and other pursuits under a vastly improved policy atmosphere encouraging women's participation in a wide range of entrepreneurial activities. However, the ground reality continues to be very harsh. Women's

predicaments in Bangladesh are at least three-dimensional. They are subject to abject poverty, widespread discrimination, inequality, and most importantly, their scant participation in the workforce.

Women are thinly represented in the businesses in Bangladesh. They continue to remain marginalized in entrepreneurship as various sources report that women-owned businesses constitute roughly 3 to 4 per cent of the total business enterprises in Bangladesh. Women's participation in the country's workforce is still significantly below men's, 36% compared to 82.5% as of 2010. Except in the Ready-Made Garments (RMG) industry, where nearly 90% of the 5 million workers are women, their presence in the non-RMG industrial sectors is minimal. The implication is that a vast human resource remains untapped as economic growth and social progress sources. To build a sustainable democratic society characterized by broader participation of all individuals, reduce poverty and ensure prosperity through engaging the entire workforce in productive, pursuits development of women's entrepreneurship is indispensable (Ahmed, 2014).

However, the Covid-19 pandemic has adversely affected the economy of Bangladesh on many fronts. The biggest concern is rising unemployment, and wage cuts have become a regular phenomenon in all formal and informal job sectors. Even though both men and women lose their jobs because of the pandemic, the impact on women is much worse since they mainly depend on male members for their livelihoods. Indeed, the pandemic could set back female labour force participation in Bangladesh. One reason is that women have a higher labour force participation rate than men in many sectors most negatively impacted by the crisis, such as commerce, education, and domestic work. Another reason is that traditional gender norms unfairly burden women with an even greater share of unpaid domestic work and caregiving activities during this time.

Women Entrepreneurship refers to the ownership and leasing of businesses by a woman. Women entrepreneurship is not only a source of income generation for a woman but also a way of achieving economic independence. Women enterprises could be of three types: i) owned by women, ii) managed by women and iii) employing women. According to the definition given in the Industrial Policy 2016, a female is an entrepreneur if she is the owner or proprietor of a privately-run business or organization or owns at least 51% share in a joint venture or company listed with the Registrar of Joint Stock Companies and Firms (BIDS, 2017).

Bangladesh's women entrepreneurs are involved in different businesses, such as manufacturing, trading, service, and others. The highest proportions (69 %) of the enterprise are trading category, followed by manufacturing (19%) and service (12%) (BIDS, 2017).

1.2 Objectives

Considering the significance of women's entrepreneurship in women empowerment and economic development, this study aims to identify the factors influencing a woman to become an entrepreneur**.** The study attempts to attain the following objectives specifically:

- To enquire into the factors those motivated (Pull) the entrepreneurs to start and run their enterprises; and
- To examine the reasons that might have compelled (Push) the entrepreneurs to pursue entrepreneurship

1.3 The organization of the study

The rest of the paper is structured as follows. Section 2 provides an extant literature review on features of the current labour market, unemployment scenario and current state of women entrepreneurs in Bangladesh. Section 3 deals with the methodology employed to conduct this study. Section 4 presents results and analysis, while Section 5 concludes with action-oriented policy recommendations.

2. Literature Review

2.1 Features of Current Labor Market

The current labour market in Bangladesh is characterized by an increasing rate of labour force participation and increases in underemployment (Kundu, 2016). Due to this, the creation of employment for the new entrants into the labour force has become one of the principal development challenges for Bangladesh. The labour force is growing at almost twice the rate of growth in population (Titumir and Hossain, 2003). It has been reported that 67% of the total population were aged 15 or older, of whom 50.4% were female (BBS, 2017).

According to the Bangladesh Bureau of Statistics (2010), the labour force increased by 42.6 per cent between 1991 and 2005 for the entire population, with an increase of 31.7 per cent for males and 126.5 per cent for females. Following this increasing trend in 2016, male and female participation in the labour force stood at 81.9 and 35.6 per cent, respectively. The total population participation in the labour force is almost equal in rural and urban areas (BBS, 2017).

Like many developing countries, the informal economy plays a vital role in employment creation and income generation in Bangladesh, where the informal sector tends to absorb most of the growth in the labour force (BBS, 2018) and accounts for 89% of the total number of jobs in the labour market (Danish Trade Union, 2014).

According to the World Economic Forum on Gender Gap report, Bangladesh ranked 68th according to its gender gap index (World Bank, 2007). Women's participation in different productive activities outside the home is rare due to few traditional social barriers (Hossain. et al., 2009). Several studies found that

women's contribution to socio-economic development was not visible, perhaps due to social norms that enabled men to dominate women (Bose et al., 2009). Economic development is expected to be associated with changes in the structure of employment (Kundu, 2016). On the other hand, participation in women's labour force is crucial as it can change the total labour market structure and play a vital role in the economic growth of Bangladesh (Rahman. et al., 2005).

An increased population may not be a burden if it can be used efficiently for development. From 1999-to 2000 to 2015-16 population increased by 34.15 million, whereas the working-age population increased only by 24.25 million. At the same time, the portion of the employed population increased by 20.53 million. That means enlarging the labour market rate is much lower than the increasing rate of the total population, which may be a severe matter of concern in continuous development. Even we failed to use the entire portion of the labour force effectively. Till the 2010 labour force survey, the total working-age population is male dominance. However, the table shows that in recent years (2015-16), the female portion of the working-age population has become higher than the male portion. It indicates that more skilled female labour is needed to ensure countries' development still. However, the amount female employed population is still less than half of the total male employed population. The unemployed portion of the labour force does not show a constant trend, but there is a sharp increase between 2015-16 in both males and females.

Table 1: Change in the size of the labour force and composition

Year	Population		Working age		Employed		Unemployed	
	Male	Female	Male	Female	Male	Female	Male	Female
1999-00	64.09	60.26	38.30	35.90	31.1	7.9	1.1	0.7
2002-03	68.33	65.08	41.20	39.60	34.5	9.8	1.5	0.5
2005-06	70.04	67.26	43.01	41.58	36.1	11.3	1.2	0.9
2010	74.15	73.59	47.85	47.74	37.9	16.2	1.6	1.0
2015-16	79.6	78.9	48.4	50.3	41.76	17.77	1.3	1.3

Source: Basak, 2013 and BBS, 2017

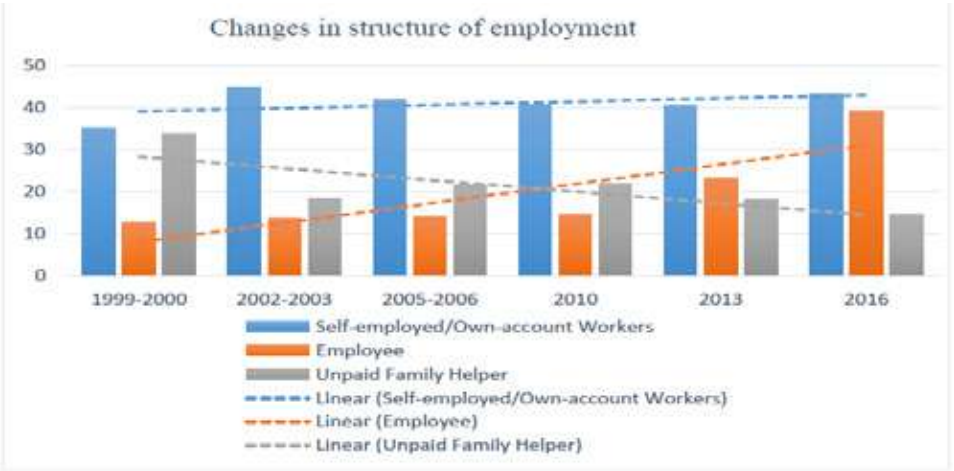
It shows that the percentage changes in the labour force are based on gender. In all cases, percentage increases in the female labour force are higher than the percentage changes in the male labour force. Especially in the last seven years, the rate of change in the female labour force (5.36%) is almost five times that of the male labour force (1.15%).

Figure 1: Changes in Labor Force (percentage) in Bangladesh

Source: *Basak, 2013 and BBS, 2017*

Self-employed as a percentage of total employment follows a slightly increasing trend from 1999-2000 to 2015-16. Employee as a percentage of total employment shows a clear increasing trend but surprisingly the unpaid family helper/labour which is mainly involved with a female member of households, provide a decreasing trend in the same period. Within total employment self-employed population increased from 351% in 1999-2000 to 43.2% in 2015-16. The employee also increased from 12.6% to 39.2% of total employment within the same period, but the unpaid family helper/labour decreased from 33.8% to 14.47% of total employment.

Figure 2: Changes in the Structure of Employment by Status (% of total employment)



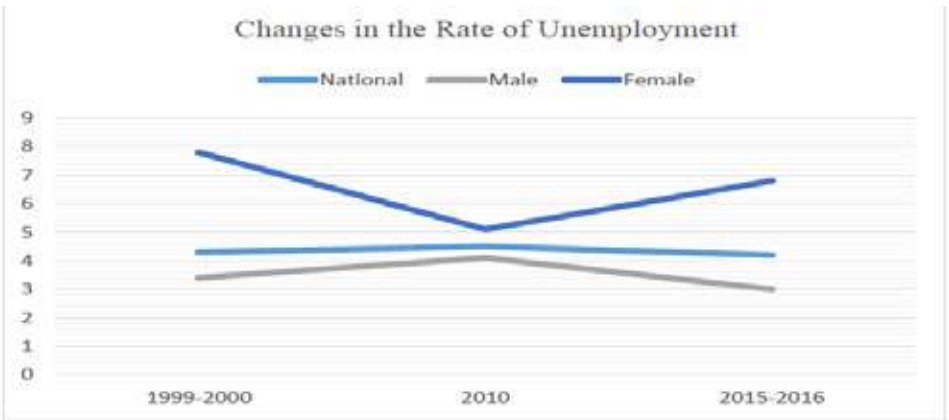
Source: *Basak, 2013 and BBS, 2017*

According to LFS 2016-17, the employment status can be distinguished into two main categories of the employed such as (1) employee and (2) self-employed. The present distribution scenario of employed person shows that self-employed/ own account workers hold the highest rank at 43% and employers hold the lowest at 3%. Besides this, there may be some other categories which contain an ignorable percentage in total employed person.

2.2 Unemployment Scenario

The rate of unemployment at the national level followed a decreasing trend till 2010 from 1999-to 2000. Interestingly, the female unemployment rate decreased from 7.8 in 1999-2000 to 5.1 in 2010, whereas the male unemployment rate increased from 3.4 to 5.1 then. Later on, an opposite scenario was observed in 2015-16. The female unemployment rate shows an increasing trend up to 6%, and the male unemployment rate decreased to 3% till 2015-16 though the national level unemployment rate almost remained the same (4.3% in 1999-2000 and 4.1% in 2015-16).

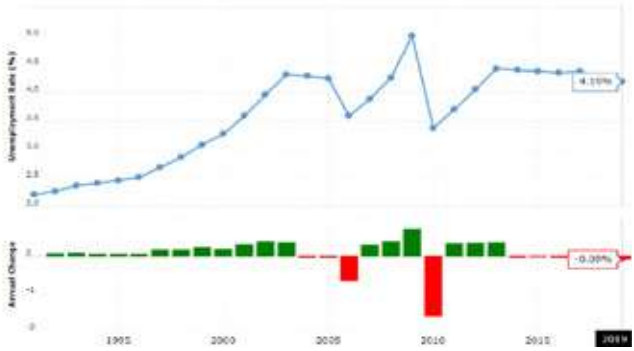
Figure 3: Percentage change in unemployment



***Source**: Basak, 2013*

Unemployment is an economic problem in a country when many people cannot secure a job because of the lack of employment opportunities. Bangladesh's unemployment rate dropped to 4.15 % in Dec 2020, from the reported number of 4.19 % in Dec 2019. Bangladesh's unemployment rate is updated yearly, available from Dec 1991 to Dec 2020, with an average rate of 3.93 % (World Bank). A recent study by World Bank shows that, In 2020, Bangladesh's unemployment rate was approximately 4.15 per cent. After a decrease from 2010 through 2011, Bangladesh's unemployment has been steady at around 4.2 per cent. Unemployment refers to the share of the labour force without work available for and seeking employment.

Figure 4: Unemployment Rate and Annual Change

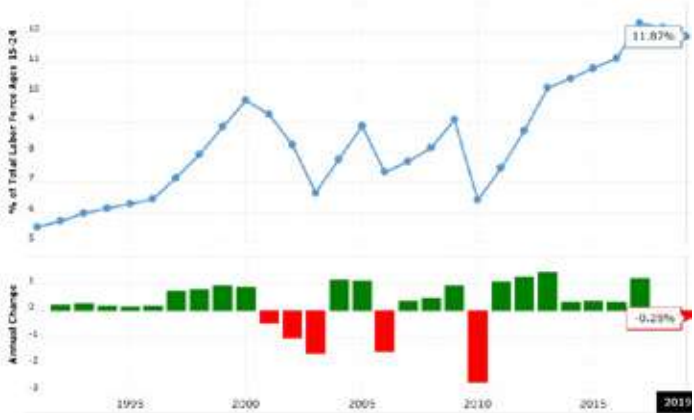


Source: *https://www.macrotrends.net/*

Youth unemployment refers to the share of the labour force ages 15-24 without work but available for and seeking employment.

- Bangladesh's youth unemployment rate for 2019 was 11.87%, a 0.28% decline from 2018.
- Bangladesh's youth unemployment rate for 2018 was 12.15%, a 0.15% decline from 2017.
- Bangladesh's youth unemployment rate for 2017 was 12.30%, a 1.18% increase from 2016.
- Bangladesh's youth unemployment rate for 2016 was 11.12%, a 0.33% increase from 2015.

Figure 5: Youth Unemployment Rate and Annual Change



Source: *https://www.macrotrends.net/*

2.3 State of Women Entrepreneurship in Bangladesh

The current employment growth rate in Bangladesh is 2.4 per cent. At this pace, it will be possible to generate employment for half of the unemployed by 2030. The government has declared youth development as one of the national development agendas. However, meeting the government's stated employment goals will not be possible if a business as usual approach is followed.

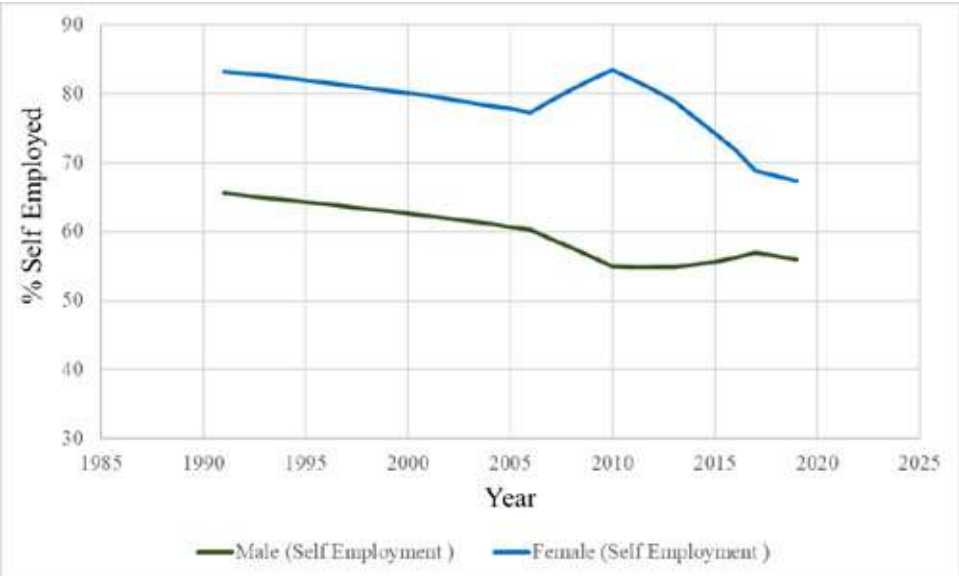
There are more than 34 million own-account and unpaid family workers in Bangladesh, representing 56 per cent of the workforce. Self-employed persons and the micro, small and medium enterprises (MSMEs) that they establish have enormous potential for rapidly generating large numbers of new jobs and raising productivity to increase incomes, provided the proper policy measures are in place to support them.

A large proportion of MSMEs is established by women and employs women in Bangladesh predominately. An appropriate mix of policies focusing on access to technology, training, credit, marketing and distribution channels can substantially accelerate self-employment, particularly in the informal and rural sectors and among women.

In Bangladesh, the self-employed female (% of female employment) (modelled ILO estimate) was 67.39 as of 2019. Its highest value over the past 28 years was 83.44 in 2010, while its lowest value was 67.39 in 2019. Self-employed males (% of male employment) (modelled ILO estimate) in Bangladesh was 55.89 as of 2019. Its highest value over the past 28 years was 65.61 in 1991, while its lowest value was 54.78 in 2012. Another thing is, from the very beginning, women have been found to opt for self-employment more than men. However, in the case of both men and women, the rate is following a significant declining trend.

Women entrepreneurs still suffer disproportionately more significant obstacles than their male counterparts in accessing bank credits and face rigid and non-transparent regulatory barriers, institutional rigidities and various policy-induced constraints resulting from gender bias. Women entrepreneurs' predicaments are further multiplied by the patriarchal social norms and family values which are seriously anti-developmental. Therefore, the need is to remove all socio-economic barriers by taking more proactive policy initiatives and designing an effective implementation mechanism of the policies and programmers at macro and micro levels which are gender-neutral and explicitly pro-women (Ahmed, 2014).

Figure 6: Self-employed Male and Females, total (% of total employment) in Bangladesh



Source: *International Labour Organization, ILOSTAT database. Data retrieved in September 2019*

The initial problems faced by the female entrepreneurs seem like those confronted by a female in other countries. However, the findings show lower levels of work-family conflicts among Bangladeshi female entrepreneurs, who seem to differ from other countries in terms of their reasons for starting a business and succeeding in the venture (Rahmatullah and Zaman, 2014)

The share of loans disbursed under the dedicated women loan scheme to total loans increased to 15.6 per cent in 2013 from 12.7 per cent in 2009. Moreover, only 27 bank branches out of 144 were headed by women. Without women heads at women's desks, women entrepreneurs hesitate to discuss business and loans and are occasionally harassed by their male counterparts (Bangladesh Bank, 2014).

Women in various small and medium enterprises take on the challenge of working in a male-dominated society, competitive and complex economic and business environment. However, the identified challenges are inadequate capital, sales promotion, getting permission to start up a business, gender discrimination, illiteracy and lack of knowledge among women, non-availability of the training program and technical support, lack of managerial experience, and in some cases young people make ill-talk about the enterprise and so on. Personal qualities such as hard work and perseverance, management and marketing skills, and support provided by their spouses or family are the main reasons behind the success of the women entrepreneurs. The level of participation of women in mainstream

economic activities remains insufficient, and the percentage of women in business is still much below that of their male counterparts (Afroze, 2014).

The Novel Corona Virus (COVID-19) has created tremendous negative impacts on the livelihood of the marginal population in Bangladesh. Many people working in the informal sector have lost their job and income due to the ongoing pandemic. The success in economic

growth in the last few decades could not save poor people from becoming extremely poor because economic prosperity was not inclusive in Bangladesh. This article suggests that only growth-oriented policy measures are insufficient to reconstruct the post-COVID era's economy. Instead, Bangladesh needs to adopt employment-oriented economic policies to create more jobs and reduce poverty and inequality (Hossain 2021).

The women entrepreneurs of Bangladesh lack economic participation, leadership and empowerment compared to men entrepreneurs. Research shows that about seven per cent of the total business establishments of Bangladesh are owned and headed by women, which is negligible in terms of the women population proportion of the country. This limited ownership, leadership and empowerment of women is a clear gap to be filled for the country's sustainable economic development. This study suggests that the policymakers of this sector should emphasize regulatory framework, entrepreneurship education and training, husband engagement in women's business and the role of women's business association in formulating the SME policy to increase women empowerment for the sustainable development of Bangladesh (Hoque et al., 2020).

2.4 Conceptual Framework on Push & Pull Factors

Based on the review of several national and international research papers, the following factors have been selected as push and pull factors that affect the decision of an entrepreneur to start a new business.

Table 2: Review of Push & Pull Factors

Author's Name	Pull Factors	Push Factors
Dana (1993)	Cultural desirability	Other options have failed, coping with marginality.
Dana (1997)	Self, ethnocultural milieu.	Host society, necessity, reduction in perceived social status
Dana and Light (2011)	Culture, prestige.	Need for cash
Islam (2012)	Money making for family, self-employment, gaming higher social status, use of personal knowledge and previous experience, family business tradition, and less complexity but more profitability.	Lack of higher formal education, curse of unemployment, dissatisfaction with previous occupation, and family hardship or pressure.

Segal et al. (2005)	Job dissatisfaction, difficulty finding employment, insufficient salary, or inflexible work schedule.	Seeking independence, self-fulfilment, wealth, and other desirable outcomes.
Verwey (2007)	Independence, achievement, recognition, personal development, and personal wealth.	Unemployment, job insecurity, disagreement with management, lack of alternatives.
Yunus (2010)	Good prospect, ever-increasing demand.	Previous experience, family business.
Riaz et al. (2018)	High salary, Job stress, Career advancement, New challenges and interesting work, Job security, Better culture and life-work balance, Use of personal knowledge and previous expression, Family business tradition, and Financial award.	Job Stress, Job dissatisfaction, Lack of higher formal education, Family hardship, Insufficient salary, Inflexible work schedule, Disagreement with management, and Economic necessity.
Kabir et al. (2017)	Earning extra money for me, Family business tradition, Gaining Higher Social Status, Self-employment with economic freedom, For Inheritance case, user of personal knowledge and experience, Less Complex and More Profitable, Support from Government, Financial Support from Bank	Lack of Higher Formal Educational, Curse of Unemployment, Dissatisfaction with the previous occupation, Family Hardship and Pressure, others

Based on reviewing the factors mentioned in the literature above, the Table below is the finally selected push and pull factors for this study. The push and pull factors have been chosen so that there is no overlap between the factors; hence all the factors are independent and can be differentiated from each other. The number of push and pull factors in Table 3 will meet the study's objective by gathering the necessary information for further analysis.

Table 3: Final List of Push and Pull Factors

Push factor	Pull factor
• Previous Job Stress. • Previous Job Dissatisfaction. • Low salary. • Lack of Higher Formal Education. • Family Hardship. • Inflexible Work Schedule. • Curse of Unemployment.	• Earning extra money for the family. • Self-Employment and Economic Freedom. • Less Complex and More Profitable. • Family business tradition. • Gaining Higher Social Status. • Use of Personal Knowledge and Previous Experience. • Career advancement. • Strong willpower to do something on own. • Independency and Flexibility. • Support from the Government. • Financial Support from the Bank.

3. Methodology

The data used in the study covered primary data, which were collected through a structured online survey questionnaire. Due to COVID-19, the primary data was collected online in 2 ways using a snow-ball technique: from a known person and from known of a known (mutual) person.

Total Forty-one (41) entrepreneurs responded to the survey. A structured questionnaire containing 11 and seven pull factors was used to collect primary data. The sample enterprises' ownership style, nature of the enterprise, experience, educational qualifications, and push and pull factors were considered the primary sources of primary data.

A structured questionnaire was prepared for data collection. The questionnaire has been developed to be easily understandable and not so long yet gather the necessary information required to perform the analysis. Respondent finds the questionnaire convenient to fill up.

Primary data were collected from 41 female respondents picked up purposively from among the female individuals engaged in various entrepreneurial activities. The sample enterprises' ownership style, nature of the enterprise, Experience, educational qualifications, and push and pull factors were the primary sources of primary data.

4. Results and Analysis

The purpose of the Data analysis was to find out governing push and pull factors which attract a female individual to become an entrepreneur. The data analysis has been performed in two ways:

- Average Response of the Respondent on a statement
- Principle Component Analysis (PCA) of the Responses

4.1 Push Factors

The responses in terms of the level of agreement by all the forty-one (41) respondents were recorded in the STATA software. To summarise the analysis findings and the "Mean" and "Standard" deviation for all the statements using the same tool are shown in Table 4.

Table 4: Mean and Standard Deviation of the Statements of Push Factors

Variable	Obs	Mean	Std. Dev.	Min	Max
pjs	41	2.707317	.7156781	1	4
pjd	41	2.682927	.8197263	1	4
ispj	41	2.804878	.8130041	1	5
lhfe	41	1.658537	1.086503	1	5
fh	41	1.926829	1.212234	1	5
iwspj	41	2.609756	.7706507	1	4
cump	41	3.219512	1.695762	1	5

4.1.1 Principal Component Analysis (PCA) of the Responses of Push Factors

Principal Component Analysis, or PCA, is a dimensionality-reduction method that has been used to reduce the dimensionality of large data sets by transforming the large set of variables into a smaller one that still contains most of the information in the large set.

4.1.2 Variable Reduction

PCA helps to reduce the dimensionality of their data. Doing so is particularly important in the presence of highly correlated variables. By doing PCA, the co-relation between the push factors will be determined. Firstly, all the factors have been considered for the correlation analysis.

Table 5: The pairwise correlation in STATA

	age	pjs	pjd	ispj	lhfe	fh	iwspj	cump	marita~2	eduqua~2	exp_2	os_2
age	1.0000											
pjs	-0.1921	1.0000										
pjd	-0.1580	0.7754	1.0000									
ispj	-0.1438	0.5869	0.6551	1.0000								
lhfe	-0.0637	-0.1960	-0.1527	-0.1905	1.0000							
fh	-0.0187	-0.0541	0.0012	-0.0909	0.6069	1.0000						
iwspj	-0.3109	0.3317	0.3928	0.3143	-0.0437	0.1025	1.0000					
cump	-0.2139	0.1367	0.3211	0.1769	0.0146	0.1661	0.4881	1.0000				
maritalsta~2	-0.4929	0.0608	-0.0332	-0.2157	0.1151	0.0549	0.1235	-0.0192	1.0000			
eduqualifi~2	-0.3437	-0.1420	-0.1094	-0.0959	0.3326	0.1054	0.1289	0.1774	0.1793	1.0000		
exp_2	-0.3003	0.3151	0.4571	0.3599	-0.1724	-0.1002	0.2671	0.3266	-0.0412	-0.1360	1.0000	
os_2	-0.1399	0.3307	0.1349	-0.0668	-0.0387	-0.0059	0.2031	-0.0187	0.0995	-0.0293	-0.0736	1.0000

From Table 5, we can see that variables in the data are not highly correlated. It is because of variation in a range of levels of agreement put for the variables (from strongly disagree to agree strongly). Because of variation in a range of levels of agreement, the correlation between the variables or factors will not be logically the same. Hence, the reduction of variables should not only be made based on co-relation analysis. We have to perform The Kaiser-Meyer-Olkin Measure of Sampling Adequacy test, also known as the KMO test.

This particular test has been done to indicate the suitability of the data for structure detection. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy is a statistic that shows the proportion of variance in the variables underlying factors might cause. High values (close to 1.0) generally indicate that factor analysis may be helpful with the data. If the value is less than 0.50, the factor analysis results will probably not be beneficial.

Table 6: 1st KMO Test result

Variable	kmo
age	0.5394
mstatus	0.4087
equali	0.6775
experience	0.7522
OS	0.3492
pjs	0.6883
pjd	0.7302
ispj	0.6871
lhfe	0.5870
fh	0.5278
iwspj	0.7544
cump	0.6417
Overall	0.6388

The KMO test in Table 6 shows that not all the variables are suitable for structure detection. Two factors have a KMO value below 0.5, which indicates that the PCA analysis results will probably not be beneficial. Hence, these three factors were deducted from the list, and a further KMO test was performed on the remaining variables after the reduction.

Table 7:Second KMO Test result

Variable	kmo
age	0.6134
equali	0.6492
experience	0.7925
pjs	0.7135
pjd	0.7021
ispj	0.8739
lhfe	0.5711
fh	0.5279
iwspj	0.7667
cump	0.6529
Overall	0.7011

4.1.3 Final Push Factors

Table 8: Finally selected Push factor

Principal component loadings
component normalization: sum of squares(column)

	Comp1	Comp2	Comp3
age	-.229	-.1602	.5537
equali	.1768	-.2209	-.4849
experience	.3525	.00231	-.1433
pjs	.4303	-.0584	.3196
pjd	.4724	.02448	.2961
ispj	.4096	-.06254	.3287
lhfe	-.1582	.5785	.04625
fh	-.06619	.6421	.1842
iwspj	.3368	.263	-.1594
cump	.2705	.3185	-.28

By carefully observing Table-9, we found component 1 has higher loading on the factors like 'Previous Job Stress", "Previous Job Dissatisfaction", "Insufficient Salary in Previous Job", and "Insufficient Work Schedule in Previous Job". It indicates that component 1 is respondents' perception of the Previous Job Field. However, these cannot be counted as push factors as maximum respondents have no previous experience; hence the loading is higher for these four statements.

On the other hand, "Family Hardship" has higher loading (0.64) on Component 2. Also, maximum respondents have shown agreement with this statement. Hence, it can be said that Family Hardship is the governing push factor.

4.2 Pull Factors

4.2.1 Principle Component Analysis (PCA) of the Responses of Pull Factors

Table 9: The pairwise co-relation done in STATA

	mstatus	equali	experi~e	OS	age	ownf	sself	lcmf	familyb~d	social~s	prsnck~g	cradv
mstatus	1.0000											
equali	0.1285	1.0000										
experience	-0.0412	0.1214	1.0000									
OS	0.0995	0.0204	-0.0736	1.0000								
age	-0.4929	-0.2686	-0.3003	-0.1399	1.0000							
ownf	-0.0677	-0.0521	0.0066	-0.0107	0.1823	1.0000						
sself	0.0060	-0.0176	0.1331	-0.0962	-0.0148	0.7052	1.0000					
lcmf	0.1037	0.1079	0.2424	-0.3895	-0.2857	-0.0943	0.0752	1.0000				
familybstrd	0.2512	-0.3014	-0.0772	-0.0409	-0.1035	-0.1028	-0.2150	0.1282	1.0000			
socialstatus	-0.1226	-0.1038	-0.1198	-0.2631	0.1650	0.5599	0.7257	0.1589	-0.0600	1.0000		
prsnnmldg	0.0138	0.0544	0.0092	0.0150	0.0302	0.6314	0.8490	0.0615	-0.1156	0.6651	1.0000	
cradv	0.0366	-0.0273	-0.0553	-0.1878	0.0987	0.6680	0.8238	0.1345	-0.0379	0.7524	0.8752	1.0000
willpower	0.0416	-0.0248	0.1313	-0.0706	-0.0275	0.6046	0.9346	0.1046	-0.2083	0.6782	0.8581	0.7661
indfelx	-0.0678	0.0552	0.2179	-0.1015	0.0690	0.6281	0.8738	0.1709	-0.2589	0.6330	0.7613	0.6935
supgvt	0.1504	-0.2077	-0.1556	-0.0326	0.1399	-0.0790	-0.2747	-0.0575	0.4659	-0.2611	-0.2055	-0.1221
fnspbnk	0.1241	-0.1618	-0.2563	-0.0195	0.1072	-0.2260	-0.3650	0.0308	0.5896	-0.2558	-0.2954	-0.1987

	willpo~r	indfelx	supgvt	fnspbnk
willpower	1.0000			
indfelx	0.9096	1.0000		
supgvt	-0.3448	-0.2520	1.0000	
fnspbnk	-0.4557	-0.3806	0.8644	1.0000

Variables in the data are not highly correlated. It is because of variation in the range of level of agreement put for the variables (from strongly disagree to agree strongly).

4.2.2 Variable Reduction

Because of variation in the range of level of agreement, the correlation between the variables or factors will not be logically the same. Hence, the reduction of variables should not only be made based on co-relation analysis. For this, a KMO test is performed.

Table 10: First KMO result for pull factors

Variable	kmo
mstatus	0.4532
equali	0.3073
experience	0.3731
OS	0.3462
age	0.4776
eemf	0.8014
seef	0.7821
lcmf	0.4211
famlybstrd	0.5211
socialstatus	0.9045
prsnnknldg	0.7967
cradv	0.8260
willpower	0.7425
supgvt	0.5605
indfelx	0.8006
fnspbnk	0.5591
Overall	0.7041

From the KMO Test, it is visible that not all the variables are suitable for structure detection. Six factors have a KMO value below 0.5, indicating that the PCA analysis results probably will not be beneficial. Hence, these six factors were deducted from the list, and a further KMO test was performed on the remaining variables after the reduction.

Table 11: Second KMO result on rest variables

Variable	kmo
eemf	0.8200
seef	0.8372
famlybstrd	0.5804
socialstatus	0.9069
prsnnknldg	0.8608
cradv	0.8460
willpower	0.7626
supgvt	0.6085
indfelx	0.8841
fnspbnk	0.6042
Overall	0.7971

4.2.3 Final Pull Factors

Table 12: Final pull factors

	Comp1	Comp2
eemf	.3068	.1632
seef	.3949	.07939
famlybstrd	-.1187	.4993
socialstatus	.3278	.1181
prsnnknldg	.3712	.1404
cradv	.3581	.2192
willpower	.3913	.01892
supgvt	-.1669	.5645
indfelx	.3705	.03618
fnspbnk	-.2101	.5619

It is observed that component 1 has higher loading on the factors like 'Earning Extra Money for Family", "Self-Employment and Economic Freedom", "Use of Personal Knowledge and Previous Exp", "Career Advancement", and "Strong willpower to do something by own". It indicates that component 1 is about respondents' positive attitude towards entrepreneurship.

On the other hand, "Support from Government" and "Financial Support from Government" have higher loading (0.69 and 0.68, respectively) on Component 2. However, these cannot be counted as pull factors as respondents disagree with these statements.

So, in component 1, the factors which have more loading close to 0.40 are "Self-Employment and Economic Freedom" and "Strong willpower to do something by own". So finally, these two can be counted as the most governing pull factors which encourage an individual to become an entrepreneur.

5. Conclusion and Recommendation

Findings of the study show that 'Family Hardship' is the main push factor and 'Self-Employment and Economic Freedom', and 'Strong willpower to do something on own' are the primary pull factors**.** Moreover, according to our PCA result, 'financial support from the government' could be a dominant pull factor. Based on the result, this study recommends that only financial support from the government is not enough for the development of women's entrepreneurship. Instead, building an entrepreneurial ecosystem for women is vital that can encourage more women to unleash their immense potential entrepreneurial capabilities. Based on this analysis, we would like to recommend the following policies.

1. Credit facilities should be more gender-friendly. College and university students should be encouraged to have bank accounts, which will later help them get bank credit.
2. Fund for women entrepreneurs sanctioned in the national budget should be utilized properly. Every year the government allocates some funds (in the national budget) for developing women entrepreneurs, and this fund is often not correctly used, and a significant part remains unutilized.
3. Sensitization of Bank officials and organizing awareness-raising programs at the different levels are necessary to support women entrepreneurs. Challenges and concerns of women entrepreneurs should be shared in those programs. The awareness-raising programs may take the form of workshops, consultations, and counselling sessions which will make bank officials and other service providers aware of taking preventive and curative measures to support women entrepreneurs.

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Challenges in Corporate Social Responsibility (CSR) Practices in Bangladesh: A Study on Selected Private industries

Sujan Kanti Biswas[*]
Bidduth Kanti Nath[**]
Subhankar Chowdhury[***]

Abstract

The prime objective of this study is to examine the challenges to CSR practices and remedies to overcome these. Data were collected from 30 executives of different private enterprises through printed questionnaires to fulfil the study's objectives. Respondents were also interviewed wherever and whenever possible. The study uses means, standard deviations, and cross-tabulation of different respondents' responses on identical issues to analyse and interpret the data. An important finding of the study is that sampled companies are well concerned regarding challenges to CSR practices. Important steps like increasing awareness programs, governmental support, making pertinent rules and regulations and ensuring their implementation, and nurturing a positive attitude towards CSR practice could effectively remove the current challenges to the CSR practices in Bangladesh. The most important implication of the study is that the business organisations, governments, policymakers, and managers may consider the study's findings in their policy-making and business practices. Implications and future research directions are also discussed in the study.

Keywords *CSR · Challenge · Growth · Bangladesh · Economy · Impact · PSEs*

1. Introduction

Corporate social responsibility plays a vital role in today's business to expose sustainable competitive advantages and become an essential issue of regular

[*] (Corresponding author), Assistant Professor, Department of Business Administration, Premier University. Email:sujankbtpu@gmail.com
[**] Assistant Professor, Department of Economics, Premier University. Email: biddutheco@gmail.com
[***] PMO Lead (TFS), Tata Consultancy Services, India. Email: subho.chowdhury9@gmail.com

business practices that ultimately helps to ensure the better market positioning of a firm. Most of today's organisations spend a considerable amount of money from their financial surpluses and invest a great deal of time and effort to satisfy their stakeholders and perform the corporate social responsibility task. These social responsibility activities facilitate the firm by providing more prolonged survival of life, greater acceptance of products, services and firms in society, and ultimate financial benefit through more outstanding market share. Social responsibility is "the set of obligations an organisation has to protect and enhance the society in which it functions" (Anderson, 1986). Corporate Social Responsibility (CSR) includes all those claims made on an organisation by the interest groups such as the community, suppliers and creditors, owners and stockholders, customers and clients, unions and government and finally, employees (Reitz & Jewell, 1995). In the 21st century, all organisations must concentrate on CSR practices besides the various activities of business organisations. Corporate social responsibility is a concept whereby companies integrate social and environmental concerns into their business activities (Julie, 2002). The CSR movement has gathered significant momentum over the past years and is now regarded at its most prevalent (Willaims, 2005). The issue has received academic attention and has quickly moved up the corporate agenda (Knox et al., 2005).

One of the significant purposes of business is to make a profit. However, the profit motive is sometimes viewed as less than virtuous because it emphasises self-interest. Nevertheless, self-interest is not the same as selfishness, emphasising one's interests at others' expense. Self-interest is simply a concern for financial reward and is arguably necessary if society is maximally productive and efficiently allocates its resources (Geoffrey, 2002). Profit rewards hard work and innovation, incentives that most people need; otherwise, it would be irrational to save and invest rather than consume.

Consequently, business organisations cannot operate successfully without the cooperation of the society in which it is located. The corporate world has some brightest minds globally and tremendous financial resources (Ahamed, 2010). Thus, businesses should utilise some of their human and financial capital to "make the world a better place". According to Mohammad Alimullah (2006), "Corporate Social Responsibility is one of the new dimensions in corporate management once the focus was on financial Management". Most of the time, people say that profit maximisation is the company's main objective, but in modern times, we do not speak like that (Bowen, 1953). We feel that the company's corporate management's main objective is to achieve the corporate goals and incentives. Corporate Social Responsibility is for progressive companies, and they will look after the underprivileged, distressed, and those who cannot survive in this society.

Corporate Social Responsibility indicates that the companies have an essential social role in the various segments of the society that are directly or indirectly affected by the company. It emphasises that the corporate entities must not exist

only for the sole motive of profit but have to devote some of their precious resources and time to the well-being of society. Social responsibility of business is not a new concept in our country that has developed gradually over two decades. In the past, whenever there was famine, tidal bore, or natural disasters, the leading business people would throw open their business premises to provide food and other assistance to the needy. But nowadays, the contributions of business firms are found around the year through various social activities that benefit society.

Corporations are necessary for economic growth and development, to the extent that the problems of society be solved by providing more and better jobs, higher income levels for more people, and an ample supply of goods and services; Such organisations may be expected to halt the pollution of the environment by their industrial waste, train hardcore unemployed and lean up the slums because ultimately such actions will affect the business favourably. Corporations act as trustees of the public interest out of self-interest in this circumstance. Such trusteeship may cause management to forego immediate profit for the public good and the corporation's long-term goals and profits. With the increasing complexities of society, the route to profit also has become more complex (Gill & Leinbach, 1983).

CSR in Bangladesh can also contribute a lot to community development. The corporate house can develop the community by creating employment, providing primary education, contributing to infrastructure development like roads and highways and addressing environmental concerns. It is more relevant to a country like Bangladesh, where the government interventions in these fields augmented by corporate alliance can go a long way in developing the economy, society and environment. Businesses and organisations live together. If there is no society, there is no business and vice versa. Thus it is understood that CSR is necessary for the company now.

2. Literature Review

Corporate Social Responsibility (CSR) has become a buzzword in the corporate world. The social responsibility of business is now being widely recognised and emphasised for practice, although its origin dates back to a long past. In today's competitive economy, corporate social responsibility has been critical to managers for their stakeholders' changing expectations, incorporated into business strategy formulation. As for a common understanding, all terms speak about some basic notions of a business's role in proving some 'good' to society in jobs, growth, philanthropy, law abidance, environment stewardship, rights protection, and other expectations. This study considers some of the scholarly works and thinkers who have been influential in the Corporate Social Responsibility (CSR) debate during the past 50 years or before and bring together fundamental thoughts in CSR that have a considerable resource for contemporary business practices. This discussion is followed by an overview of major theories and models of CSR, CSR drivers, etc.

In research on 'Discloser of Accounting Information concerning Corporate Social Performance in Bangladesh' by collecting a sample of 30 public sector enterprises through convenience sampling technique, Bishawjit (2011) stated that historically CSR had been viewed as a developed country phenomenon though this is not true. Furthermore, he indicated that literature review and website search have led to believe that managers in Bangladesh and all stakeholders of developing countries were also showing interest, though to a lesser extent than in developed countries, in CSR issues. In this regard, the present researcher feels interested in conducting the study on challenges to CSR practices by private sector enterprises, especially in developing countries like Bangladesh.

Post and James (1996) did a research work on 'Business and Society, Corporate Strategy, Public Policy Ethics' by collecting a sample of 435 randomly and concluded that CSR means that a corporation should be held accountable for any of its actions that affect people, their communities, and their environment. It may require a company to forego some profits if its social impacts are seriously harmful to some of the corporation's stakeholders or if its funds can be used to promote a positive social good. In this work, the researchers mentioned the crucial issues that were good for business and society under CSR practices but could be more specific in topics and industries.

One of the most critical research work done by Windsor (2001) on 'The future of corporate responsibility, to know the key issues by collecting 125 samples of business houses in different industries regarding CSR practices that could be benefited the business house and the findings that 'business leaders have since the 1920s widely adhered to some conception of responsibility and responsiveness practices.

Ahmed & Islam (2008) conducted another research work in the same field, "CSR in the private sectors' for knowing the impact on society and the change of business in the CSR field and the findings are about the last two decades it has been seen a radical change in the relationship between business and society. Prime drivers of this change have been the globalisation of trade, increased size and influence of companies, the repositioning of government and the strategic importance of stakeholder relationships, knowledge and company reputation. The relationship between companies and civil society organisations has moved from paternalistic philanthropy to a re-examination of business roles, rights, and responsibilities.

Sultana (2009) conducted a research work On "Corporate Social Responsibility in Bangladesh" to discover the impact and relationship between Business and the stakeholders by collecting 378 samples through purposive sampling, and she asserted that it was the awareness that business activities have an effect on society and the consideration of that impact by firms in decision-making. Besides emphasising profits, firms are concerned with social responsibility and voluntarily engage in activities that benefit society. It creates new business opportunities,

synergies, and private-public partnerships and connects customers, suppliers, stakeholders and communities. Recent research suggests that it concerns how a company governs the relationship between the firm and its stakeholders.

A research work conducted by Raihan (2002) on "Corporate Responsibility practices in Bangladesh: Results from a Benchmark Study" asserted that the private sector enterprises (PSEs) could play a vital role in providing social goods and services to the masses at a very competitive price. Hence the private sector enterprises are subjected to immense social pressure. The competitiveness of corporate entities in Bangladesh can be improved by involving more emerging concerns of CSR issues. It is no more with expectations; rather, the responses should be more efficient and effective. Though the researchers in Bangladesh are interested in this topic, research at both academic and business levels is largely absent here.

Another research work by Julie (2002) on 'Corporate Social Responsibility in Bangladesh: Barriers and Opportunities experienced by SMEs when undertaking CSR' stated that the people of business enterprises have to be convinced that the arguments in favour of CSR practices are exaggerated. Instead, companies are aware that they can contribute to sustainable development by managing their operations in such a way to enhance economic growth, increase competitiveness, ensure environmental protection and promote social rights. Thus corporate social responsibility (CSR) is a concept whereby companies integrate social and ecological concerns into their business activities. This research has encouraged the present researcher to identify the challenges of CSR practices by the PSEs in Bangladesh.

Stoner (1997) asserted the CSR concept in the book of Management that all business organisations must recognise some social responsibility division among the various segments of the society, including government and the business community. Most managers and other people believe that the government and the business community have some responsibility to act in the interest of society. As the two most powerful institutions in the country, the sheer size of business and government obliges them to address problems of public concern. Both corporations and governments depend upon acceptance by the society they belong to.

Lamy (2002) conducted research on "The Role of Corporate Social Responsibility" by collecting a sample of 323 through convenience sampling with the key aim of identifying the critical impact of CSR in the business. He concluded that the past twenty years had seen the globalisation of trade, the increased size and influence of companies, the repositioning of government and the rise in the strategic importance of stakeholder relationships, knowledge and brand reputation.

Hoque (1995) conducted a research work on "Social Responsibility of Business: Bangladeshi Business Enterprises" by collecting a sample of 127 through purposive sampling to address the scenario of CSR and determine some recommendations for improving the situation. He concluded that the business

enterprises in Bangladesh are divided into different groups according to the size of the operation, nature of the process, ownership pattern and effort taken for the procedure. In this work, the researcher mentioned that public and private sector enterprises should perform social responsibilities in Bangladesh. Unfortunately, he identified that the businessman of Bangladesh had been ignoring those responsibilities or had miserably failed to discharge the responsibilities. He also mentioned that the factors responsible for not being socially accountable were economic, political, administrative and organisational, and the researcher provided some recommendations. That's why the present researcher has given the concentration on the private industries of Bangladesh regarding the challenges to CSR practices.

3. Objectives of the Study

The prime objective of the study is to investigate the current challenges of CSR practices by private organisations in Bangladesh. The specific objectives are: -

1. To identify the challenges to CSR practices by the private sector enterprises.
2. To determine the present status of those challenges by having a deeper insight into them.
3. To identify the ways to overcome those challenges.

4. Scope of the Study

The study concentrated on the challenges of Corporate Social Responsibility (CSR) practices by some large and medium-scale private sector enterprises in Bangladesh. Thirty companies in Bangladesh from different sectors were purposively selected for the study. The study mainly covered fourteen issues to investigate the challenges to CSR practices by the business houses in Bangladesh.

5. Methodology

This section describes the methods and procedures of developing and administering the questionnaires and data collection procedures used to investigate challenges to CSR practices and other necessary answers to the related questions regarding this study.

5.1 The Sample and their Selection

The focus of the study is mainly directed to challenges of CSR practices by sampled enterprises primarily based on primary data. The random sampling method was used to select the sample for this study. Thirty business houses from different industries were set as sample organisations for the current study. All the sample enterprises in this study are engaged in business activities, including producing and selling goods, importing raw materials from abroad, and offering services to the people of the society in various forms. Samples selected for the study covered banks, Financing companies, Real Estate, Insurance, Health Care organisations,

Food and Beverage, Textile, Telecom companies, Pharmaceutical companies, and Steel Mill to fulfil the study's objectives. Most of the companies are renowned and famous to the customers and society in their respective industries, among which some secured the leading position from the viewpoint of market share. In selecting the sample enterprises for this study, the size and numbers of employees of the organisations were important considering factors.

5.2 Questionnaire Design, Pilot Study and Data Collection

For collecting the primary data, top/mid-level executives from sampled organisations were selected regarding challenges to CSR practices by their respective organisations. About three months (from January 2017 to March 2017) were dedicated to collecting primary data for this study and serving this study's purposes. Before administering the final questionnaires, a pilot survey was conducted to check question design, clarity of instructions and the time to complete the questionnaires. To meet the study's objectives, questionnaires for the executives were developed and pre-tested. The following steps were taken in producing the questionnaires. Firstly, the questionnaire was given to six fellow researchers at different universities who commented on the design and clarity of the instrument. Finally, a participating pre-test was conducted with four participants (executives working at other organisations of different professions).

Questions were multiple choices on a five-point Likert's scale on agreement or disagreement and the extent from highest to lowest. Twenty-three executives were provided questionnaires and interviewed personally to collect data for this study. To explain the relevant issues, this study is partly based on secondary information that has been obtained from different sources like websites, research articles, published journals of several universities and organisations, and thesis papers. The researcher carefully studied the related text, annual reports of different organisations, and other pertinent documents regarding CSR to serve the purpose of the research.

Table 1: List of Sample Enterprises with their Categories

Sample	Name of the Private Enterprises	Category
Sample 1	Apollo Hospital Ltd. Dhaka	Health
Sample 2	United Hospital Dhaka	
Sample 3	Robi (Axita)	Telecommunication
Sample 4	Banglalink	
Sample 5	Grameen Phone	
Sample 6	Dutch Bangla Bank Ltd.	Banking sector
Sample 7	Standard Chartered Bank	
Sample 8	HSBC	
Sample 9	Beximco Pharmaceuticals Limited	Pharmaceuticals
Sample 10	Square Pharmaceuticals Ltd	
Sample 11	KSRM	Steel
Sample 12	Bangladesh Steel Re-rolling Mill (BSRM)	

Sample 13	Metlife	Insurance
Sample 14	Delta Life Insurance	
Sample 15	CPDL	Real Estate
Sample 16	Equity property Management Ltd.	
Sample 17	Lanka Bangla Finance	Non-banking (Financing Sector)
Sample 18	IDLC	
Sample 19	Pran Group	Consumer Goods
Sample 20	S. Alam Group	
Sample 21	Ispahani Group	
Sample 22	KDS Textile	
Sample 23	Desh Garments	

5.3 Analysis and Interpretation Tools

In this study, qualitative and quantitative techniques have been employed to analyse and interpret collected data. Data have been analysed using descriptive statistics like mean and standard deviation to explain the respondents' answers. Respondents' views on the issue of challenges to practising CSR have been analysed using descriptive statistics. 'Statistical Packages for Social Science' (SPSS-17) has been used to analyse the collected data in this study.

6. Findings and Analysis Tools

To fulfil the study's objectives, questionnaires consist of open- and closed-ended questions. Data regarding CSR challenges and probable remedies were sought out from the respondents through questionnaires and interviews.

Table 2: Demographic Information of Respondents

Demographic characteristics	Mean (in years)	SD (in years)	N	%
Respondents' experience	18.30	6.27	----	----
Respondents' gender:				
Male	----	----	22	95.6
Female	----	----	1	4.4
Total	----	----	23	100
Respondents' position level:				
Top	----	----	7	30.4
Middle	----	----	16	69.6
Total	----	----	23	100
Respondents' Academic qualifications				
Masters	----	----	22	95.6
Others	----	----	1	4.4
Total	----	----	23	100.0

Source: *Field Study*

The respondents' average years of work experience were 18.30, with an SD of 6.27. Among 23 respondents, 22 (95.6%) were male, and only 1 (4.4%) were female. 7 (30.4%) and 16 (69.6%) were represented by the top-level and mid-Level respondents. The respondents were well educated: 22 (96.6%) had completed Master's degrees, while only 1 (4.4%) showed other higher degrees.

6.1 Descriptive Statistics of Executives' Responses Regarding Challenges to CSR Practices

Twenty-three business houses from different industries were selected as sample organisations for the current study. Samples selected for the study covered banks, Financing companies, Real Estate, Insurance, Health Care organisations, Food and Beverage, Textile, Telecom Industry, Pharmaceutical companies, and Steel Mill. Most of the companies are renowned and popular to the customers and society, among which some secured the leading position from the viewpoint of market share.

6.2 Challenges to CSR Practices

The respondents (Top & Mid-level Executives of selected enterprises) were asked to rate the different critical issues regarding challenges to CSR practices of their respective companies. A five-point Likert scale was designed to determine their response levels regarding those issues. The scale stratifies levels as SA= strongly agree; A= agree; N=neutral; D= disagree; SD= strongly disagree. The responses were as follows:

Table 3: Frequencies of Executives' Responses on Challenges to CSR Practices by the Sample Enterprises

Particulars	Corporate People Do not have Enough Experience, Skills and Patience to Practice CSR					Total	WAS	SD
	SA	A	N	D	SD			
Frequency	5	6	6	6	0	23	2.30	1.09
%	21.7%	26%	26%	26%	0%	100%		
Particulars	Expensive					Total	WAS	SD
	SA	A	N	D	SD			
Frequency	3	6	6	6	2	23	2.97	1.16
%	13.0%	26%	26%	26.6%	8.7%	100%		
Particulars	Social Involvement of the Organizations is not Encouraged by a Large Number of People in the Society					Total	WAS	SD
	SA	A	N	D	SD			
Frequency	1	6	7	5	4	23	2.73	1.14
%	4.3%	26%	30.4%	21.7%	17.4%	100%		

Source: *Field Study*

In this analysis table, executives of different organisations rated their companies under the CSR practices regarding challenges' Corporate people do not have enough experience, skills and patience to practice CSR', 'Expensive' and 'Social involvement of the organisations is not encouraged by a large number of people of the society. In this regard, among 23 respondents, 6 (26.0%) agreed, 'disagree', 6 (26%) and 7 (30.4%) were neutral on all three issues, respectively.

Table 4: Frequencies of Executives' Responses on Challenges to CSR Practices by the Sample Enterprises

Particulars	Negatively Effect of the Business Efficiency					Total	WAS	SD
	SA	A	N	D	SD			
Frequency	2	4	9	3	5	23	2.67	1.18
%	8.7%	17.3%	39.1%	13.3%	21.7%	100%		
Particulars	Lack of Legal Obligation by the Government					Total	WAS	SD
	SA	A	N	D	SD			
Frequency	1	7	9	4	2	23	3.13	0.94
%	4.3%	33.3%	39.1%	17.3%	8.7%	100%		
Particulars	Lack of Available Organisational Resources					Total	WAS	SD
	SA	A	N	D	SD			
Frequency	1	6	9	5	2	23	3	0.95
%	4.3%	26%	39.1%	21.7%	8.7%	100		

Source: *Field Study*

In this table, executives of different organisations rated their companies under the CSR practices regarding challenges' Negatively effect of the business efficiency', 'Lack of legal obligation by the government' and 'Lack of available organisational resources' by their respective companies. In this regard, among 23 respondents, an equal number of respondents, 9 (39.1%), agreed on 'neutral' in all three issues, respectively.

Table 5: Frequencies of Executives' Responses on Challenges to CSR Practices by the Sample Enterprises

Particulars	Decreases the Profitability of the Organization					Total	WAS	SD
	SA	A	N	D	SD			
Frequency	1	6	7	7	2	23	2.67	1.06
%	4.3%	26.0%	30.4%	30.4%	7.6%	100%		
Particulars	Cannot Relate Towards the Organizational Benefits					Total	WAS	SD
	SA	A	N	D	SD			
Frequency	2	3	9	8	1	23	2.80	0.93
%	8.6%	13.0%	39.1%	34.7%	4.3%	100%		
Particulars	More Profit Seeking Mentality					Total	WAS	SD
	SA	A	N	D	SD			
Frequency	3	6	8	6	0	23	3.20	0.96
%	13.0%	26.0%	34.7%	26.%	0%	100%		

Source: *Field Study*

In this analysis table, executives of different organisations rated their companies under the CSR practices regarding challenges- 'Decreases the organisation's profitability', 'Cannot relate towards the organisational benefits' and 'More Profit-seeking mentality'. In this regard, among 23 respondents, 7 (30.4%) and 9 (39.1%) agreed with 'disagree' in the first two issues, and 8 (34.7%) were neutral for the last issue, respectively.

Table 6: Frequencies of Executives' Responses on Challenges to CSR Practices by the Sample Enterprises

Particulars	Think Burdensome Works					Total	WAS	SD
	SA	A	N	D	SD			
Frequency	3	6	5	9	0	23	3.13	1.11
%	13%	26%	21.7%	39.1%	0%	100%		
Particulars	Lack of Government Support					Total	WAS	SD
	SA	A	N	D	SD			
Frequency	5	4	11	3	0	23	3.47	1.01
%	21.7%	17.4%	47.8%	13%	0%	100%		

Source: *Field Study*

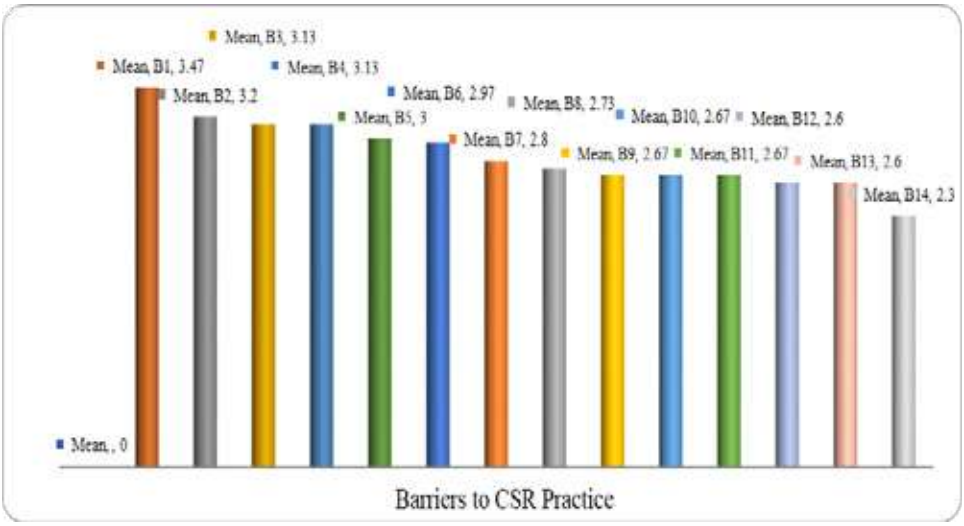
Finally, in this analysis, executives of different organisations rated their companies under the CSR practices regarding challenges 'Think burdensome works' and 'Lack of government support'. Among 23 respondents, 9 (39.0%) rated in 'disagree' and 11 (47.0%) agreed in 'neutral' respectively. Not a single respondent agreed 'strongly disagree' regarding both issues.

Table 7: The Mean, Standard Deviations of Challenges to CSR Practices by the Sample Enterprises

SL	Particulars	Executives	
		Mean	SD
C1	Lack of government support	3.47	1.01
C2	More Profit-seeking mentality	3.20	0.96
C3	Lack of legal obligation by the government	3.13	0.94
C4	Think burdensome works	3.13	1.11
C5	Lack of available organisational resources	3.00	0.95
C6	Expensive	2.97	1.16
C7	Cannot relate to the organisational benefits	2.80	0.93
C8	Social involvement of the organisations is not encouraged by a large number of people in the society	2.73	1.14
C9	Could not realise the top-Management about the importance of CSR	2.67	1.35
C10	Negatively affect the business efficiency	2.67	1.18
C11	Decreases the profitability of the organisation	2.67	1.06
C12	Negative attitude of management	2.60	1.33
C13	It creates a conflict of interest among the decision-makers	2.60	1.22
C14	Corporate people do not have enough experience, skills and patience to practice CSR	2.30	1.09

Source: *Field Study*

Figure 1: Mean of Challenges to CRS practices by the sample enterprises.



From the observation of the table, the highest mean value (3.47) is found in the challenges to CSR practising issue, 'Lack of government support'. The nearest highest (3.20) was found in the 'More Profit-seeking mentality' case. On the other hand, from the mean and SD table, the lowest mean value (2.30) was found in the case of 'Corporate people do not have enough experience, skills and patience to practice CSR', which indicated that executives considered this issue in the lowest level which was very pragmatic from the Bangladesh industrial historical point of view.

7. Discussions

Regarding challenges to CSR practices, the researcher has found that most executives' responses are not favourable to the given statements. It is clear to the researcher that among 14 comments regarding challenges to CSR practising, nine issues, i.e. expensive, cannot relate to the organisational benefits, social involvement of the organisations is not encouraged by a large number of people in the society, cannot realise by the top-management about the importance of CSR, negatively effect of the business efficiency, decreases the profitability of the organisation, negative attitude of management, create the conflict of interest among the decision-makers, and corporate people do not have enough experience-skills and patience to practice CSR, the companies think that these are not barriers to CSR practices. The sampled companies recognised four challenges to practising CSR: lack of government support, more profit-seeking mentality, lack of legal obligation by the government, and think burdensome work. One most interesting issue is that the executives are neutral about the challenges of lack of available organisational resources, which indicates a good sign of aggressively enhancing

the CSR field in today's competitive environment. It has not been surprisingly noted to the researcher that the sampled companies don't think that the money involved in the CSR practices is not expensive, which can ensure the optimism in the CSR field to the growing companies. Finally, according to the executives of sampled companies, the biggest challenge to CSR practices is 'lack of government support', which is not very much expected of an industrially developing country like Bangladesh.

8. Recommendations

Based on analyses and the findings, the following recommendations are offered for encountering challenges to the CSR practices in the private sector in Bangladesh and for Government to make policy and ensure the implementation of the same at the highest level.

1. In the year of presence competitive business field, the companies of the private sector should emphasise creating awareness of employees about environment-related issues, i.e. producing a safe product, managing waste efficiently, establishing water treatment plants, energy-saving technology, recycling facilities, renewable energy, and more on all should be environment friendly. It is of great strategic importance in the interest of long-term survival in the market.
2. Government plays a vital role in the development of the industry. In the case of CSR practices, the government may play an essential role in ensuring the private sector by providing exceptional support to the industries and investors who intensively practice CSR. These may be training programs for investors to create awareness about CSR practices, technological support by research institutes for the advancement of industrial environmental technology, free of cost, financial support for encouraging (tax holiday, low-interest rate for credit) CSR related activities, incentives and rewards programs for CSR practitioners.
3. Another significant role can be played by the government through their institutions, by making and implementing rules and regulations in favour of practising CSR by all the private sector companies compulsorily in some particulars issues which must be friendly from the investor's point of view, i.e. plantation, providing compulsory of profit for the well-being of society, green marketing etc.
4. Indeed CSR practices involve cost, but it accrues more benefits to every practising company. So the company should not consider the money involved in the CSR field as an expense. Instead, they must consider it an investment because CSR practices produce different benefits for the company, i.e. direct social involvement having long-term self-interest in business, and solving social problems can be financially beneficial. It creates goodwill among the public, and businesses can be a partner with the government. So the government

may nurture investors and managers to positively change their attitudes about CSR practice issues through some development programs.

5. Private sectors have to play a role in ensuring the knowledgeable stakeholders of society about that to enhance the business sustainability through their CSR-related works.
6. Today's world mostly depends on the availability of quality information in the correct quantity and time, so people should acquire accurate information at the right time to support long-term industrial development. On the other hand, a country's social, educational and economic development is mainly related to cultural advancement. They should emphasise cultural development through their innovative long-term programs. The people should be more conscious of their culture through the education system because, without a strong culture, no nation can be able to lay the foundation of its economic and social development.
7. Today's business is customer-oriented, so the companies should be aware of customers' expectations to strengthen their position in the market. The finding of this study indicates that company people are well-concerned regarding this issue.
8. Nurturing a positive attitude towards CSR practice could be effective in removing the current challenges

9. Implications

This study mainly tries to investigate the challenges to CSR practices to suggest ways to encounter these challenges. This study reveals some remedies to overcome the obstacles to CSR practices in Bangladesh. The result of this study is relevant and informative for the private sector, government, policymakers, the managers etc. This study was primarily conducted based on executives' perceptions of selected private sector enterprises. Hence, their perceptions and suggestions are essential to the concerned authorities of established private enterprises, government institutions and other organisations. Policymakers can consider the factors while making related regulatory policies and frameworks to enhance CSR practices in the private sector. On the other hand, the business authorities and other institutions can appraise the findings of this study while formulating their business strategies.

10. Limitations and Direction for Future Research

The study has some limitations. Identifying the challenges to CSR practices by the PSEs requires some valuable tools. Although some tools and techniques for determining the challenges to CSR practices were developed in western countries, applying such devices in developing countries like Bangladesh is questionable or impossible to identify correctly. Furthermore, because of limited practices and consciousness about the challenges to CSR practices in Bangladesh, it was tough to get an opinion from executives of Bangladesh on most of the issues practised

in developed countries' industries. Moreover, the opinion collected from the executives and employees might be biased toward their own enterprise's practices. Subsequent studies could investigate challenges to CSR practices by both public and private sectors longitudinally. Future research would benefit from a larger sample size, using various samples. The current research did not study the public sector enterprises. Hence, research on comparative study and impacts of these two main types of public and private sector enterprises may produce more interesting results that may prove more helpful to the policymakers for taking better steps for developing the business positioning. Issues identified as challenges to CSR practices in the private enterprises and suggested problems related to overcoming these challenges may be researched distinctly to produce better results that will be more specific.

11. Conclusion

The economic dependency of Bangladesh over the last two to three decades has been shifting from agriculture to the industrial sector. The industrial sector contributes a significant portion of GDP; at the same time, this sector has contributed to society in diverse ways. Continuously, the list of new investors and the investment in this sector are increasing rapidly. The investment creates employment opportunities for millions of people and contributes to the well-being of society through CSR practices. For the existence of business organisations, they must do CSR practices as one of their regular business activities in the long run. The company and government should consider emphasising equally creating awareness and making rules and regulations to encounter the challenges of CSR practices. Even though the large companies are conscious of the challenges to CSR practices in Bangladesh, the small companies are not truly aware of CSR practices and their challenges as it brings extra costs. The management of these companies should consider CSR practices as a significant investment rather than costs. In essence, support and commitment from an organisation's top management can play a vital role in practising CSR and regularly overcoming challenges.

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Maximising Demographic Dividend for Bangladesh: Policy Support, Investment Requirements to Transform the Opportunity into Reality

Mohammad Ibrahim Khalil[*]
Partha Sarathee Ghosh[**]
Syed Asrarul Haque[***]

Abstract

Bangladesh's economy is among the highest growing economies in the globe. In the last two decades, the country has been within the steady economic growth, significantly eradicating poverty. From recent economic activities and performance, it is assumed that the growth will continue and further accelerate in the coming years, where Bangladesh dreams of entering into the list of developed countries by 2041. Alongside, the country is showing its shining face to improve the human development index. Over a few decades, the decline in fertility and mortality rates and subsequent increase in the number of working-age population offered the country an opportunity for accelerated economic growth. The advantage of having more working-age people with sufficient creation of work for them can contribute to accelerated economic growth; the economists optimistically termed it a "Demographic Dividend". So, how will this demographic dividend transform Bangladesh tomorrow- that is a matter of great concern. Reaping the benefits of demographic dividend is not guaranteed or automatic. It all depends on how much the country invests in critical areas like education, health, nutrition, infrastructure, good governance etc. and whether or not there is an environment suitable for young people to contribute to the country's socio-economic growth and development. There are challenges to reap the benefits of demographic dividends-including prioritising expanding the labour market and creating mass employment through appropriate economic policies, focusing on the youth as development targets, eliminating/reducing the apparent gender gap in labour force participation, employment rates, wages and economic opportunities, job creation in rural areas, human resource development

[*] FCA, Chief Financial Officer, Bank Asia, Bangladesh. Email: khalil.ibrahim@bankasia-bd.com
[**] First Assistant Vice President, United Commercial Bank Ltd. Email: parsageco@gmail.com
[***] Chief Motion Graphic Designer, BanglaVision. Email: syedshopen@gmail.com

(ensuring good health, quality education, skill development).To overcome the challenges towards realising the window of opportunity created from the demographic dividend, the country needs decisive policies, investing in youth and skill development, enhancing health services, generating mass employment in the rural and formal sector, reducing gender gaps in education, employment, skills and in the labour markets. This paper incorporates the present status of the country's demographic benefits and how it will transform in the future. Identification of the challenges for utilising the potential of the youth population and analysing the policy support and investment areas to ensure reaping the more significant benefits of demographic dividend are also discussed in this paper.

Keywords *Demographic dividend · Youth · Policy · Bangladesh*

1. Introduction

Bangladesh, a land earned by one of the most extraordinary sacrifices in recent centuries, started her journey on 16th December 1971. The country put its steps toward future shouldering a pile of the problem, including population pressure, considered one of the most formidable hurdles for development and uplifting. Still, after 50 years of its self-governed period, the country is one of the most densely populated countries in the world, with a total population of 165 million and about 3,000 people living per square mile (World Development Indicators 2020). Despite the population pressure, the country has rapidly grown its economy in recent years. It is expected to increase its GDP by 6.8% in 2021 (ADB 2020), even though the country and other countries are undergoing the cold periphery of the Covid-19 pandemic. While Bangladesh is experiencing rapid demographic changes accompanied by age-structural transitions, it is also creating a window of opportunity for potential demographic dividends over the next two to three decades.

It is a much-talked argument of social science and economics - whether population growth encourages, discourages or is independent of economic growth. However, the focus of this debate has mainly remained confined to population size and growth, giving little consideration to the population's age structure. Bringing age structure dynamics in this debate can be attributed to Coale and Hoover (1958). They argued that sustained high fertility and falling mortality burden governments and households with high youth dependency rates, lowering tax revenues and household savings. Economists have recently begun to focus on the impact of changing the age structure of the population, moving beyond the Malthusian emphasis on population growth [Mason (2005); Birdsall et al. (2001); Sachs (2002); Bloom and Canning (1999); Bloom and Freeman (1986); Bloom and Sachs (1998); and Bloom and Williamson (1998)]. The interest in the relationship between population change and economic growth has reignited because of the demographic transition in developing countries (including Bangladesh), which are experiencing declining fertility and mortality rates at varying stages.

2. Demographic Dividend and Economic Growth

Bangladesh has a relatively young population, with 34% aged 15 years and younger and just 5% aged 65 years and older. More than 65% of our population is of working age, between 15 and 64. Over the last few decades, the decline in fertility and mortality rates in Bangladesh and subsequent increase in the working-age population (15-59) relative to the dependents (0-14 and 60+) offer the country an opportunity for accelerated economic growth.

Such a large percentage of young people in any nation are expected to contribute to the country's economy. This opportunity is known as the "demographic dividend", which refers to "the economic growth potential that can result from shifts in a population's age structure, mainly when the share of the working-age population is larger than the non-working-age share of the population," as defined by the United Nations Population Fund.

Bangladesh entered this window of opportunity in the 1990s, and three variants of population measurement suggest a three-time frame for the dividend closure (SANEM-ActionAid). Bangladesh would benefit from a demographic dividend until the early 2040s. Bangladesh is expected to gain an average of 1 per cent additional yearly GDP just because of this growing working-age share (Sheikh Farid)—yet realising that potential has been one of its significant challenges.

No demographic transition results automatically in dividends, i.e., economic benefits for the country. It largely depends on the government coming out with appropriate policies to provide the abundant young population with proper education, proper healthcare, good governance, and other economic factors that may increase their productivity and job opportunities.

One key indication for moving towards a demographic dividend is the declining fertility and mortality rates. The fertility rate was 6.9 births per woman at the time of independence in 1971, which dropped to 5.3 in 1985, then fell sharply to 2.04 in 2018. Moreover, infant mortality decreased remarkably from 148.2 (per 1,000) in 1971 to 26.7 in 2018. Adult male and female mortality rates also declined markedly over this period. It indicates that Bangladesh is well in line for attaining its demographic dividends. We are at the midway point of the dividend period, and the potential remains alive until the 2040s.

One global standard measure of demographic transition is the dependency ratio, which refers to the proportion of the non-working age population to the working-age population. According to the Population Division of the Department of Economic and Social Affairs of the United Nations, the nonworking-age population refers to age groups below 20 and above 65 years. Therefore,

the 20 to 65 is considered the working population. The lower the value of the dependency ratio, the higher the dividends the economy is assumed to gain out of it, as proportionately, a greater number of people are expected to be involved in economic activities than the non-working population. The results indicate that a 10-basis point decrease in the dependency ratio, ceteris paribus, would increase the GDP by 7.2%, on average.

2.1 Demographic Dividend in Bangladesh

In all the variants of population projections, the demographic dividend in Bangladesh started in the 1990s, and according to the low variant, it will end in 2035. According to medium and high variants, it will end in 2040. So, Bangladesh has already experienced three decades of demographic dividend. The country is in the midway of a dividend period.

Today, Bangladesh is considered one of the fastest-growing economies in the world and the fastest-growing economy in South Asia. For the last decade and a half, the country has averaged above six per cent annual GDP growth, and in the previous fiscal year 2020-21, the country recorded a growth of 6.80 per cent. Our per-capita income is USD 2,554, only USD 405 in 2000. It is the 33rd largest economy in the world in nominal terms and the 31st largest by purchasing power parity. It is classified among the next eleven emerging market middle-income economies and a frontier market. We have also made spectacular progress in different socio-economic sectors, particularly in reducing extreme poverty and hunger, promoting gender equality and empowering women, ensuring universal primary education and reducing child mortality. Life expectancy exceeded 73 years from 65.32 years in 2000. For these achievements, it is assumed that demographic dividend puts its impact (which might not be the maximum) along with others. We have two to three more decades to pass on to benefit from the demographic dividend.

While we have a long list of achievements to our credit, we have failed on many fronts. We remain one of the world's poorest, most overpopulated and inefficiently governed countries. The country is still struggling with a massive pool of low-skilled workforce; about 86 per cent of the total employed population aged 15 and above are in the informal sector, which is insecure, poorly paid and has no social security, which means that they cannot contribute much to economic development. Almost one in four Bangladeshis (24.3 per cent of the population) lives in poverty, 12.9 per cent of the population live in extreme poverty, 15.2 per cent of the country's population suffer from undernourishment, while 36.1 per cent of children under the age of five face growth development issues.

Utilising the potential of the youth population remains a big challenge. The country, being in the middle of a period of demographic transition, has yet to reap the benefits of its demographic profile. The demographic dividend is not an induced phenomenon. Instead, it is a structurally given time-bound phase, which requires 'quality' human resources regarding education, health and skill. Given the

gap in policy efforts to prioritise public spending for human capital development with youths at the forefront, the country must prioritise youth development in its national plans and policies and resource allocation to reap the benefits of demographic dividend in the coming years.

3. How to Reap the Benefits of Demographic Dividends?

The demographic dividend is not a given. Shifts in the age structure of a country's population do not automatically guarantee growth. Instead, it requires investment in several areas and a set of policy commitments to manage its working-age population for productive economic output systematically. Based on data from the "Labour Force Survey 2016-17" published by the Bangladesh Bureau of Statistics (BBS) in 2018, several gaps have been chalked up on where the country should focus on gaining a boost in economic productivity, making the most of the "window of opportunity". They are the following with others:

3.1 Labour Force-employment

1. The supply of labour is quite inadequate in the absence of sufficient demand. Labour force participation in Bangladesh declined gradually from 59.3 per cent in 2010 to 58.2 per cent in 2016-17. Of the total 63.5 million labour force, 2.7 million are unemployed—which increased considerably from 2.6 million in 2010. The unemployment rate is still 4.2, which is slightly low compared to the 4.6 per cent in 2010. The proportion of jobs in the formal and informal sectors did not grow, keeping pace with the population growth. To reap the benefits of the demographic dividend, the government should prioritise expanding the labour market and creating mass employment through economic policies.
2. The youth should be the focus of development targets if we want to make the most of our demographic dividend. While the labour force participation of Bangladesh is 58.2 per cent, the rate is only 48.7 for people aged 15-29, which is a 31.6 per cent share of the total labour force. That means more than half of our younger-aged population (aged 15-29) are doing nothing—they are not employed or looking for a job. Even if an opportunity for work arises, they would not, reportedly, take the possibility either. It applies to those who are studying at the tertiary level. All possible efforts need to be made to get our youth into the labour force from the time they enter the working-age bracket (work opportunities for them also need to be increased). It is not just the labour force participation rate that is alarming; the higher unemployment rate is also largely a consequence of unemployment among youth aged 15-29. Whereas total unemployment is 4.2 per cent, the rate is 10.6 per cent among the youth. Universities should take the lead role in addressing this. More involvement of universities with "subject-related organisations" through internships and partnerships will benefit the organisations and contribute to the country's

economic output. It will also help the youth equip themselves with the skills needed for the fast-changing job market.

3. There is an apparent gender gap in labour force participation, employment rate, wages and economic opportunities for women in Bangladesh. Only 36.3 per cent of women participate in the labour force compared to the 80.5 participation rate of men. Like the total participation rate, the rate for women has also remained constant over the last decade. Nearly 81 per cent of women who do not participate in the labour force cannot work outside the home because of their role as homemakers. The high unemployment rate among women also contributes to the overall rate. Unemployment among women is 6.7 per cent compared to 3.1 per cent for men.
4. Interestingly, among the young working-age group, the rate is 15 per cent for women compared to 8.2 per cent for men. There is also a gender gap in employment: 8.2 per cent of employed women are in the formal sector compared to 17.9 per cent of men. Therefore, addressing the gender gaps in these economic indicators is a must if we want to harness the maximum benefits of the demographic dividend in Bangladesh.
5. The economic growth has also failed to create enough jobs for the millions of young Bangladeshis joining the workforce yearly. Different studies show that between 2013 and 2017, while the average annual GDP growth was 6.6 per cent, the average annual growth of jobs was only 0.9 per cent. The employment shares of the manufacturing sector declined from 16.4 per cent to 14.4 per cent. This is in addition to a decline in manufacturing jobs of 0.77 million and female employment of 0.92 million (Bangladesh Labour Force Survey cited by SANEM, 2018). The slow growth in job creation is also reflected in the declining employment elasticity over the last decade. The overall employment elasticity concerning GDP growth declined from 0.54 during 1995-2000 to 0.25 in 2010-2018. What is worrying is that the share of the youth population not in education, economic activities and training (NEET) increased from 25.4 per cent in 2013 to 29.8 per cent in 2016-17—more than one-fourth of all young people are not participating in any form of economic or educational activities. The high unemployment rate is also associated with fewer employment options in rural areas. What is surprising is that 1.8 million unemployed persons live in rural areas compared to 866,000 living in urban areas. Inequality between rural and urban areas and among income groups has been glaring, which may hamper the utilisation of the youth labour force. To seize the demographic dividend opportunity, the government should focus more on job creation in rural areas.

Our policymakers must consider that for a country where 24.3 per cent of the population lives below the national poverty line, no matter what the GDP growth rate or per-capita income is, rising income inequality and millions

of young people unemployed or underemployed point to a ticking time bomb. Moreover, our population will reach 223.5 million by 2041 and 230-240 million by 2050. As mentioned earlier, this demographic dividend is not guaranteed or automatic—dividend comes of use when jobs are created, and young people join the workforce. Therefore, if we want to reap the full benefits of the demographic dividend, we need to act fast because the demographic dividend is a one-time short-lived phenomenon that usually continues for 30 to 35 years. From 2045 to 2060, this window of opportunity to accelerate economic growth will disappear.

A BIDS research paper (Rahman, 2014) cited that the Bangladesh government and the relevant ministries have, from time to time, reiterated their commitment to the development of the young workforce. It is expected that such commitment will be followed up by adopting relevant programmes and policies. Applicable policies and programmes may be categorised into three different groups:

i. Employment generation targeted to youth,
ii. Programmes for increasing the employability of the youth labour force,
iii. Programmes to connect the youth labour force with jobs and help the job search by providing information and training.

The growing youth labour force has often been highlighted as the demographic dividend because this segment is likely to be the more dynamic labour market component. In recent years, the shortage of skilled labour for the modern sectors is being felt, and youth labour can play an essential role in this context. The younger labour force requires separate analysis because this group faces distinct types of demand, likely to be generated by different employers. The youth labour force may face additional vulnerability because of their age. Transitioning from school to the workforce is often tricky, especially for youth from low-income families, who are likely to enter the labour force earlier than others. The youth labour force did not receive adequate attention in analysing of Bangladesh's labour market.

Actual employment generation, especially for the youth, may not be cost-effectively done by the government. Public schemes may not be able to generate employment for the vast addition to the youth labour force every year. Government schemes may be adopted only as a demonstration of good practices or as part of social safety net schemes. Social protection schemes for unemployed and disadvantaged youth may come in this context. The private sector will continue to generate a significant share of incremental employment. In the following discussion, the existing policy documents are examined to highlight the policies for the benefit of the youth labour force and to provide suggestions for improvement.

3.2 Education and Skills

It is premised that demographic transition significantly affects investment in human capital. Increasing life expectancy makes parents invest more in their children's human capital as the premium of higher education increases and lasts longer. As a consequence, the labour force becomes more productive, gets higher wages, and there is an improvement in the standard of living. With the shrinking of the young population, pressure on the education system is reduced, which can help countries invest more in improving the quality of education and in higher levels, rather than investing in primary education. It cannot be emphasised enough that it is not the quantity but the quality of education that is more important for human capital formation and economic growth.

Also, our education system is not yet pro-poor, and the curriculum does not serve the goals of human development and poverty eradication. According to a World Bank report, Bangladesh's workforce of 87 million is mainly undereducated (only four per cent of workers have higher than secondary education), and the country's human capital quality is low. An internal report of the Directorate of Primary Education (DPE) of 2015 states that around 70 per cent of children are unable to read or write correctly or perform basic mathematical calculations even after five years at primary school, and most of those who graduate from primary schools do not acquire the nationally defined basic competence. While the enrolment rate is appreciably high at the primary level, many of them don't make it to secondary schools (11-15 years). The government's statistics from the Bangladesh Bureau of Educational Information and Statistics (BANBEIS) show that in 2015, the national dropout rate at the secondary level was 40.29 per cent, out of which 45.92 per cent were girls, and 33.72 per cent were boys. And currently, there are about four million children in the age group of 6-10 are out of school in Bangladesh.

Moreover, among those employed, only 5 per cent and 6 per cent have completed tertiary and higher secondary levels of education, respectively, while 26 per cent are primary graduates. It indicates a massive gap in education and skills among the employed section, automatically leading to lower wages and income. It also shows that around 30 per cent of the youth are not in education, employment or training. The government should invest more in education and skill development to build human capital. It can adopt skill development models for enhancing the skills of those out of education.

Some key factors are pivotal in facilitating the demographic transition and digitisation, such as faster urbanisation, education, and structural transformation (i.e., moving away from agriculture toward industry and service sectors). The ADBI Working Paper Series 2021 shows that the urbanisation rate almost doubled from 19.8% in 1990 to 37.4% in 2019. Moreover, the expected years of schooling (i.e., the total years of education a child can expect to receive throughout their life under the prevailing context when they enter the school) also rose from 5.6 years in

1990 to 11.6 years in 2019, revealing that an educated young population is getting prepared to attain the demographic advantages.

3.3 Health

Encashing the demographic dividend is irrevocably linked with human resource development. Good health, quality education and skilled human resources are prerequisites for such desired growth. Surprisingly, 25.3 per cent of men are out of the labour force because of illness or injury. Health promotion, especially maternal and child health, is also linked with greater productivity. The allocation proportion for the health sector as part of the total budget needs to be increased. The government has accommodated health care needs, reflected in their medium and long-term plan. The 8th Five Year Plan will increase the budget allocation of healthcare spending from 0.7% of GDP in 2019 to 2.0% of GDP by FY2025, will sharply increase health care facilities, staffing, equipment and supplies, will strengthen partnerships with the private sector, enhance district-level health care capabilities, and promote telehealth care through ICT solutions. People's access to safe water and sanitation facilities will be enhanced to improve hygiene standards and protect human health. Most importantly, the government will adopt a Universal Healthcare Policy learning from the experiences of Malaysia and Thailand and combining public and private health insurance schemes as relevant. Regarding nutrition, the 8FYP will accelerate the progress in improving child and mother nutrition with a combination of augmented supply of nutritious food in general and through school mid-day meals, education campaigns, nutrition counselling in local health clinics, and expansion of related social security programmes.

The population management effort has focused on reducing total fertility and slowing down the population growth through voluntary compliance based on education, health counselling and easy access to low-cost birth control options. This strategy has paid off handsomely as the total fertility rate fell to a low of 2.1, approaching a replacement rate population growth of 1.2% per year. The focus in the 8FYP will shift more onward, converting the population as an asset as a part of the inclusion agenda whereby the emphasis will move to managing an ageing population, reducing maternal mortality through greater access to birth attended by skilled staff, reduction in early age female pregnancies enhanced access to reproductive health education and health care, increase in female labour force participation and better use of the youth population in the development process. Indeed, proper implementation of the government plans and strategy in the health sector will help boost national health and contribute to the expected picking up of demographic dividend.

3.4 Digitisation

Fostering economic activities through digitisation requires establishing the digital infrastructure for businesses and operations, e-money transactions, a digital

payment system, and online-based platforms for providing and facilitating business services. Throughout the last decade, Bangladesh has experienced rapid growth in internet connectivity and mobile phone penetration. Furthermore, the country has also fostered the development of a support system for digital entrepreneurs that would attract the enormous young population towards attaining the advantages of digitisation and technologies.

Estimations reveal that both digitisation and the demographic transition significantly influence economic growth. ADB Working Paper results indicate that for an increase of 1 percentage point of internet users per 100 people, the GDP would increase by 0.001%, ceteris paribus. It is pretty evident as digitisation, particularly in recent times, has played an influential role in excavating new opportunities in various sectors of the economy, especially in the service sector.

4. Dividend to Disaster

Economic gains from demographic dividends are not sure, as the term might misleadingly imply. Economic returns are not solely a function of demographic dividends. For economic benefits to materialise, there is a need for policies dealing with education, public health and those promoting labour market flexibility and providing incentives for investment and savings. On the contrary, if appropriate policies are not formulated, the demographic dividend might be a cost, leading to unemployment and an unbearable strain on education, health and old age security.

So before time runs out, we must act to prepare our young people for the future world of work. Since most new jobs that will be created in the future will be highly skilled, we need to revamp our weak education system to make it more suitable for the changing times. Alongside that, we must invest much more in education, health and nutrition, infrastructure, and adopt an expansionary economic policy and create a favourable environment for local and foreign investment to increase production, productivity and consequent employment opportunities for the future workforce. If we succeed, we will ensure the prosperity of our people. And if we fail, our "demographic dividend" can become a "demographic disaster."

5. Conclusion

Reviewing the trend of economic growth over the last ten years, it can be said with certainty that the economy of Bangladesh is at a particular stage of development. The government is committed to implementing the SDGs by 2030, just as it is working to achieve the national collective goal to elevate itself to the list of developed countries in 2041. With such growth prospects, the entire financial sector must adopt a visionary action plan. Not only sound education but alertness and dedication too are most required. In other words, far-reaching ideas, programs, initiatives and priority sector-based investments are needed to move the country's economy forward. With this investment, the country's working people can make the wheel of the country's economy more dynamic in the fastest time with their

labour and talent. And a huge opportunity for us is the demographic dividend. The demographic dividend is the age difference in a country's population due to a decrease in birth rates and mortality rates.

According to economists, there are four benefits to a demographic dividend: a. Improving labour supply, b. Growth of savings c. Human capital and d. Domestic market expansion. These four benefits can be ensured if this functional youth force can be harnessed. In other words, by 2040, the opportunity to achieve Bangladesh's economic growth at lightning speed by utilising the demographic dividend will begin to decline. Currently, the number of working people in our country is about 65 per cent of the total population. The number of working people in Bangladesh is now 106.1 million (10 crores 61 lakh).

Therefore, now is the time to boost the country's economy by engaging this working population in productive socio-economic activities. For example, China, South Korea, Vietnam, Taiwan and Thailand have taken their economic position to new heights by employing demographic dividends. If the benefits of the demographic dividend can be realised, then as Bangladesh's per capita income increases, more people will be economically active, and their savings will increase. The question is where to place the appropriate use of the demographic dividend. It is recognised that the garment sector is still the primary source of export earnings in Bangladesh (86.0 per cent). It is crucial to determine which sectors outside the garment sector can be exploited to harness these working youths' potential. Therefore, it is time to formulate a roadmap for investment by designing a development curriculum. Then we must develop long, medium and short-term plans to implement the roadmap successfully. In this context, it can be said that at present, rapid investment is required in various sectors, including information and communication technology, light engineering, tourism and hospitality, agriculture and service industries. If this functional youth group of the country can be trained in these sectors through long-term planned training, then these youth groups will be able to establish their position in the country and the international arena. And soon, Bangladesh will be a middle-income country and far ahead in the list of developed countries in 2041.

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From Ashes to Achievements: Corruption is pulling back one of the achievement tools (FDI inflows) in Bangladesh

Shapan C. Majumder[*]
Farjana Layla[**]

Abstract

To draw the success story of Bangladesh in 100 years, Foreign Direct Investment will be one of the 'blood drops' as it provides many opportunities; creates employment, shares knowledge, increases specialisation and opens up more windows for regional and global trade, that are imperative to make a well-developed economy but the scenario of inward FDI in Bangladesh is not at a satisfactory level. Corruption is one of the drawbacks of this failure, while trade openness accelerates the amount of FDI inflows. This study is based on secondary data from 1986 to 2016. To examine the short-run and long-run impact of corruption and trade openness, Auto Distributed Lag (ARDL) bound test approach is used. The results reveal that in the long-run GDP, trade openness positively impacts FDI inflows, and corruption negatively affects FDI inflows in Bangladesh. Antithetically, in the short-run only trade openness positively prolongs the inward FDI. The empirical results are confirmed by robustness checking.

Keywords *Corruption . Foreign Direct Investment . Bangladesh.*

1. Introduction

Now Bangladesh is the 31st largest economy in the world and will be 28th by 2030. It is hoped that it will be the 23rd largest economy by 2050. To fulfil the goods demand of a large population, making a new position in the world market, and keep the existing situation, Bangladesh needs a considerable amount of Foreign Direct Investment. In 2018, Bangladesh received USD 3613 million, which is 68% higher

[*] Associate Professor, Department of Economics, Comilla University, Cumilla-3506, Bangladesh. Email: scmajumder_71@yahoo.com
[**] (Corresponding Author), MSS Thesis Student, Comilla University, Cumilla-3506. Email: rimu.cou@gmail.com

from 2017. However, this amount is not sufficient enough. The USA remains the largest single recipient of FDI in the world. In 2017 and 2018, it received USD 252 billion and USD 277 billion. The 2nd position was followed by China which was USD 139 billion in 2017 and USD 134 billion in 2018. Whereas India, a neighbour country of Bangladesh, received USD 42 billion in 2018 (UNCTAD, 2019).

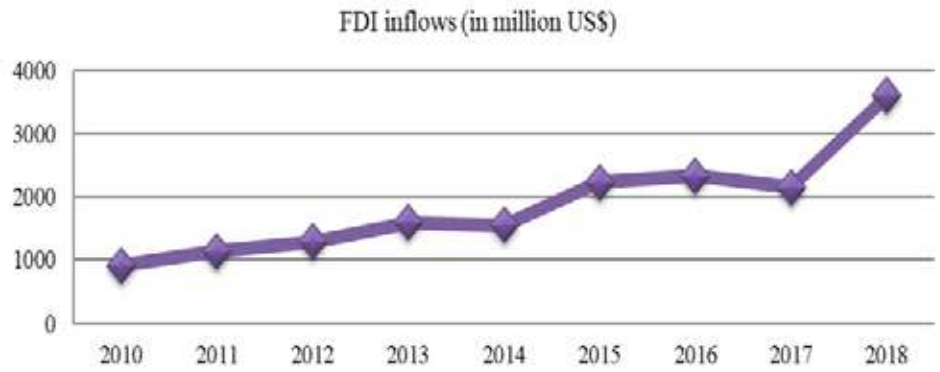
Bangladesh's Government is on the way to making 100 special economic zones by 2030 and has already been giving FDI a significant boost. Former BGMEA president Abdus Salam Murshedy said that the Bangladesh government is offering all facilities to foreign investors at SEZs to attract investment. The market economy, population and location have made Bangladesh highly important to its neighbours. The government has undertaken significant projects such as Padma Bridge, Rooppur Nuclear Power Project and LNG terminals, and these also worked as incentives for foreign investors.

The geographical position of Bangladesh is very appealing for regional trade. However, the country has not been able to take advantage of intra-regional trade. Foreign direct investment and trade openness are often seen as imperative economic indicators. From the literature, it can be stated that the higher the trade openness, the greater the FDI inflows in Bangladesh. According to a report published by the US Department of State, corruption remains a severe drawback to investment and economic growth in Bangladesh. The American Chamber of Commerce, Bangladesh (AmCham) released a report. This report reveals that corruption has a corrodent impact on the broader business market climate and opportunities for US companies in Bangladesh, and corruption deters investment and stifles economic growth.

Foreign investment has increased GDP for the most recent two decades in Bangladesh. FDI gives significant advantages such as innovation, capital, managerial aptitudes, enterprising limit and access to general markets. These recently referenced factors are fundamental for making countries industrialise and open to more work. Factors that upset FDI flows include administrative weight and insufficient physical infrastructure (Basnet& Pradhan, 2014).

Most of the monetary portions are overseen by FDI in Bangladesh. From those fragments, we can get the economic yield that is dedicated to the GDP. Right now, GDP has a prompt and circumlocutory relationship in a country. The examination will help the government and policymakers seek out the most basic division, which has more impact on economic development. From the beginning of freedom, Bangladesh began to attract FDI for money-related improvement. All through the past two decades, the flood of FDI into Bangladesh has broadly expanded because of the giving of certain offices to the foreign financial specialist, for instance, corporate duty holidays, avoidance of twofold expense appraisal, the holiday for infrastructure investment, money motivating forces and fare endowments, remittance of sway, particular skill and specialised help charges and some more.

Figure 1: Present scenario of FDI trend in Bangladesh



Source: *Bangladesh Bank, 2018*

In 2010 we received only 913. Thirty-two million USD FDI inflows and from 2011 to 2013, FDI inflows were progressing, but in 2014 the FDI inflows decreased, and the amount was 1551.28 million USD. In 2018 Bangladesh received an outstanding amount of FDI inflows of 3613.30 million USD, the highest in these decades.

Despite the way that various offices are given by the Government to the foreign investors anyway, the flood of FDI is still inadequate. In any case, there has been constantly a solid positive connection between FDI and GDP.

Table 1: Share of FDI in GDP Growth (2010- 2018)

Year	FDI Inflows percent of GDP
2010	1.07
2011	0.98
2012	1.19
2013	1.74
2014	1.47
2015	1.45
2016	0.86
2017	0.72
2018	1.07

Source: *WDI, 2018*

In Bangladesh, FDI's contribution to GDP growth is not at a satisfactory level. In 2010, the share was 1.07%, but after that, the FDI share continuously decreased except in 2013, when the FDI share upturned to 1.74%, which was unheard of in this decennary. Investment friendly environment, special economic zones, and more incentives for foreign investors are indispensable for attracting more FDI inflows.

FDI can likewise produce local investment in coordinating assets, encourage the movement of innovation and administrative abilities, increase nearby market rivalry, make current openings for work, support worldwide market access for trade wares, and so on. All of which ought to eventually add to economic development in host nations. Perceiving these benefits, developing countries have commonly eased limitations on FDI since the mid-1980s. In 2012, developing nations got the more significant part of worldwide FDI inflows ($703 billion), and upwards of 9 of the 20 biggest FDI beneficiaries were developing countries (World Bank, 2012).

Corruption is one of the obstructions that downsides FDI inflows. Bangladesh has ranked fourteenth among the most degenerate nations, as indicated by the Global Corruption Perception Index 2019 released by the Berlin-based Transparency International.

Table 2: Corruption Perception Index

Country Name	CPI 2015		CPI 2016		CPI 2017		CPI 2018	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Bangladesh	25	139	26	145	28	143	26	149
India	38	76	40	79	40	81	41	78
Pakistan	30	117	32	116	32	117	33	117
Sri Lanka	37	83	36	95	38	91	38	89

Source: *Transparency International, 2018*

In South Asia, Bangladesh ranked the second most reduced, just before war-torn Afghanistan. The CPI index, which positions 180 nations by their apparent degrees of open division corruption dependent on discoveries by universally trustworthy review sources, utilises a size of zero to 100, where zero is exceptionally degenerate, and 100 is highly corrupted. The current year's average score was 43, and Bangladesh scored 26, somewhat over a portion of the normal. The country's most recent position is thirteenth, starting from the bottom, from seventeenth in 2017. Pakistan scored 7 focuses more than Bangladesh to situate itself at 117, a spot of 32 stages in front of Bangladesh (The Daily Star, 2018). The CPI granted a score of 40, ranked 81st in 2017 and scored 41 and 78th in 2018. While India is doing not that good, it stayed to make the same score after the most recent couple of years.

The study aims to assess the behaviour of corruption and trade openness on FDI inflows in Bangladesh by establishing short-run and long-run equilibrium relationships using the ARDL approach. It attempts to forward some recommendations that may be helpful to making prosperous Bangladesh in 100 years.

2. Literature Review

2.1 Theoretical Framework of Foreign Direct Investment

Transaction Cost Approach: The exchange cost approach is spearheaded by R.H. Coase and summed up by Williamson (1979). FDI is seen as an authoritative reaction to imperfections in intermediate products, information and capital markets looked at by TNCs. The hypothesis declares that the best organisation achieves efficiency by reducing transaction costs. The foreign market accessible to a Transitional Corporation (TNC) does not want to praise the potentiality of other firms where it can profit by utilising its innovation, know-how, brand name or creation forms. The firm with this norm delivers a self-made market structure using investment in different nations, and in this manner, the firm makes the required market to fulfil its targets.

Microeconomics Theory: The microeconomic hypothesis was presented by Hymer (1960, distributed in 1976). This theory is viewed as a landmark in the quest for FDI. Hymer said that there were two reasons behind the internationalisation of organisations. One is variables related to the organisation's measurement and ownership of factors of production, and another is about the existence of market disappointments.

Internalisation Theory: Buckley and Casson (1976) conceptualised the internalisation hypothesis. The market imperfections approach to FDI is considered an internalisation hypothesis and hides exchanges inside a firm. Directing business remotely between two firms-in different nations, it appeared profitable to maximise profits by doing business inside, with national limits.

Oligopolistic Theory: Knickerbocker (1973) presented an "oligopolistic response" to clarify why firms follow their rivals into foreign markets. According to the hypothesis, FDI flows are a strategic imprint of firms in the global market. There is a reliance on the firms on other firms in the oligopoly market as one firm's decisions have an immediate impact on another firm.

Traditional Explanation of FDI: FDI can likewise be sorted dependent on the rationale behind the investment from the investment firm: Resource seeking or supply oriented - Investments that try to procure factors of creation that are more productive than those realistic in the home economy of the firm. These resources may not be accessible in the home economy by any means (for example, modest work and characteristic resources).

Market seeking- Investments that focus on either infiltrating new markets or keeping up the existing ones. FDI of this sort may likewise be utilised as a guarded methodology. It is contended that businesses are bound to be pushed towards this kind of investment out of the dread of losing a market instead of finding another one (Dunning, 1993).

Proficiency seeking – This investment will increase effectiveness by exploiting the benefits of economies of scale, scope, and joint ownership. It is recommended that this kind of FDI comes after resource or market-seeking investments have been acknowledged, with the desire to increase further the firm's profitability (Dunning, 1993).

Strategic resource seeking – FDI aims to ensure or expand the contributing firms' current explicit advantages and diminish those of their rivals.

2.2 Literature Review Related to Subject Matter

Foreign direct investment flows from nations where profitability is low to countries where profitability is high. It implies along these lines that capital is portable both broadly and globally. Here and there, the suggestion is that nations with bottomless capital should fare and countries with less capital should import. Busse and Hefeker (2008) and Gastanaga et al. (1989) examined the impacts of different institution indicators on FDI utilising panel information from 83 developing nations and 49 less-developed nations. Some years ago, no significant relationship was found between corruption and FDI. Zhao et al. (2003) likewise discovered proof of a negative connection between corruption and FDI by utilising information from 40 nations for a long time.

Egger and Winner (2006) did a comparative investigation of two-sided FDI panel information from 21 Organization for Economic Co-activity and Development (OECD) country sources and 59 beneficiaries. They discovered proof of corruption's negative impact on FDI.

In another comparable examination, Wei (2000) utilised information from 12 FDI source nations and 45 beneficiary nations and discovered the negative impact of corruption on FD Liargovas and Skandalis (2012) uncovered that trade receptiveness contributes decidedly to the inflow of FDI in developing economies over the long haul. They utilised an example of 36 developing economies from 1990 to 2008.

Sabir et al. (2018) revealed results for India, Iran, and Pakistan over the period 1982-to 2012. Fixed Effect and Pooled OLS methods are utilised to examine the panel information for estimating individual country impacts. They indicated that higher trade openness has a significant positive effect on FDI inflows. The outcomes likewise examined that FDI inflows appear to be influenced significantly by traditional determinants such as Exchange rate, Inflation and GDP per capita.

Kakar and Khilji (2011) said that trade openness and foreign direct investment are firmly related according to the economic development of Pakistan and Malaysia from 1980-to 2010. They used the Johansen co-joining test to evaluate the idea of a relationship, and the Granger causality test was used to decide the causality direction in the model.

Seyoum et al. (2013) said there is a connection between trade openness and FDI inflows in 25 Sub-Saharan African countries. They used the granger causality

test from 1977 to 2009 and found a bidirectional causal relationship between trade openness and FDI inflows in these African nations.

Canare (2017) revealed that corruption harmed inward FDI in 46 Asia and Pacific countries from 2006 to 2013.

Ohlsson (2007) showed that corruption negatively and significantly affects FDI inflows in 46 developing countries' time range from 1997 to 2004.

3. Sample and Measurement

This study is based on secondary data, ranging from 1986 to 2016. This study's dependent variable is FDI inflows (% of GDP). Independent variables consist of corruption, GDP growth, trade openness, and democratic accountability, and trade openness is the proxy for Trade % of GDP.

Table 3: Variable's Explanation

Variables	Explanation	Notation	Expected sign	Source
Gross Domestic Product % of Annual Growth	GDP growth rate is the percentage mutation in the value of the goods and services produced by a nation during a year compared to an earlier year. The GDP growth rate is used to look at the comparative progress of an economy over time.	L (GDP)	(+)	World Bank
Corruption	Corruption is behaviour that yaw from the formal duties for private gains, and it is a composition of dishonesty undertaken by a person or institution with a position of power. The greatest obstacle to economic and convivial development is the continuous practice of corruption.	L (COR)	(-)	International Country Risk Guide (ICRG)
Trade openness	**Trade openness** is the combination of economic and business policies that either intervene or attract trade between countries. Trade openness is the subject of economic benefits, including; technological transfer, skills sharing, increased labour supply, productivity improvement and thus improved economic growth and development.	(LOP)	(+)	World Bank
Democratic Accountability	In a democratic ambience, citizens can make a decision, and without angst, they can express their opinion. The government is responsible for any feedback from any decision and is answerable to its citizens. Most democratic governments respect their opposites and welcome their suggestions. Democratic accountability helps to make a peaceful nation.	L (DMA)	(+)	International Country Risk Guide (ICRG)

4. Model Specification

This study aims to model the impact of corruption on FDI inflows. So the following model proposes to explain the goal DI=f (Corruption, GDP growth, Trade openness, Democratic Accountability)

In econometrics form:

$$FDI_t = \beta_0 + \beta_1 COR_t + \beta_2 GDP_t + \beta_3 OP_t + \beta_4 DMA_t + u_t \quad \text{..... (1)}$$

By using natural logarithm form,

The econometric model is given below

$$LFDI_{i,t} = \beta_0 + \beta_1 LCOR_t + \beta_2 LGDP_t + \beta_3 LOP_t + \beta_4 LDMA_t + u_t \quad \text{..... (2)}$$

t = 1,…, T where T = 1984 to 2016, L= Natural Log. B_1 to β_4 to be estimated to find out the result, and μ_t is the error term that is normally distributed.

5. Data Analysis Technique

Eviews 9 will be used for unit root tests and econometrics analysis. Unit Root test is performed to test the stationary of the variables. It is found that variables are stationary at I (0) and I (1). It can be concluded that selected variables are static in mixed order. ARDL is performed to explain the goals. After performing ARDL, Dynamic ordinary least squares (DOLS) are performed for long-run Robustness checking.

6. Econometric Model

Engle and Granger (1987) and Johansen (1988&1991) tests are the most popular methods to check the long-run equilibrium relationship (Cointegration). These methods require all the selected variables to be stationary at first difference; I (1). The Autoregressive Distributed Lag (ARDL) bound test approach to overcome this limit. It was developed by Pesaran et al. (2001) and is the most widely accepted method. When all the variables in a model are stationary in mixed order, I (0) or I (1), then we can apply the ARDL approach. Our unit root result confirms that our selected variables are stationary in mixed order. Table 2 represents the Unit root result.

So we can apply ARDL, and our proposed ARDL model is given below:

$$\Delta L(FDI_t) = \beta_1 + \beta_{2i} \sum_{i=0}^{m} \Delta L(COR_{t-i}) + \beta_{3i} \sum_{i=0}^{m} \Delta L(GDP_{t-i}) + \beta_{4i} \sum_{i=0}^{m} \Delta L(OP_{t-i}) + \beta_{5i} \sum_{i=0}^{m} \Delta L(DMA_{t-i}) + \beta_6 L(COR_{t-1}) + \beta_7 L(GDP_{t-1}) + \beta_8 L(OP_{t-1}) + \beta_9 L(DMA_{t-1}) + \varepsilon_t \quad \text{..... (3)}$$

Where m is the optimal lag, Δ is the symbol of the first difference operator, $\beta_{2,}$ $\beta_{3,}$ $\beta_{4,}$ $\beta_{5\ are}$ short-run coefficients, and $\beta_{6,}$ $\beta_{7,}$ $\beta_{8,}$ β_9 are long-run coefficients, and ε_t is the white noise error term.

Before applying ARDL, we have tested unit root through the Augmented Dickey-Fuller test (ADF). We have conducted a bound test using F-statistics to find out about long-run cointegration. The null hypothesis is no cointegration

among variables. When F-statistics exceed the upper bound, we can reject the null hypothesis, meaning there is long-run cointegration among variables. After that, Akaike Information Criterion (AIC) is used to select the optimal lag length of variables. To estimate short-run coefficients, the proposed Error Correction Model is given below

$$\Delta L(FDI_t) = \beta_1 + \beta_{2i} \sum_{i=0}^{m} \Delta L(COR_{t-i}) + \beta_{3i} \sum_{i=0}^{m} \Delta L(GDP_{t-i}) + \beta_{4i} \sum_{i=0}^{m} \Delta L(OP_{t-i}) + \beta_{5i} \sum_{i=0}^{m} \Delta L(DMA_{t-i}) + \lambda ECT_{t-1} + \varepsilon_t$$

…….. (4)

λ is the speed of adjustment; it represents the speed at which the long-run disequilibrium of the previous year is corrected in the current year. The ECT must be negative and statistically significant.

7. Empirical Results

Unit Root Test

It is mentioned earlier that the ARDL approach relies on the order of integration of the variables. Unit root test is necessary to confirm that none of the variables is stationary at I (2). For this, we use the Augmented Dickey-Fuller method to check the stationarity of the variable, and the result is given in the below table:

Table 4: Unit Root Test Result

Variables	Level		1st Difference		Order of Integration
	Constant and No Trend	Constant and Trend	Constant and No Trend	Constant and Trend	
L (FDI)	-3.5251	-2.5812	-4.8286	-4.7621	I (0)
L (COR)	-1.3325	-2.2104	-3.7340	-3.7143	I (1)
L (GDP)	-2.3051	-4.8336	-4.9348	-4.6756	I (1)
L (OP)	-1.2730	-3.7232	-4.8535	-4.8545	I (1)
L (DMA)	-1.5363	-1.5712	-4.8034	-4.0057	I (1)

Table 3 shows that except L (FDI), all four variables are stationary at 1st difference. Now we can go for ARDL bound test approach.

Bounds Test for Cointegration: Table 3 shows the ARDL bounds cointegration test result. The result reveals that the computed F-statistics is 6.1705 higher than the upper bound at 1%, 5% and 10% critical values.

Table 5: ARDL Bounds test result

Lag	Significance Level	Pesaran et al. (2001)		F-Statistics
		Lower Bounds	Upper Bounds	
2	10%	2.45	3.52	6.170
	5%	2.86	4.01	
	1%	3.74	5.06	

The result from the table confirms to rejection of the null hypothesis. So, it can be concluded from the ARDL bounds test result that there is long-run cointegration among variables.

We used Akaike Information Criterion (AIC) to select the optimal lag length of selected variables annexed in the ARDL model.

Table 6: Estimated Long-run Coefficients of ARDL (1,2,0,2,0) Model

Variables	Coefficient	Standard Error	Prob.
Constant	-1.5656	0.2949	0.0000
L (COR)	-0.2861	0.10652	0.0146
L (GDP)	0.08914	0.04933	0.0549
L (OP)	0.07528	0.00999	0.0000
L (DMA)	0.07403	0.06173	0.2451

The above table shows the estimated long-run coefficient. According to the result, corruption is statistically significant and negatively affects Bangladesh's FDI inflows in the long run. The coefficient of corruption is -0.28610, which indicates that a 1% increase in corruption declines FDI inflows by 28.61%, which is too large.

The coefficient value of GDP growth is 0.08914, meaning that a 1% increase in GDP growth increases FDI inflows by 8.9%, which is significant at a 10% significance level.

The coefficient value of trade openness is 0.0752, meaning that a 1% increase in trade openness increases FDI inflows by 7.5% and is statistically significant at a 1% significance level.

Democratic accountability is positively correlated with FDI inflows but statistically insignificant.

Table 7: Results of Error Correction Model

Variable	Coefficient	Standard Error	Prob.
ΔL (COR)	0.14356	0.15035	0.0351
ΔL (GDP)	0.00963	0.05216	0.8555
ΔL (OP)	0.03214	0.01507	0.0463
ΔL (DMA)	0.07797	0.06476	0.2434
ECT (-1)	-1.0532	0.18675	0.0000

(R^2=0.9103, Adj. R^2 = 0.8678, DW= 1.82, F-statistic = 21.429 (Prob.= 0.0000)

The result reveals that in the short-run, none of the variables is significant except trade openness. The coefficient value of trade openness is 0.03214, which means a 1% increase in the trade openness in the short-run increases FDI inflows by 3%. ECT value indicates the speed of adjustment of the correction of disequilibrium. The coefficient of ECT is negative and statistically significant, implying no bias regarding omitting important variables and that a long-run relationship exists between dependent and independent variables. From the table, we can see that ECT is -1.0532 and statistically significant, implying that the speed of adjustment to the correction of last year's disequilibrium to reach long-run equilibrium is 105%.

Long-run Robust Testing: We use Dynamic Least Square (DOLS) to check the robustness of long-run results. The results support our ARDL long-run findings. The result of DOLS is given below:

Table 8: Results of Dynamic Least Square (DOLS)

Variable	Coefficient	Standard Error	Prob.
L (COR)	-0.36701	0.153360	0.0353
L (GDP)	0.07752	0.130961	0.065
L (OP)	0.08272	0.017381	0.0006
L (DMA)	0.051029	0.08242	0.5485
Constant	-1.5396	0.38863	0.0022

The results of DOLS are similar to the ARDL long-run estimation. Corruption has a negative and significant impact on FDI inflows. Still, trade openness has also a positive and significant impact on FDI inflows in the long run. GDP growth positively influences FDI inflows at a 10% significance level. Democratic accountability is not significant in the long –run.

Table 9: Diagnostic Tests Results

Test Statistic	Probability Value
Serial Correlation	0.7097
Normality	0.8153
Heteroscedasticity	0.4556

The results of diagnostic tests show no problem with serial correlation, heteroscedasticity, and residuals following the normality as all the p-values of the tests are more than 5%, so we can reject the null hypotheses**.**

Stability Test

Figure 2: CUSUM Test

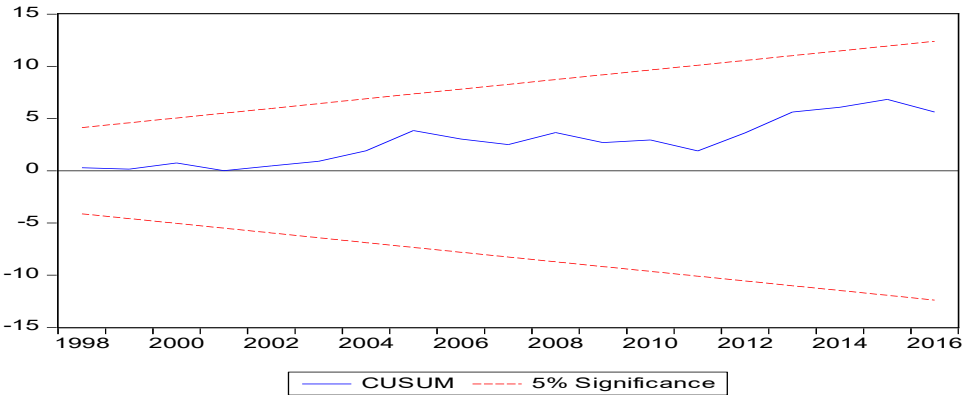
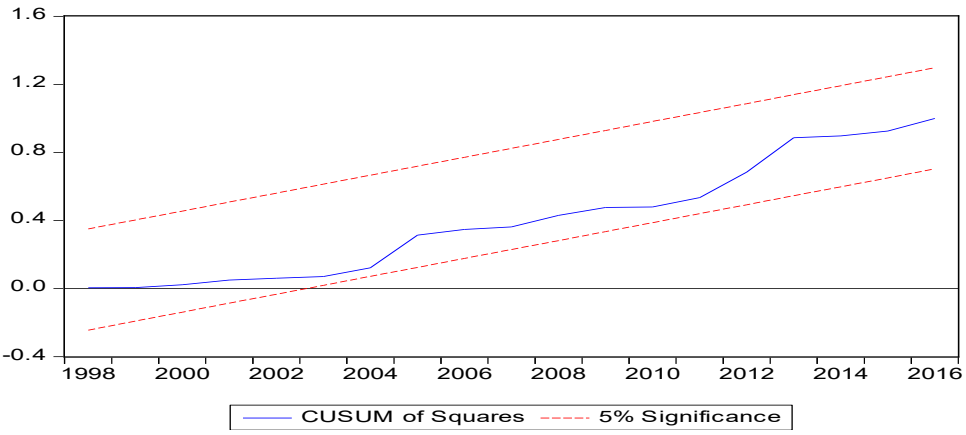


Figure 3: CUSUMSQ Test



The above figures show that CUSUM and CUSUMSQ are within the critical 5% bound and confirm the stability of the coefficients.

8. Conclusion and Recommendations

The main finding of this research is that corruption and trade openness affect the attraction of FDI inflows in Bangladesh. Corruption negatively and significantly influences the FDI inflows, and trade openness positively and significantly impacts the FDI inflows in Bangladesh. The positive and significant results of trade openness indicate that over the last three decades, policies, incentives and initiatives regarding trade openness have contributed much towards creating investment and a business-friendly environment; in this way, it is capturing more FDI inflows in Bangladesh. Regarding the significant and negative results of corruption, it can be stated that there is a lack of transparency and accountability

and rampant corruption in the tax and customs sectors which make the vulnerable situation for foreign investors.

The weak significance of GDP growth indicates that GDP growth has a lesser impact on FDI inflows which is not surprising. It can happen due to the composition of the equation, which influences both the significance and direction of the relationship between FDI inflows and selected variables, and it may be due to data constraints. However, we need to make sensible macroeconomic policies to boost economic growth and increase the GDP growth, contributing to attracting FDI inflows.

In the light of the findings, this study suggests that Bangladesh needs to take effective action to control corruption and take proper steps to check and balance the unwanted factors. It will undoubtedly help enhance foreign investment and strengthen the economic growth of Bangladesh, and the dream of being a developed economy will be fulfilled in 100 years.

9. Contributions

As far as my little knowledge goes, very few studies provide such analysis regarding the level of corruption and its impact on FDI. This report can help the government of Bangladesh to understand the loopholes of corruption which may deter the smooth FDI inflows in the country and take corrective actions against corruption. This report can provide the Anti-Corruption Commission Bangladesh with valuable data, which is essential to establish a stable economic condition for the country by stabilising FDI inflows in Bangladesh. This report can also help the trade and Commerce Ministry of the country as a tool to liberalise the country's trade to attract more FDI inflows. This report will also work as a ground for future analysis of a country's foreign direct investment inflows and give insight to the future research.

10. Limitations

The present study empirically analyses the impact of corruption, trade openness, GDP growth rate and democratic accountability on FDI inflows. However, it seems complicated to deny that the current study has certain limitations. Firstly, due to the non-availability of corruption and democratic accountability data from ICRG, we cannot analyse the data after 2016. Secondly, the study is based on secondary sources, so the data's reliability cannot be confirmed.

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Appendices

Unit Root Test:

1. Cor:

Level:

Intercept without trend:

Null Hypothesis: COR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.332583	0.6012
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

**MacKinnon (1996) one-sided p-values.*

Intercept with the trend:

Null Hypothesis: COR has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.210433	0.4665
Test critical values:	1% level	-4.309824	
	5% level	-3.574244	
	10% level	-3.221728	

**MacKinnon (1996) one-sided p-values.*

1st difference:

Intercept without trend:

Null Hypothesis: D (COR) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.734021	0.0088
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

**MacKinnon (1996) one-sided p-values.*

Intercept with the trend:

Null Hypothesis: D (COR) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.714371	0.0374
Test critical values:	1% level	-4.309824	
	5% level	-3.574244	
	10% level	-3.221728	

**MacKinnon (1996) one-sided p-values.*

2. DMA:

Level:

Intercept without trend:

Null Hypothesis: DMA has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.536374	0.5018
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

Intercept with the trend:

Null Hypothesis: DMA has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.571271	0.7804
Test critical values:	1% level	-4.296729	
	5% level	-3.568379	
	10% level	-3.218382	

**MacKinnon (1996) one-sided p-values.*

1st difference:

Intercept without trend:

Null Hypothesis: D (DMA) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.083432	0.0037
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

**MacKinnon (1996) one-sided p-values.*

intercept with the trend:

Null Hypothesis: D (DMA) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.005785	0.0199
Test critical values:	1% level	-4.309824	
	5% level	-3.574244	
	10% level	-3.221728	

**MacKinnon (1996) one-sided p-values.*

3. FDI:
Level:
Intercept without trend:

Null Hypothesis: FDI has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.525150	0.0174
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

**MacKinnon (1996) one-sided p-values.*

Intercept with the trend:
Null Hypothesis: FDI has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.581280	0.0487
Test critical values:	1% level	-4.296729	
	5% level	-3.568379	
	10% level	-3.218382	

**MacKinnon (1996) one-sided p-values.*

1st difference:
Intercept without trend:
Null Hypothesis: D (FDI) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.828600	0.0007
Test critical values:	1% level	-3.711457	
	5% level	-2.981038	
	10% level	-2.629906	

**MacKinnon (1996) one-sided p-values.*

Intercept with trend
Null Hypothesis: D (FDI) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.762183	0.0040
Test critical values:	1% level	-4.356068	
	5% level	-3.595026	
	10% level	-3.233456	

**MacKinnon (1996) one-sided p-values.*

4. GDP growth
Level:
Intercept without trend:

Null Hypothesis: GDP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.305194	0.1769
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

**MacKinnon (1996) one-sided p-values.*

Intercept with the trend:

Null Hypothesis: GDP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.833664	0.0028
Test critical values:	1% level	-4.296729	
	5% level	-3.568379	
	10% level	-3.218382	

**MacKinnon (1996) one-sided p-values.*

1st difference:
Intercept without trend:

Null Hypothesis: D (GDP) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.934854	0.0005
Test critical values:	1% level	-3.711457	
	5% level	-2.981038	
	10% level	-2.629906	

**MacKinnon (1996) one-sided p-values.*

Intercept with the trend:

Null Hypothesis: D (GDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.675653	0.0049
Test critical values:	1% level	-4.356068	
	5% level	-3.595026	
	10% level	-3.233456	

5. OP:
Level:
Intercept without trend:
Null Hypothesis: OP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.273029	0.6287
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

**MacKinnon (1996) one-sided p-values.*

intercept with the trend:
Null Hypothesis: OP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 7 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.723281	0.0411
Test critical values:	1% level	-4.416345	
	5% level	-3.622033	
	10% level	-3.248592	

**MacKinnon (1996) one-sided p-values.*

1st difference:
Intercept without trend:
Null Hypothesis: D (OP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.853550	0.0005
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

**MacKinnon (1996) one-sided p-values.*
intercept with the trend:
Null Hypothesis: D (OP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.854543	0.0028
Test critical values:	1% level	-4.309824	
	5% level	-3.574244	
	10% level	-3.221728	

**MacKinnon (1996) one-sided p-values.*

Optimal Lag:
VAR Lag Order Selection Criteria
Endogenous variables: FDI COR OP GDP DMA
Exogenous variables: C
Date: 03/12/20 Time: 09:42
Sample: 1986, 2016
Included observations: 29

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-192.5936	NA	0.570010	13.62715	13.86289	13.70098
1	-101.4585	144.5592*	0.006140*	9.066101*	10.48055*	9.509088*
2	-85.36765	19.97481	0.013441	9.680528	12.27367	10.49267

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

ARDL

Dependent Variable: FDI
Method: ARDL
Date: 02/21/20 Time: 22:47
Sample (adjusted): 1988, 2016
Included observations: 29 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): COR GDP OP DMA
Fixed regressors: C
Number of models evaluated: 162
Selected Model: ARDL (1, 2, 0, 2, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
FDI (-1)	-0.053260	0.186752	-0.285192	0.7786
COR	0.143563	0.150351	0.954852	0.3516
COR (-1)	-0.201271	0.227050	-0.886460	0.3865
COR (-2)	-0.243636	0.174743	-1.394252	0.1793
GDP	0.009633	0.052167	0.184659	0.8555
OP	0.032143	0.015077	2.131839	0.0463
OP (-1)	-0.003964	0.018737	-0.211561	0.8347
OP (-2)	0.051120	0.016251	3.145673	0.0053
DMA	0.077974	0.064765	1.203961	0.2434
C	-1.649083	0.409241	-4.029611	0.0007
R-squared	0.910322	Mean dependent var		0.575876
Adjusted R-squared	0.867843	S.D. dependent var		0.547858
SE of regression	0.199165	Akaike info criterion		-0.122570
Sum squared resid	0.753665	Schwarz criterion		0.348911
Log-likelihood	11.77727	Hannan-Quinn criter.		0.025092
F-statistic	21.42994	Durbin-Watson stat		1.816706
Prob (F-statistic)	0.000000			

***Note:** p-values and any subsequent tests do not account for model

Bound test

ARDL Bounds Test

Date: 02/21/20 Time: 22:47
Sample: 1988, 2016
Included observations: 29
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	6.170588	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Long-run and short-run relationship

ARDL Cointegrating And Long Run Form
Dependent Variable: FDI
Selected Model: ARDL (1, 2, 0, 2, 0)
Date: 02/21/20 Time: 22:48
Sample: 1986, 2016
Included observations: 29

Cointegrating Form

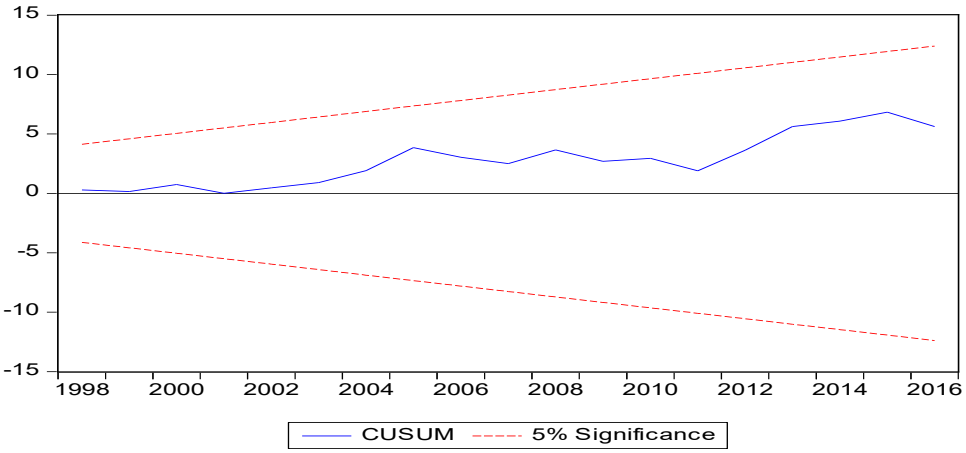
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D (COR)	0.143563	0.150351	0.954852	0.3516
D (COR (-1))	0.243636	0.174743	1.394252	0.1793
D (GDP)	0.009633	0.052167	0.184659	0.8555
D (OP)	0.032143	0.015077	2.131839	0.0463
D (OP (-1))	-0.051120	0.016251	-3.145673	0.0053
D (DMA)	0.077974	0.064765	1.203961	0.2434
CointEq (-1)	-1.053260	0.186752	-5.639885	0.0000

Cointeq = FDI - (-0.2861*COR + 0.0091*GDP + 0.0753*OP + 0.0740*DMA -1.5657)

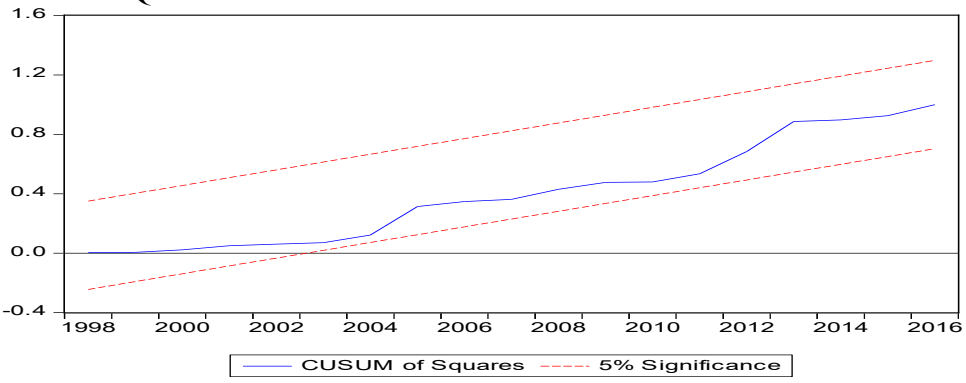
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
COR	-0.286106	0.106527	-2.685750	0.0146
GDP	0.089146	0.049325	0.185422	0.0549
OP	0.075289	0.009993	7.534133	0.0000
DMA	0.074031	0.061727	1.199340	0.2451
C	-1.565694	0.294947	-5.308395	0.0000

Diagnostic test

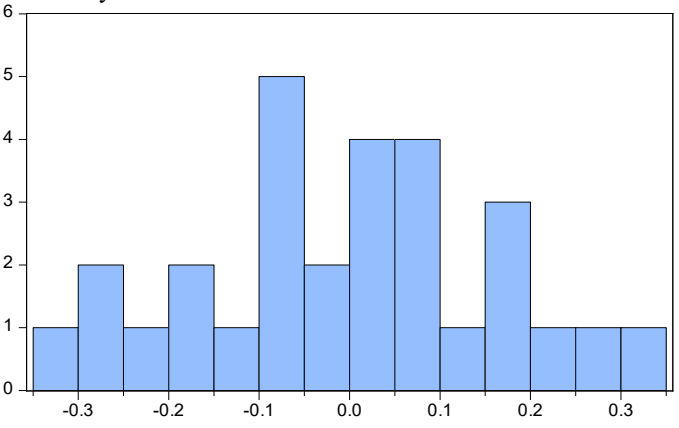
Stability Test
CUSUM Test



CUSUM SQUARE Test



Normality test



Series: Residuals	
Sample 1988 2016	
Observations 29	
Mean	-2.34e-16
Median	0.014303
Maximum	0.308994
Minimum	-0.318137
Std. Dev.	0.164063
Skewness	-0.113560
Kurtosis	2.464814
Jarque-Bera	0.408425
Probability	0.815289

Serial correlation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.205882	Prob. F (2,17)	0.8159
Obs*R-squared	0.685809	Prob. Chi-Square (2)	0.7097

Heteroscedasticity

Heteroscedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.920213	Prob. F (9,19)	0.5291
Obs*R-squared	8.803473	Prob. Chi-Square (9)	0.4556
Scaled explained SS	2.767692	Prob. Chi-Square (9)	0.9728

Robustness checking for long-run Evidence

DOLS

Dependent Variable: FDI

Method: Dynamic Least Squares (DOLS)

Date: 02/22/20 Time: 01:24

Sample (adjusted): 1988, 2015

Included observations: 28 after adjustments

Cointegrating equation deterministic: C

Fixed leads and lags specification (lead=1, lag=1)

Long-run variance estimate (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
COR	-0.367810	0.153360	-2.398341	0.0353
DMA	0.051029	0.082426	0.619090	0.5485
GDP	0.077555	0.130967	0.057685	0.0650
OP	0.082728	0.017381	4.759834	0.0006
C	-1.539611	0.388638	-3.961558	0.0022
R-squared	0.927137	Mean dependent var		0.565663
Adjusted R-squared	0.821154	S.D. dependent var		0.555092
SE of regression	0.234749	Sum squared resid		0.606180
Long-run variance	0.033187			

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Transforming Single Crop System into Double Cropping Pattern in Upper Catena of Haor Area: An Approach to Increasing Cropping Intensity, Productivity and Profitability

M. Mohiuddin[*]
M. F. Hossain[**]
M. N. Sarker[***]
Q. Naher[****]
S. Ishtiaque[*****]

Abstract

Changing single cropping patterns to two cropping patterns can play a potential role in achieving a country's food security. With this view to increase crop productivity, production efficiency, land-use efficiency, and economic return through intensifying cropping intensity as well as crop diversity by transforming a single cropping pattern into two crops, the experiment was conducted in Old Meghna Estuarine Floodplain Soils under the Agro-Ecological Zone (AEZ) 19 at the Multi-location Testing (MLT) Site, Nikli under On-Farm Research Division (OFRD) of Bangladesh Agricultural Research Institute (BARI), Kishoreganj, for three consecutive years 2017-18, 2018-19 and 2019-20. Two crops pattern Mustard-Boro rice-Fallow was tested at on-farm condition over the existing single crop pattern only Boro rice after the floodwater receded. Findings revealed that the mean crop duration of 198 days was required for one cycle in a year in an improved cropping pattern, implying that two crops-based cropping patterns were agronomically feasible to replace the existing cropping pattern. Total seed/grain yield in terms of REY of improved cropping pattern was 11.27 t/ha/year, 62% higher than the existing pattern (6.96 t/ha/year). The improved cropping pattern's mean production efficiency (64.15 kg/ha/day) and land-use efficiency (50.32%)

[*] On-Farm Research Division, Bangladesh Agricultural Research Institute, Kishoreganj. Email: mohiuddin_bari@yahoo.com.
[**] On-Farm Research Division, Bangladesh Agricultural Research Institute, Joydebpur, Gazipur.
[***] On-Farm Research Division, Bangladesh Agricultural Research Institute, Kishoreganj
[****] On-Farm Research Division, Bangladesh Agricultural Research Institute, Joydebpur, Gazipur.
[*****] On-Farm Research Division, Bangladesh Agricultural Research Institute, Joydebpur, Gazipur.

were 5% and 61%, higher than the existing cropping pattern. Results showed that the improved pattern with management practices provided an average gross return of 54, gross margin of 91 and benefit-cost ratio (BCR) of 21%, respectively higher than the farmer's pattern. Three years' results revealed that 27% extra cost provides ample scope for considerable improvement of the productivity of improved pattern with the inclusion of Mustard before Boro rice.

Keywords *Cropping intensity · Cropping pattern · Productivity · Gross margin · Haor area*

1. Introduction

Haor is a low-lying river basin in Bangladesh that generally remains underwater for about six months during the monsoon season, from April-May to September-October (Sharma, 2010). Haor covers about 859000 ha in the northeastern districts of Kishoreganj, Sunamganj, Netrakona, Moulivibazar, Sylhet, Hobiganj and Brahmanbaria to 20 million people, i.e. about 13% of the total population of Bangladesh (Ali et al., 2019). Kishoreganj is quite different from other districts of Bangladesh for its unique natural beauty characterised by haors, rivers, plain land and char areas. The total cultivated area of Kishoreganj is 386121 hectares, of which about 102057 hectares of cultivated land are single-cropped, 50874 hectares are double-cropped, and 55100 hectares are tripled cropped areas with a cropping intensity of 182 per cent (DAE, 2020). The average cropping intensity in haor areas of Kishoreganj is about 104% (DAE, 2019). The country is losing 0.49% of cultivable land every year for high population pressure and other purposes (Hasan et al., 2013). Cultivable land is declining daily, so escalating cropping intensity with more production and bringing the barren land under cultivation is the prerequisite for sustainable food security in Bangladesh. Thus, an increase in cropping intensity in rice-based

The cropping system is becoming essential for food security and poverty alleviation. To ensure the food security of the increased population, the country needs to be increased food production by increasing cropping intensity. To produce more food within a limited area, the most important options are to increase the cropping intensity and increase the individual crop's production efficiency by using optimum management practices (Mondal et al., 2015). Flash flood comes late in the upper catena part of the haor but wakes up quickly, and 10-15% of haor areas become suitable for crop cultivation in the last week of September to the second week of October (Mohiuddin and Sarker, 2019). At that time, farmers are waiting to cultivate boro rice with irrigation by deep tube well up to December second week to the first week of January. As a result, the vast area remains fallow for a long time, about 80-90 days after the floodwater receded. There is an excellent scope for introducing a short-duration crop like mustard during the fallow period to increase cropping intensity and crop productivity. Mustard is a short (76-90 days) high-value edible oilseed crop that may easily be fitted in an upper catena of haor areas before boro rice in existing fallow-boro rice-fallow cropping pattern. Potential adoption of mustard in the

fallow-boro rice-fallow cropping system would generate employment and additional income for the farmers by utilising fallow lands in the haor areas. Moreover, several studies on different cropping patterns are available in Bangladesh and India that an additional crop could be introduced without any changes or replacing the existing ones for considerable increases in productivity as well as the profitability of the farmers (Azad *et al*., 1982; Malavia *et al*., 1986; Soni and Kaur, 1984; Khan *et al.,* 2005; Nazrul *et al*., 2013; Kamrozzaman *et al.,* 2015).

2. Objectives

Although the country is nearly self-sufficient in rice production, other foods such as vegetables, pulses, oil crops etc., are still in deficit to a large extent. Therefore, crop diversification will increase cropping intensity, raise productivity, and improve farmers' economic conditions. Farmers in haor areas have been facing problems in existing cropping patterns. In contrast, they have a great potential to conduct two crops in the same piece of land in a year because 30% of lands are high and medium-high land under irrigation. But no attempt has been made for on-farm verification of two crops based on improved cropping pattern Mustard-Boro rice-Fallow in an upper catena of haor areas. Bearing the above statement in mind, the present study was, therefore, undertaken with the following objective

i. to estimate the compound growth rate of area, production and yield of mustard
ii. to find out the agronomic practices of mustard -Boro rice-Fallow cropping pattern;
iii. to examine the feasibility of mustard -Boro rice-Fallow cropping pattern in farmers' field conditions;
iv. to compare productivity and profitability of improved pattern against farmer's existing cropping pattern.

Table 1. Area, production and yield of mustard in Bangladesh

Year	Area (000' acre)	Production (000' M.T)	Yield (kg/ha)
2002	735	218	732.59
2003	690	210	751.74
2004	597	191	790.23
2005	536	183	843.30
2006	520	189	897.75
2007	577	228	976.01
2008	578	203	867.49
2009	601	222	912.37
2010	623	246	975.31
2011	682	262	948.88
2012	728	194	658.21
2013	727	296	1005.67
2014	803	359	1104.27
2015	787	362	1136.14
2016	831	363	1078.95
2017	760	352	1144
2018	667	312	1155.38
2019	764	358	1157.41
Compound growth rate (%)	0.11%	2.41%	2.30%

3. Materials and methods

The study was carried out for three consecutive years, 2017-18, 2018-19 and 2019-20, at a farmer's field, Nikli, Kishoreganj (241555.95'N latitudes and 905558.026' E longitude) located in Agro-Ecological Zone (AEZ)-19; under Old Meghna Estuarine Floodplain Soils. This trial was conducted to derive the economic consequences of two cropping patterns, viz. IP: improved pattern (Mustard-Boro rice-Fallow) and FP: farmer's pattern (Fallow-Boro rice-Fallow) by incorporating high-yielding varieties with improved management practices. In the improved pattern, mustard var. BARI Sarisha-14 was introduced during the fallow period. Boro rice var. BRRI dhan29 was used in both farmer's and improved patterns, respectively. The agronomic parameters and cultural operation for crop production under improved and farmer's practices are presented in Table 2. All farmers' field operations, management practices, and improved patterns were closely monitored, and the data were recorded for agro-economic performance. Agronomic performance viz. land-use efficiency, production efficiency, equivalent rice yield and benefit-cost ratio of cropping patterns were calculated. Land use efficiency is calculated by taking the total duration of an individual crop in a sequence divided by 365 days (Tomer and Tiwari, 1990). The following formula calculates it:

Land use efficiency= $\frac{d_1 + d_2}{365} \times 100$ Where d_1 and d_2 are the duration of the first and second crop of the pattern

Production efficiency: Production efficiency values in Kg./ha/day were calculated by total production in a cropping sequence divided by the entire duration of crops in that sequence (Lal et al., 2017; Tomer and Tiwari. 1990).

$$\text{Production Efficiency} = \frac{Y_1 + Y_2}{d_1 + d_2} \; kg/ha/day$$

Where Y_1= Yield of first crop and d_1= Duration of the first crop of the pattern; and Y_2= Yield of second crop and d_2= Duration of the second crop of the pattern.

Rice equivalent yield: For comparison between crop sequences, the yield of all crops was converted into rice equivalent yield (REY) based on the prevailing market price of the individual crop (Verma and Modgal, 1983).

$$\text{Rice equivalent yield (t/ha/yr)} = \frac{\text{Yield of individual crop} \times \text{market price of that crop}}{\text{market price of rice}}$$

The economic indices like gross return, gross margin and marginal benefit-cost ratio were also calculated based on the prevailing market price of the product. The economic analysis involved collecting data on prices and quantities of inputs used and output produced. The inputs used included seed, fertiliser, labour and insecticides. The MBCR of the farmer's prevalent pattern and any replacement for it can be computed as the marginal value product ((MVP) over the marginal value cost (MVC). The marginal product of a prevalent pattern (F) and any potential replacement (E) for it was computed as (CIMMYT, 1988).

$$\text{Marginal Benefit-Cost Ratio (MBCR)} = \frac{\text{Gross return (E) - Gross return (F)}}{\text{TVC (E) - TVC (F)}} = \frac{MVP}{MVC}$$

4. Results and Discussion

Mustard is the most dominant oilseed crop in Bangladesh and has experienced an expansion in the area, production and yield over time while facing the fierce competition for land to produce cereals, e.g., rice, wheat and maise. The total cropped area of mustard has increased from 735 thousand acres in 2002 to 764 thousand acres in 2019; production from 218 thousand metric tons to 358 thousand metric tons; and yield from 732 kg/ha to 1157 kg/ha during the same period (BBS, 2020). Mustard covers 80% of the area under oilseed crops (Miah et al., 2015). The production of high-yielding variety mustard rose sharply, while local one rose slower.

Results of three years of improved cropping pattern (Mustard- Boro rice-Fallow) and farmer's existing pattern (Fallow- Boro rice- Fallow) are presented in Tables 2 to 5.

Grain/ Seed yield

The total field duration of improved cropping pattern (IP) is 174-191 days against 110-117 days of existing farmer's pattern, indicating that mustard can easily be fitted before boro rice cultivation at upper catena of haor areas. The grain yield of boro rice in an improved cropping pattern (6.5 t/ha) was significantly higher than the farmer's existing pattern (6.43 t/ha) might be due to improved management and the residual effect of the mustard crop. Mustard seed yield at improved cropping pattern was 1.4 t/ha, 1.97 t/ha and 1.85 t/ha in the first, second and third year, respectively, with an average of 1.74 t/ha. Similar results were also obtained by Nazrul et al. (2013) and Khan et al. (2005) in the case of rice-based cropping sequences.

By-product yield

The improved cropping pattern produced a lower average rice by-product yield (3.55 t/ha) than the farmer's existing pattern (3.9 t/ha) (Table 3). It might be due to the residue of fertilisers used in mustard. In the case of mustard, the average straw yield was found to be 3.0 t/ha (Table 2), and this straw of mustard was sold as good fodder and fuel in the haor areas.

Rice equivalent yield

The improved cropping crop (IP) component crops gave higher rice equivalent yields against grain yield and by-product yields. The mean rice equivalent yield of the improved cropping pattern was (11.27 t/ha), which was 65.75% higher than the farmer's traditional cropping pattern (6.96 t/ha) in terms of grain as well as by-product yield (Table 4). Including a crop with high-yielding varieties and improved management practices in the improved pattern increased the equivalent

rice output. This finding was supported by Nazrul *et al.* (2017). The lower rice equivalent yield was obtained in the farmer's pattern with only one crop and traditional management practices in the haor areas.

Production efficiency

The improved cropping pattern's lower production efficiency was observed (Table 5). The result indicates that two crops, i.e. boro rice and mustard, remained in the field for extended periods. In the farmer's pattern, only boro rice remained for a short period, and that's why production efficiency was higher for the farmer's existing system (61.32 kg/ha/day) than for the improved pattern (61.14 kg/ha/day).

Land use efficiency

Land use efficiency is the effective use of land in a cropping year, which mainly depends on crop duration in the pattern. The average land-use efficiency indicated that the improved pattern used the land for 50.14% of the year, whereas the farmers' pattern used the land for 31.05% of the year. Land use efficiency was 61.47% higher in the improved pattern than in the farmers' pattern. This higher land-use efficiency in the improved pattern is due to the cultivation of mustard as a component crop in the fallow period.

Financial analysis

From the financial point of view, the improved cropping pattern (IP) showed its superiority over the farmer's existing cropping pattern (FP). The Gross return of the improved cropping pattern was Tk.214668, which was about 54% higher than the farmer's pattern (Table 5). The average total production cost per hectare of the improved pattern (TK. 121188) was higher than that of the farmer's pattern (TK. 95115) due to the cultivation of an additional crop (mustard) and improved management practices. The gross margin of the improved cropping pattern was 91% higher than the farmer's existing pattern due to the higher yield advantages of the component crop. Though the cost of cultivation in the improved cropping pattern was much higher, BCR was also higher (1.77) than in the farmers' pattern (1.46) due to the higher yield and the high price of mustard. The mean marginal benefit-cost ratio (MBCR) was 2.91, which indicated the superiority of the two crops' patterns over the farmers' patterns. The marginal benefit-cost ratio (MBCR) also showed that the inclusion of mustard in the existing pattern might be profitable and acceptable to the farmers. These results are supported by Mondal et al. (2015). They reported that the inclusion of T.Aus, potato, mustard and mungbean in the existing pattern was profitable and acceptable to the farmers and grown successfully one after another in the one-year cycle.

5. Conclusion

Three years study revealed that mustard could be easily fitted in the existing pattern with higher rice equivalent yield and higher benefit. Besides, the cultivation of

two crops, Mustard (var. BARI Sarisha-14)-Boro rice (var. BRRI dhan29)- Fallow pattern in a year in the same piece of land could be created more employment opportunities, as well as increased production of rice and mustard for the farmers at the same time cropping intensity and productivity, could be improved.

Table 2: Agronomic practices of improved cropping patterns (IP) and farmer's existing cropping patterns (FP) during 2017/18-2019/20

Parameters	Improved pattern (IP)				Farmer's pattern (FP)	
	Mustard	Boro rice	Fallow	Fallow	Boro rice	Fallow
Variety	BARI Sharisha-17	BRRI dhan29	Fallow	Fallow	BRRI dhan29	Fallow
Date of Sowing/ Transplanting	24 October - 03 November	19 January-04 February	-	-	25 December-10 January	-
Seed rate (kg/ha)	8	50	-	-	50	-
Planting method	Broadcast	Line	-	-	Line	-
Spacing (cm) (Row x Hill)	Broadcast	25 x 15	-	-	25 x 15	-
Fertilizer dose (kg/ha) ($NPKSZ_nB$)	115-32-40-25-2-2	140-18-53-8-3-2	-	-	150-25-60-10-5-5	-
Fertiliser application method	Half of N and all $PKSZ_n$ used as basal during final land preparation, and the rest of N fertiliser should be applied before flower initiation at 15 to 20 DAS.	All $PKSZ_n$ with one-third nitrogen was used as basal during final land preparation. Rest of one-third N was used at 15-20 DAT, and another one-third applied 5-7 days before panicle initiation.	-	-	All $PKSZ_n$ with one-third nitrogen was used as basal during final land preparation. Rest of one-third N was used at 15-20 DAT, and another one-third applied 5-7 days before panicle initiation.	-
Wedding (no.)	-	2	-	-	2	-
Insect-Pest control	IPM	IPM	-	-	Chemical	-
Harvest time (Time)	10 January-04 February	25 April-15 May	-	-	13-20 April	-
Field duration (days)	78-90	96-101	-	-	110-117	-

Note- FP: Farmer's pattern, IP: Improved pattern

Table 3: Yield of different crops under improved cropping pattern (IP) and farmer's existing cropping pattern (FP) in haor area during 2017/18-2019/20.

Parameters	year	Improved cropping pattern (IP)			Farmer's cropping pattern (FP)		
		Mustard	Boro	Fallow	Fallow	Boro	Fallow
Grain yield	2017-18	1.4	5.56	-	-	6.0	-
(t/ha	2018-19	1.97	6.8	-	-	6.0	-
	2019-20	1.85	7.15	-	-	7.3	-
	Average	1.74	6.5	-	-	6.43	-
Straw yield	2017-18	2.8	2.86	-	-	3.6	-
(t/ha)	2018-19	3.0	3.5	-	-	3.7	-
	2019-20	3.2	4.3	-	-	4.4	-
	Average	3.0	3.55	-	-	3.9	-

Table 4: Rice equivalent yield, production efficiency and land-use efficiency of an improved pattern (IP) and farmer's pattern (Average of 2017/18- 2019/20)

Parameters	Years	Mustard-Boro-Fallow (IP)	Fallow-Boro-Fallow (FP)	Increased (%)
Rice equivalent yield (t/ha)	2017-18	8.36	6.32	32.28
	2018-19	12.51	6.82	83.43
	2019-2020	12.87	7.74	66.28
	Average	11.27	6.96	61.93
Land use efficiency (%)	2017-18	47.67	30.14	58.18
	2018-19	50.41	30.96	62.83
	2019-2020	52.33	32.06	63.25
	Average	50.14	31.05	61.47
Production efficiency (kg/ha/day)	2017-18	48.05	57.46	-16.38
	2018-19	67.99	60.35	12.66
	2019-2020	67.38	66.15	1.86
	Average	61.14	61.32	-0.29

Table 5: Cost and return of improved and farmer's existing cropping pattern in haor area during 2017/18-2019/20.

Years	Parameters	Improved cropping patterns (IP)	Farmer's cropping pattern (FP)	Increased over FP (%)
2017-18	Grass return (Tk./ha)	186915	139040	34.43
	Total cost (Tk./ha)	111378	99761	11.64
	Total variable cost (Tk./ha)	100378	88761	13.09
	Gross margin (Tk./ha)	86537	50279	72.11
	BCR	1.68	1.39	20.86
2018-19	Grass return (Tk./ha)	225090	122760	83.36
	Total cost (Tk./ha)	128806	88153	46.12
	Total variable cost (Tk./ha)	117480	76827	52.91
	Gross margin (Tk./ha)	107610	45933	134.28
	BCR	1.75	1.39	25.90
2019-20	Grass return (Tk./ha)	232000	154800	49.87
	Total cost (Tk./ha)	123380	97430	26.63
	Total variable cost (Tk./ha)	112400	86450	30.02
	Gross margin (Tk./ha)	119600	68350	74.98
	BCR	1.88	1.59	18.24
Mean	Grass return (Tk./ha)	214668	138867	54.59
	Total cost (Tk./ha)	121188	95115	27.41
	Total variable cost (Tk./ha)	110086	84013	31.03
	Gross margin (Tk./ha)	104582	54854	90.66
	BCR	1.77	1.46	21.23
MBCR	2017-18	4.12	-	-
	2018-19	2.52	-	-
	2019-20	2.97	-	-
	Mean	2.91	-	-

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Single-Digit Interest Rate and Future of Bangladesh Economy: A Brief Analysis

Lizon Mia[*]
Ankan Chandra Dey[**]
Md. Tanjil Hossain[***]

Abstract

Investment plays a vital role in employment. Interest rate is the main factor that determines the investment. The government of Bangladesh has implemented a single-digit interest rate to increase investment and employment. As of July 1, 2018, the government allowance has reduced the bank interest rate to a single digit. We evaluate statistics data from 2011 to 2020 and find that investment and employment do not vary much before and after the single-digit is established. We see a slight increase in investment after setting single digits, but no change in employment.

Along with the reduction of interest rate investment climate have to be improved. Investment climate includes technological improvement, stimulus package, cost of doing business, property rights law, and good governance after implementing reduced single-digit interest rate investment. It may be for the worldwide pandemic.

Keywords *Interest rate · Single-digit interest rate · Bangladesh economy*

1. Introduction

Bangladesh is a developing country that intends to become a middle-income country by 2021; growth must be accelerated in all areas of the economy. The Central Bank plays a vital role in realising this objective by providing an effective policy promoting growth-generating economic activity while maintaining price and exchange rate stability.

One of the essential tools in the modern banking system is interest on deposits and loans. We know that interest rate dramatically impacts the economy.

[*] Post Graduate Student. Department of Economics, Jatiyo Kabi Kazi Nazrul Islam University.
[**] Post Graduate Student. Department of Economics, Jatiyo Kabi Kazi Nazrul Islam University.
[***] Associate Professor, Department of Economics, Jatiyo Kabi Kazi Nazrul Islam University.
Email: tanjilhossain@yahoo.com

If the interest rate is higher, the investment is low because the investors are reluctant to take loans at the higher interest rate. As a result, a "single-digit interest rate" is desperately needed to revitalise our economy. Even though it has been nearly two years since the government established a single-digit interest rate, only state-owned banks adhere to the law, while others refuse to do so.

Bangladesh's average GDP growth rate has been about 6% for several years, lower than many other developing countries. Bangladesh's GDP growth rate in 2020–21 is only 5.4 per cent, which is lower than the previous year's rate. During the COVID-19 period in Bangladesh, over 2.26 million individuals lost their jobs, with the World Bank reporting that 68% of persons working in urban areas lost their jobs. As a result, the poverty rate quickly increased.

As a result of the present condition of the economy of Bangladesh, to create economic growth, there needs to be an increase in investment in every sector. So, single-digit interest rates play a vital role in increasing investment rates. However, interest rates have been rising in recent months, and the authorities have been unable to bring them down, which is a barrier to economic development. Investment is critical for substantial and long-term economic growth in every economy.

To attain the required level of economic growth, policymakers frequently use investment-stimulating measures. To meet their investment desire, most investors borrow money from financial organisations. The interest rate on money borrowed from financial institutions for investment purposes is quite sensitive. Several research points to the interest rate as one of the most important factors influencing the investment. Bangladeshi investors are likewise concerned about the interest rate when making investment decisions.

Many bank authorities say that bringing down the interest rate from double-digit to single-digit is not possible in a short period at 6% and 9%, and respectively, the government set the highest deposit and advance rates. However, if this is done, it will have a negative impact on investors, particularly those at the grassroots.

Finding a good sector to invest in will be challenging for them. Bangladesh's capital market is highly volatile, and investors have lost faith in it.

Because of insecurity, many investors are also hesitant to invest in non-banking financial firms. Investors' first choice used to be government savings certificates. However, because the government has enforced some additional procedures, investing in savings has become relatively complex. It should be clear to the people because the country's people are directly and indirectly clients of the Banks, and everybody is affected by the higher interest rate. To know the problems, we must first understand the interest and its determination.

People who come to the bank to deposit their money expect to get a benefit, profit, or interest throughout the deposit period. People who borrow money from a bank, on the other hand, pay interest, profit, or cost for the money borrowed for a particular period. We all know that banks borrow money from depositors at a specific interest rate and then lend it to borrowers at a greater rate than they receive.

People who deposit money in the bank anticipate getting a benefit, profit, or interest throughout the deposit period. People who borrow money from a bank, on the other hand, must pay interest, profit, or cost for the money they borrow for a set period. We all know that banks borrow money from depositors at a fixed rate and then lend it to borrowers at a higher rate. The decision also involves two other crucial stakeholders: depositors and banks. These stakeholders are primarily responsible for the implementation issues. The depositors will undoubtedly be dissatisfied with the change because their savings will now yield lower returns.

Banks lend to the demand side and accept deposits from the supply side. Banks can lend at a lower rate if they take deposits at a lower rate. The lending rate is calculated by adding the spread to the deposit interest rate. The deposit rate of interest governs the lending rate, and it is one of the critical concerns of businesspeople to reduce the loan rate to a single digit. However, this is only achievable if the deposit rate falls into the single digits. As a result, it is evident that the interest rate on deposits in Bangladesh is currently high, and the borrowing rate is similarly high. Let us investigate the many factors behind Bangladesh's high deposit interest rate.

We can observe that the interest rate on the government's savings certificate differs from the interest rate on bank deposits. The government borrows money from citizens to fund development projects by issuing high-interest savings certificates that pay more than a bank's deposit rate. As a result, depositors prefer to buy savings certificates since they provide the best return. The banking sector in Bangladesh is overly competitive. In comparison to the economy, there are far too many banks. Over 60 banks are operating in the market. All banks are striving hard to attract market deposits. The demand for money exceeds the supply of money. It also resulted in a rise in the interest rate on deposits.

2. Literature and Inferences

Rahman & Hoque (2019) analysed that most loans, particularly in consumer credit, construction, transportation, trade, and green and SME financing, have rates well above 9%, while the weighted average deposit rate in the banking industry is far below 6%. As a result, it is reasonable to conclude that the depositor surpluses generated due to lower deposit rates are primarily divided among banks and borrowers in the form of bigger spreads or, in some situations, lower lending rates. When setting interest rates, most banks in the country consider the cost of funds, peer banks' rates, and market rates, market competition and demand and supply of

loanable funds, regulatory compliance, operating costs, assets-liabilities condition, credit risk, BB's monetary policy stance, money market situation, economic outlook and inflation movement, borrower's financial strength, NPL position, and so on. Furthermore, the advance to deposit ratio, spread, and the yield on government securities, among other things, have a considerable impact on the deposit rate. They estimated that the range for loans is 6.2 to 13.0 per cent, which means that a bank with a low cost of funds, low operating cost, low capital charge, and low-risk factors could set a lending rate as low as 6.2 per cent, while a bank with a high cost of fund, high operating cost, high capital charge, and high-risk factors would not be able to set a lending rate lower than 13.0 per cent.

Sarker (2021) reported that Bangladesh's government had announced a single-digit interest rate. Initially, most banks were reluctant to adopt a single-digit interest rate. However, most banks have now cut down deposit and lending rates to a level even far below the 6-9 per cent benchmark. The Bangladesh Bank has recently recognised the plight of specific depositors caused by declining interest on deposits and instructed the banks not to set deposit interest below the inflation rate.

Jonaed (2020) analysed that the lending rate is one of the main determinants of private investment, contributing to gross domestic product (GDP). Private investment in Bangladesh's GDP was 23.4 per cent in the 2018-19 fiscal year and is projected to be 24.2 per cent by 2019-20. Borrowers will be happy if the government can carry out the decision. Low lending rates lower the cost of doing business, encouraging more significant private investment. Growth in private investment would improve GDP and create more jobs, a key government goal. The majority of the implementation issues come from depositors and banks. As a result of the lending rate cut, demand for the loanable fund will significantly increase. The situation may lead to a significant gap between the demand and supply of loanable funds. This mismatch will intensify the liquidity crisis of banks, keeping pressure for increasing the rates. Some banks may face higher challenges in such a situation.

Mowla (2018) reported that the depositors are unwilling to deposit their money as it cuts down the interest rate. As a result, the bank faces a liquidity crisis. Because many depositors are withdrawing their money and investing in other sectors such as saving certificates. In the banking sector, the deposit rate has been falling. According to central bank data, depositors withdrew roughly a thousand crore taka between December 2017 and March 2018. The total deposit in December of the previous year was Tk 9,26,179 crore. The total amount was Tk 9,25,279 crore at the end of March. However, investors and business people were pleased with the decision because they believed that a lower interest rate would increase investment in all sectors of the economy.

Haq (2021) finds out that, due to high inflation, the single-digit interest rate primarily impacted poor and senior depositors, as most of them rely on the interest rate. A retired person with no other source of income gets about 3% of his bank savings on average, while the inflation rate consistently fluctuates around 6%.

Essentially, the retiree is left with no income at all to survive. Since August of this year, the banking industry has been struck by crises. Depositors earn negligible, and perhaps negative, returns on investment as the real interest rate for deposits falls below the inflation rate. There are countries with interest rates even lower than 1%. It may appear normal in a welfare state when a social safety net protects the people. Unfortunately, such a system does not exist in Bangladesh.

Figure 1: Interest Rate

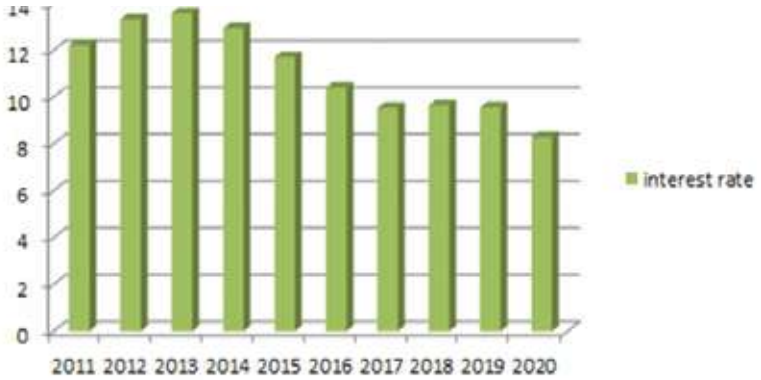


Figure 2: Investment

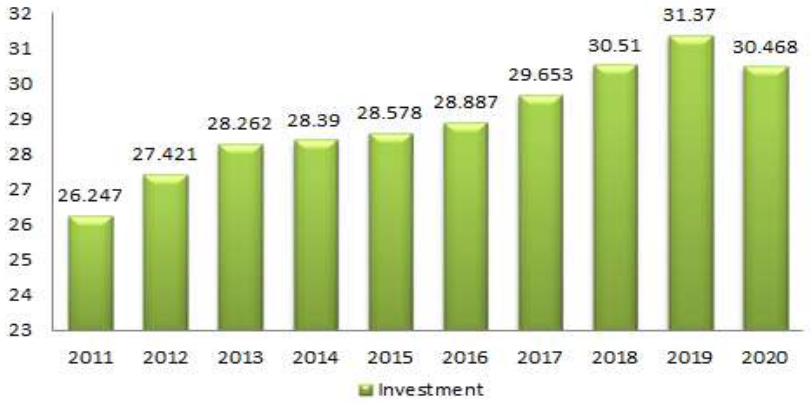
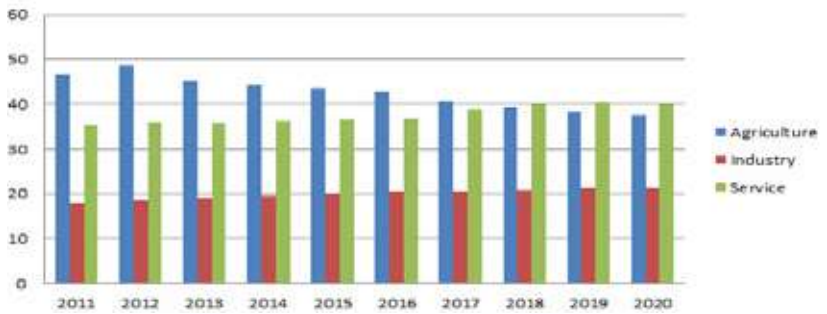


Figure 3: Employment Rate



In 2016, the interest rate was 10.41%, the investment rate was 28.887%, and the employment rate in agriculture, industry, and the service sector was 42.66 per cent, 20.46 per cent, and 36.87 per cent, respectively. In 2017, the interest rate was 9.54 per cent, the investment rate was 29.653 per cent, and the employment rate in agriculture, industry, and the service sector was 40.60 per cent, 20.42 per cent, and 38.98 per cent, respectively.

As of July 1, 2018, the government allowance has reduced the bank interest rate to a single digit. In this scenario, the government charged a 9% interest rate on loans and a 6% interest rate on deposits. We can see the difference between the economic environment before and after the single-digit interest rate was established. According to statistics, the interest rate for 2018 is 9.65 per cent. This year's investment rate is 30.51 per cent higher than the previous year. However, employment rates in the agriculture, industrial, and service sectors remain unchanged from the last year, at 39.39 per cent, 20.84 per cent, and 39.77 per cent, respectively. The interest rate for the year 2019 is 9.56 per cent. Investment rises from 30.510 per cent to 31.370 per cent, but employment rates remain unchanged at 38.30 per cent, 21.32 per cent, and 40.38 per cent in agriculture, industry, and services. The interest rate in 2020 will be 8.30 per cent. In the agriculture and service sectors, the investment rate is 30.468 per cent, and the employment rate is 37.6 per cent, 21.40 per cent, and 39.80 per cent.

We evaluate statistics data from 2011 to 2020 and find that investment and employment do not vary much before and after the single digit is established. We see a slight increase in investment after setting single digits but no change in employment.

3. Conclusion

Bangladesh Bank announced that it would establish a single-digit interest rate system to reduce interest rates to 6% for deposits; otherwise, a single-digit interest rate procedure would be impossible. The single-digit interest rate procedure becomes nearly impossible if they do not collect deposits at low-interest rates.

However, according to the only announcement from Bangladesh Bank, people will not agree to deposit at a 6% interest rate because the government does not have control over private wealth.

According to government reports, the current inflation rate is close to 6%, but this is not the case; the actual interest rate is higher than 6%. In this situation, people are not interested in keeping their money at a low-interest rate because it is a litmus test. How do they provide loans if they do not collect money? In an open market economic system, market demand determines market supply. Others have no option but to pressurise.

The first condition for establishing a single-digit interest rate is a decreased cost of funds. However, it is possible. According to a government report, the current cost of funds in a government bank is 8.25 per cent. The cost of funding for a private bank is higher than that of a government bank. As a result, if the private bank wishes to reduce its operating costs, it will be unable to do so. One factor that can significantly lower interest rates or establish single-digit interest rates is defaulted loans.

If the government can take appropriate steps to collect defaulted loans, it will benefit from providing loans because it increases bank liquid money.

It is undeniably true that establishing a single-digit interest rate in a developing country such as Bangladesh is critical. However, taking proper steps to remove all variables responsible for establishing single-digit interest rates can play a significant role in the development of economic growth. When interest rates are low, entrepreneurs are more likely to invest in various sectors, particularly small and medium-sized businesses. When investment increases, it aids in the establishment of multiple types of mills, factories, industries, and business institutions. It improves working conditions and reduces unemployment. Increased employment leads to increased savings, which leads to an increase in per capita income. As a result, single-digit interest rates play a direct role in national growth and economic development. Although establishing single-digit interest is critical, it will open up a world of opportunities for our country if the government can.

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Developing Gold and Jewellery Sector in Bangladesh: Problem Identification and Policy Recommendation

Sonjoy Chakraborty*

Abstract

Gold has always been a traditional business in Bangladesh, like the Indian subcontinent. Due to the proper attention in this sector, the gold and jewellery sector fails to harvest its potential. There is no specific policy and strong base for the development of this sector in the present situation. The raw materials, that is, gold mainly imports illegally. The paper is very much concerned with identifying the existing rules and regulations regarding the availability of gold. It is also a concern to determine the current problems and recommend appropriate policy for developing this sector. With this suggestion, the country can create more employment and GDP. It will also increase the law order situation and the reputation of the custom, law enforcing authority, and the state's overall image. The study's findings are that the market mechanism did not function in this sector. In addition, it can say that the market system leads the industry on the wrong track. The more interesting matter of the sector is - all the imported gold for commercial purposes in Bangladesh is illegal. It should have a positive externality for the producer, which would have more than the optimal output level in the gold and jewellery sector. However, the jewellery production is less than optimal, which is paradoxical to the existing theory of market failure. So, appropriate government intervention became essential. It is the second-best optimality approach for attaining the economic benefit from this sector. The paper suggests importing gold in a systematic legal way.

Keywords *Gold and jewellery sectors · Problems and policies · Bangladesh*

1. Introduction

Bangladesh is the most important country for producing and using Gems and Jewelry from very early British India and ancient India. Officially, no gold was imported into Bangladesh for commercial and industrial purposes until today,

* Deputy Secretary (Project Director), Ministry of Home Affairs, Government of the People's Republic of Bangladesh. Email: ddrpatcdhk@bpatc.org.bd

except for little importation under baggage rules and supervised bonds. Easy importation of gold is not allowed due to inadequacy of reserve, and jewellery is considered an extremely luxurious good. However, the industrial contribution of jewellery is not considered. Gold is the raw material of the gems, stone, and jewellery sector. This jewellery industry is more employment friendly as around 95% of the jewellery industry consists of small-scale operations (WGC, 2017). Today, though India has almost no raw studded jeweller left within her soil, India still produces 70% of the world's gems in quantity and 45% in value and consumes 29% of gold jewellery. Including Bangladesh, the continent is the original country that discovered gems & jewellers and initiated gem craft. Bangladesh's Gems and Jewellery Industry can achieve a position in the international market. As the government has no gold production opportunity, the raw materials of gold import are essential for the development of the industrial sector of jewellery.

Currently, the gold and jewellery sector is not standing in a very legal and proper way. But, there is a broad scope to create more employment and GDP by taking the right policy for the government of Bangladesh. Among the various strategies for developing this sector, the availability of the raw materials, that is, the availability of gold is essential through the legal channel. As, for an extended period, it was not practised to import gold in a very legal way, the government should take the measure for the availability of gold. As the market system did not function properly, government intervention is essential. It should take the appropriate policy for the development of this sector, which will increase the economic growth and the state's overall image. The paper is given attention to exploring this policy. These are significant issues for the national interest, such as economic growth, employment, law and order, and many others, but little literature is available in this specific sector. There is very little free online literature regarding the gold industry.

2. Literature Review

Very few numbers of literature are available, especially in the case of Bangladesh. Among the few pieces of literature, Yadav (2010) mentions that India is a primary source of imports for the developed countries, mainly because of the surplus or availability of skilled and cheap labour. Though India has managed to keep the world position of gold and jewellery production healthy, it faces serious competition from countries like China, Thailand, and Sri Lanka. Sultana (2015) analysed the essential factors to reveal the jewellery customer psychology. This research was gathered using a questionnaire survey from a new market, Dhaka. By analysing the demographic information, it has been observed that the majority of the customers are females who are housewives. These customers are aged between 34 to 41 years. Moreover, the customers prefer plain gold instead of other fancy jewellery items. Rozo (2016) mentions that illegal economic activities are not only associated with higher levels of violent crime but may also increase unforeseen risks and causes other negative unintended consequences for populations.

3. Statement of the Problem

Gold has always been a traditional business in Bangladesh. The artisans of this industry have a long reputation as producers of the most delicate quality gold ornaments and jewellery. But since there is no gold and jewellery policy and hard and fast rule for the import of gold in Bangladesh. The sector has not been able to flourish in a befitting manner. A realistic guideline is required to facilitate importing gold for investment, employment, export and finally, to generate more GDP. Bangladesh Jewellers Association (Bajus) has been demanding an effective gold policy to prevent gold smuggling in Bangladesh.

4. Research Objectives

1. To identify the existing problem and policy recommendations for developing the Gold and Jewelry sector in Bangladesh

Within the main objective of the research, the following issues have been addressed:

-To explore the Strategy for the Sustainable Development of the National Gold and Jeweller Sector

To assess Bangladesh's general rules and regulatory system for the Gold and Jeweller sector, including business-related gold, export, bond, warehousing regulations, tax and tariff measures, domestic and foreign trade, etc.

-To Enumerate prudent regulatory policy options for Bangladesh in the light of case studies on the global trend and best practices followed by India and other neighbouring countries.

Finally, the paper will conclude through the proposal of appropriate gold policy reform regarding the import, export, bond, warehouse tax and tariff measure, and domestic and foreign trade for the sustainable acceleration of investment in the gold and jewellery sector sustain predictably.

5. Methodology of the Study

Existing literature regarding this issue is the primary source of information for conducting the research. So, a literature survey may be an essential method for collecting this research's information or data source. Except for this, Focused Group Discussion (FGD) and Interview method will be applied for collecting information and getting the issue's real field ideas and scenarios.

The focused groups are:

1. Bangladesh Jewelry Manufacturing and Exporter's Association
2. Gold and Jewelry Associations of Bangladesh, Chittagong
3. Gold and Jewelry Associations of Bangladesh, Sylhet
4. Gold and Jewelry Associations of Bangladesh, Rajshahi
5. Officials of General Insurance Companies, Investment Development and Regulatory Authority (IDRA)

Interviewed officials are:

1. Interview of the Officials of Custom Departments (DC, Custom Mr Ziaur Rahaman)
2. Interview of the Officials of Bangladesh Bank (GM Bangladesh Bank, Mr Khurshid Wahab)

6. Internationally Gold and Jewellery -Demand, Supply, and Production

Jewellery is now-a-day is one of the manufacturing industries in the world. It is not considered the currency standard. It has many types of economic activities which generate more contribution to GDP.

The impact on the global economy of gold and jewellery is undeniable. In the form of jewellery, Consumer demand for Gold, coins, or small bars contributed $110 billion to the global economy in 2012 (World Gold Council report, 2012). As per the report, overall, the gross value added (GVA), including indirect GVA, is estimated to be more than US$210 billion across those countries in the scope of this analysis. The 15 largest gold-producing countries accounted for about three-quarters of global output. China, Australia, the six most prominent producers, the United States, Russia, Peru, and South Africa, extracted more than half of the Gold mined globally (Source link: http://www.mining.com/golds-contribution-to-the-global-economy-110-billion-67225/). Gold mining directly generated US$78.4 billion of economic output in 2012, which is equal to the GDP of Ecuador or Azerbaijan. In 2012, 13 biggest Gold consuming nations accounted for 75% of Gold used for fabrication and 81% for jewellery, coins, and small bars.

World Gold Production in 2016: South Africa was the world's dominant gold producer until 2006, but other countries with a large surface area recently exceeded South Africa. China, Russia, the USA, Peru, and Australia are the primary producers of Gold. Although, none of these countries has approached South Africa's peak production, which occurred in the 1970s. Per capita, gold demand is the highest in Hong Kong in Asian countries. As India and China are the two largest populated countries, the total market for Gold is significantly high in these two countries.

Table 1: Consumer demand per capita in selected countries (grams)

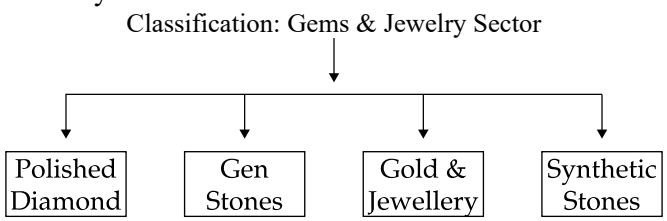
	2010	2011	2012	2013	2014	2015	2016
India	0.8	0.8	0.7	0.8	0.7	0.7	0.5
Sri Lanka	0.0	0.0	0.0	0.0	0.4	0.5	0.5
China	0.5	0.6	0.6	1.0	0.7	0.7	0.7
Hong Kong	3.4	6.2	6.9	11.9	8.5	7.2	5.8
Malaysia	0.6	0.6	0.5	0.7	0.6	0.5	0.4
Singapore	1.9	2.5	2.8	3.9	3.8	3.3	3.0
Thailand	1.1	1.7	1.6	2.3	1.6	1.3	1.2

Source: *Metals Focus; GFMS, Thomson Reuters; IMF WEO; World Gold Council*

In Bangladesh, 18-36-ton gold is required yearly to satisfy the market demand (Bangladesh Protidin, 27 November 2017, As per TIB Report). But, not a single gram of gold is imported legally for commercial purposes.

7. Gold Jewelry Industry and Its Classification

Traditionally, Bangladesh is the producer of fine-quality gold ornaments and jewellery. The artisans in this trade have long experience in making the finest Jewelry. The estimated number of artisans in Bangladesh ranges between 2-3 lakh (in 1986 from the source file:///C:/Users/Sanjay%20Chakrabarti/Desktop/Gold%20Policy1/Gold%20policy%20Bangladesh.pdf), and it increased the highest in 2010, which was around 40 lakh and again declining due to price escalation of gold in the international market. The experience of the artisans ranged from 1-to 35 years, the mean being nine years. Since its inception in 1971, Bangladesh has not imported any gold. Before independence, the State Bank of Pakistan established a quota for importing gold into the country, but since 1971 same has been cancelled. Yadav (2010) mentions that Diamonds, gems, and Jewelry have been a part of Bangladesh and Indian civilisation since its recorded history. In the Indian economic scenario, the significance of gems and Jewelry industry has been developing in the recent thirty to forty years. In the fiscal year of 1966-67, the export turnover of the Gems & Jewelry industry was just Rs 220 m, representing 3 per cent of total merchandise exports. However, it has grown to become one of India's leading export-oriented industries, recording an export turnover of around Rs 875 bn during 2006-07 and contributing 16 per cent of total exports, making it a significant foreign exchange earner for the country.



1. Polished Diamonds: Bangladesh's Diamond cutting and polishing industry are set up. Few of the sectors are going to be set up in a short time. India is one of the best markets in the world for polished diamonds for its world-class quality diamonds and delicate cutting skills. Over 83 per cent of India's Gem & Jewelry cut and polished diamonds account for exports. Jaipur and Surat are famous as world-class polishing and designing centres. As India is the nearest country to Bangladesh, the government has the same opportunity.

2. Gem Stones: This category refers to stones other than diamonds; these stones come under two basic types: precious and semi-precious. There is a massive demand for these gemstones, especially Sapphire (cobalt), Emerald (Bright

Green), and Ruby (garnet). India's exports of gems have crossed 5000000 carats, this year in the year 2010 (Yadav, 2010)

3. Gold and Jewelry: This category represents gold and jewelry manufacturing various ornaments. India consumes 29% of world jewellery alone in the world; in 2007, gold consumption in India was 850 tons, 33% up from the last year.

4. Synthetic Stones: Synthetic diamond is produced through chemical or physical processes in a laboratory. Like a naturally occurring diamond, it is composed of a three-dimensional carbon crystal. Synthetic diamonds are also called cultured diamonds. Synthetic diamond is not the same as diamond imitation, which can be made of other materials. This upcoming market is in India, which may be a powerful scope for Bangladesh.

8. Economics of Gold

Gold prices describe the actual state of the economic health of a country. When today's gold prices are high, that signals the economy is not healthy. Investors purchase gold to protect from an economic crisis or inflation. Low gold prices indicate that the economy is in good shape. Investors have many other more profitable investments like stocks, bonds, or real estate. According to a research report from Trinity College, all investors should have at least some gold in their portfolios. The report found that the best reason to buy gold is to hedge against a potential stock market crash. Gold is a haven. A haven protects investors against a possible catastrophe. That's why many investors bought gold during the 2008 financial crisis, especially in the US economy. Many others wanted to protect their investments against a possible US economic collapse. As a result of this extreme economic uncertainty, gold prices more than doubled again, from $869.75 in 2008 to a record high of $1,895 on 5 September 2011 (Source link: https://www.thebalance.com/why-invest-in-gold-3305651). Many investors want to take advantage of the fluctuation of gold prices and directly invest in gold. Others keep buying gold because they consider it a finite valuable resource with several industrial applications. Many governments and wealthy individuals also hold gold.

8.1 Gold smuggling or illegal gold import and mining

Gold is a highly scarce commodity. The number of gold swimming pools (Lamar, 2009) and almost three-quarters of the world's gold deposits have already been exhausted (WGC, CGA). Increasingly, the world now consumes more gold than ever before, producing 3,000 tons of gold per year, twice what was produced in 1970. The diminishing supply and increasing demand, combined with criminal and armed groups' quest for new sources of illicit revenue, have contributed to a surge in the illegal extraction of gold from increasingly remote and lawless regions (GITOC, 2016). The report also mentioned that in contrast to other goods produced by organised criminal groups, such as cocaine or heroin, illegally mined gold can easily be laundered to conceal its criminal origins. Unlike illicit drugs, illegally

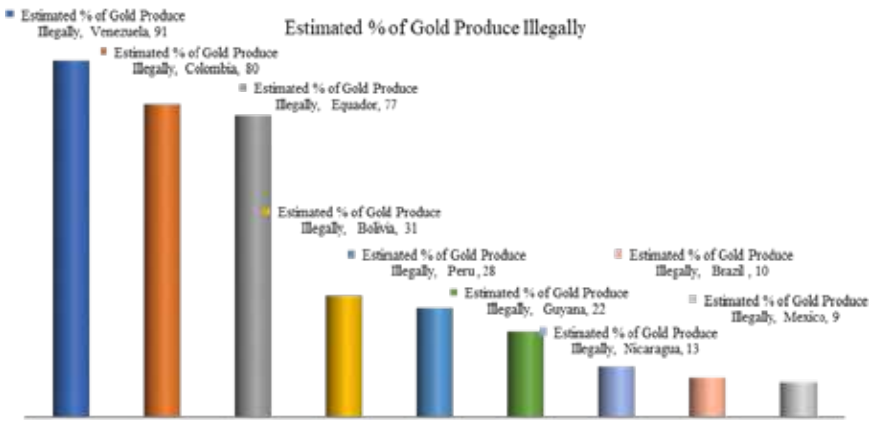
mined gold becomes a legitimate consumer commodity and moves quickly and legally across international borders. Buying illegally produced gold, companies, and central banks over vast stretches of land fomented corruption and impunity (Kepes, 2015). The countries of origin of this gold suffer enormous revenue losses as the gold is smuggled out. They cannot collect the royalties or taxes generally due on this gold. A couple of large purchasing nations have been known to fly in private aircraft with suitcases of cash. They fly back out with dozens of kilos of illegal gold by bribing a functionary who can earn the equivalent of his annual pay in one day. It is not a James Bond movie. It is the illegal gold trade. VICE NEWS, 16 February 2015, reported:

> Between July 2013 and December 2014, more than 1,667 pounds (756 kg) of gold were seized from planes and passengers at Bangladesh's airports, worth $36 million. The involvement of Biman staff in smuggling had further damaged the national air carrier's image at a time when its financial losses were already making headlines. Despite being heavily subsidised, the airline has closed several routes over the past few years. Moinul Khan, director-general of Customs Intelligence and Investigations Directorate (CIID) of Bangladesh, suggested that Biman officials were involved in the smuggling as the gold was recovered from areas of the plane about which only its crew and other airline workers would be aware. No arrests were made, however. In September of 2014, the Hindustan Times reported that about 50 tons of gold had been smuggled into India in just ten days to cater to a surge in demand during the festival of Dushhera. The report said that the gold was trafficked overland via Nepal, Bhutan, Bangladesh and Pakistan to avoid a crackdown by airport customs officials, which had seen 1166 pounds (529kg) of gold seized between April and August 2014. "Besides India, there is a domestic demand in Bangladesh, where gold is used for financing crimes," the senior customs official added. "Also, some local jewellers may be involved in smuggling as there is a persistent demand for gold jewellery in Bangladesh," he said, explaining that gold is not commercially imported into Bangladesh. In August, Bangladesh's Customs Intelligence and Investigation Directorate announced that with smuggling at "an all-time high," the Brussels-based World Customs Organization has agreed to help efforts against identified local and international gold smugglers' syndicates operating in the country. The Dhaka Metropolitan Police said that airline workers, customs and other security officials were also involved in the racket.

Illegal gold production is rampant in Latin America. In several countries, illegal and informal mines account for over 75 per cent of gold produced. In Peru and Colombia—the two largest cocaine producers in the world—the value of illegal gold exports has in recent years surpassed the value of cocaine exports, becoming the largest illicit export from these two countries 10 Illegally mined gold is "laundered" and exported, with the help of corrupt government officials, to prominent refineries in the United States, Switzerland, Italy, and the United Arab

Emirates, which supply some of the biggest central banks, jewellery companies, and electronics producers in the world. In contrast to other goods produced by organised criminal groups, such as cocaine or heroin, illegally mined gold can easily be laundered to conceal its criminal origins by buying illegal gold; companies and central banks effectively fuel conflict and finance criminal groups that subject workers to forced labour, take over vast stretches of land, and stimulate corruption and impunity (Kepes, 2015).

Figure 1: Estimated % of Gold Produce Illegally



Source: *The Nexus of Illegal Gold Mining Supply Chains Lessons from Latin America, July 2016, Available at: www.verite.org*

There are essential distinctions between informal mining and illegal mining. Illegal gold mining generally refers to gold mining in an environmentally protected area, in open violation of labour or tax rules, or by criminal organisations with no aim of formalising (GITOC, 2015). Workers hired by illegal mining are typically considered criminals rather than potential human trafficking victims. They are more vulnerable to human trafficking as a result of this prohibition. It takes attention away from the real problem: the criminal actors that control vast swaths of territory and contribute to conflict, environmental devastation, and human trafficking. Organised criminal groups, paramilitaries, and guerrillas are heavily involved in illegal gold mining in Peru and Colombia (Kepes,15), profiting from gold extraction and human trafficking and using gold to launder illicit proceeds.

Smuggling goods (such as gold) involve moving goods illegally into and out of a country. This occurs when gold is unlawfully imported into Bangladesh and exported unlawfully outside of Bangladesh in gold. From a businessman's perspective, smuggling is a hazardous endeavour. Customs can confiscate the entire consignment of goods; there can be no legal insurance for smuggled goods; there is

no legal forum for dispute resolution between parties and no legal protection from the threat of violence. From a purely economic perspective, the risks of engaging in gold smuggling are phenomenal. A rational investor, or someone motivated by self-interest and profit, would only engage in such a risky endeavour if the pay-out was significant.

As of 20 December 2017, one bhori (11.664g) of 24 karats, or pure gold, cost approximately Tk 34,662 on the international market. In contrast, one bhori of 22 karat gold was sold at Tk 42,000 in Dhaka. So, this price differential of gold is about 26-30 per cent. Since gold is a heavy and dense metal, someone can smuggle large amounts of it inconspicuously in their luggage. If someone smuggles about 15 kg of gold, they will make a gross profit of about Tk 12 million, conservatively speaking. Given the high demand for gold, smugglers can liquidate it very quickly.

On the other hand, if the neighbouring countries like India's prices become significantly higher than Bangladesh due to tariffs or other reasons, this will instigate illegal gold import and export to India. So, the country should take the strategy to equalise the price of gold to India.

An estimated 700kg of gold is smuggled into India every day. India's Financial Intelligence Unit (FIU) officials say the country has not seen such a sharp rise in contraband gold for two decades (BBC, 14 March, India, URL: http://www.bbc.com/news/world-asia-india-26511425).

Table 2: Margins Involves in Gold Import in India

Price of Gold in Dubai	-152.06 UAE Dams/gems
Conversion Rate	-17.60 Rs/Dams (Hawla Rate)
Price of Gold in Dubai	-2676 Rs/gms
Customs Duty@ 10.3%	-266.9 Rs/gms
Price of Gold in India	-3100 Rs/gms
Profit Margin (Gross)	-157 Rs/gms
Profit Margin (Gross)	-1,57,000/Kg
Profit Margin (Gross) without Customs Duty	-423900/Kgs

Source: *URL- http://trama.co.in/images/stories/File/GOLD_SMUGGLING_AND_ECONOMIC_IMPACT.pdf*

Economic Impact due to Gold smuggling

- Loss of Revenue
- Drop in Remittances
- Growth of parallel Economy and Underworld

Challenges Faced

- Creating Infrastructure to Combat Smuggling
- New Gangs/ Syndicates emerging
- Needs Clarity about policy in Long/Medium Term

Why Gold Smuggling

- To meet the demand for Gold in India

- To circumvent/ avoid Customs Duty
- A part of Hawala Transactions
- Money Laundering
- Combination of reasons cited above

There are no exact statistics on gold smuggling in Bangladesh. Siddiqui (2017, pp 147) mentions that A cumbersome import procedure and high taxes have led the Bangladeshi jewellery industry to rely heavily on smuggled gold. Currently, jewellery can import gold only by opening LC and they are required to pay tax at the rate of 58 per cent, which includes custom duty as a luxury item, supplementary duty, advance income tax, VAT, and advance trade VAT.

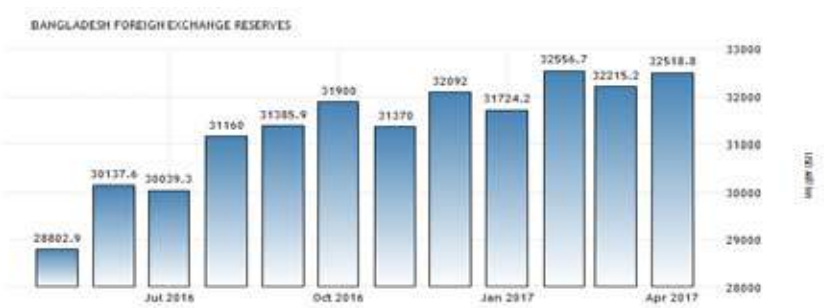
8.2 Foreign Exchange Reserves of Bangladesh and Gold Import

There is an indirect relationship between foreign exchange reserves and OFDI. As imports are always larger than exports in Bangladesh, if we calculate the export plus remittance minus imports, we can see that the trend value is always positive in Bangladesh from 2011-to 12. In such a situation, the country has sufficient foreign exchange for importing gold, which is a luxurious good.

Figure 2: Exports+ Remittance- Imports Trend of Bangladesh (Tk. In Crore)

Source: *Own Estimation from Bangladesh Bank Data*

Figure 3: Foreign Exchange Reserve Trend in Bangladesh



Source: *Bangladesh Bank*

In Bangladesh, higher forex reserves are viewed, interpreted, and ―talked about as one of the essential indicators of the nation's economic advancement. However, there are both advantages and disadvantages to holding excess reserves. The first advantage is a high level of forex reserves that allow importing essentials such as food. The second is countries maintain sizeable foreign exchange reserves as precautionary holdings. The third is a higher forex reserve is viewed as having some positive impact on sovereign credit ratings. There are a few disadvantages of holding excess reserves. These disadvantages are: First, a country's reserves held in foreign currencies may depreciate and, as a result, reduce the value of the reserves. Second, in terms of opportunity cost, maintaining higher reserves results in a low rate of return and limits domestic companies from expanding into foreign markets. These reserves could be invested in international financial markets like equities and enjoy a higher rate of return. Finally, the higher accumulation of reserves can lead to inflationary pressures in the domestic economy, influencing the exchange rate and distorting price signals that determine resource allocation (Shah & Associates (unpublished), 2014).

Because of the merits and demerits stated in the preceding sentences, a country should hold a certain adequate/optimal reserve level. There are five traditional rules for determining the adequacy reserve/ optimal reserve level. These are import cover, Short term Debt, Broad Money, Median reserve coverage ratio, and Calvo rule. According to Shah & Associates (2014), Bangladesh has an excess reserve which can be invested in foreign countries.

Table 3: The Traditional Approaches to Reserve Adequacy

SL No.	Methods	Criteria	Reserve Required to fulfil the benchmark criterion (Million US$)	Existing Reserve $ 25020 Million As of June 2015, which can cover	Reserve Surpassing the Benchmark by (Million US$)
1	Import Cover	Three months coverage of Prospective Import	10124.7	More than seven months of import	14895.3
2	Short term Debt	100% cover of Short term debt for one year	1458.1[2]	Around 1240 per cent of Short - term debt	23562
3	Broad Money	20% of Broad Money	20247.3	Around 25 per cent of broad money	4772.9
4	Median reserve coverage ratio	200% of short-term debt and six months of imports	23165.4	More than seven months of import and around 1240 per cent of Short-term debt	1854.6
5	Calvo rule	Government's external debt repayments falling due in the next 12 months should not exceed its foreign exchange reserves	1372.3	Almost 13 times of external debt repayments falling due in the next 12 months	23647.3

Source: *Shah and Associates (2014)*

In such a situation, it can be decided that the country has an adequate reserve to import the gold for the jewellery, gems and stone manufacturing industry.

8.3 Gold Price in Bangladesh

The price of gold is set twice a day by The London Gold Market Fixing Ltd. based on the basic economic principles of supply and demand. The world uses these prices to determine the price of gold. In addition to USD, the London Gold Fixing price is calculated in Bangladeshi Taka (BDT) per ounce. The price of gold is changed and calculated every 30 minutes and then updated based on live spot gold price.

Table 4: Gold Price in Bangladesh (Wednesday, 08 November 2017; 07:48 am, Dhaka time and 01:48 am, GMT)

Gold Unit (Per Ounce)	Gold Price in Bangladesh	Gold Price in USD
Gold Gram Carat 24	3,317.49	41.06
Gold Gram Carat 22	3,040.79	37.63
Gold Gram Carat 21	2,902.22	35.92
Gold Gram Carat 18	2,487.32	30.78
Gold Gram Carat 14	1,935.72	23.96
Gold Gram Carat 12	1,658.75	20.53
Gold Gram Carat 10	1,382.29	17.11

Source: Gold Price Trend (http://www.goldpricetrends.com/gold-price/bangladesh/)

Figure 4: Fluctuation of Gold Price in Bangladesh

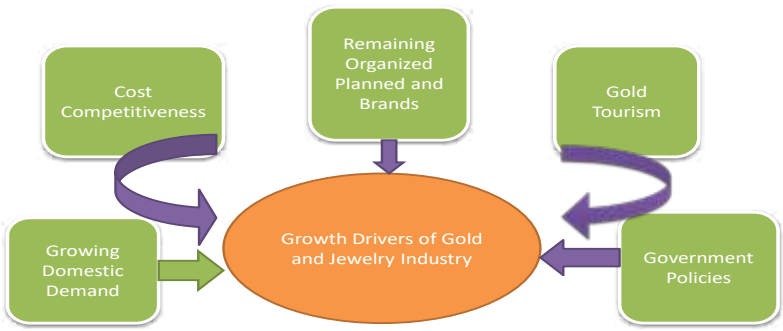
Source: *Gold Price Trend (http://www.goldpricetrends.com/gold-price/bangladesh/)*

The above figure and table show the volatility of the gold price. This price fluctuation is not only for Bangladesh but also in the international arena. It is one of the causes that the insurance company become more hesitant to take the risk during the importation of gold.

8.4 Growth Drivers of Gold and Jewellery Industry

The industry's growth drivers are factors that induce the growth of that sector efficiently and sustainably. This study has identified various growth drivers of the gems and jewellery industry. A. F. Th introduces this Modelling Tool. van der Heijden in 2005. The drivers of growth in the gems and jewellery industry are listed below:

Figure 5: Growth Drivers of Gold and Jewelry Manufacturing Industry



a. Growing domestic demand: Though the current demand for gold and Jewelry is slightly lower due to the international financial crisis and high price fluctuation of the gold in the national and international market, the domestic and international gold and jewellery demand are upward in trend. The demand for Jewelry in Bangladesh is unique. Though its price elasticity of demand is elastic, one part of the relative inelasticity of gold demand to price is explained by gold's religious and cultural significance, where gold is purchased for ornamentation and gifting purposes is deeply ingrained in the subcontinental cultural psychology.

Growing spending power: Jewelry demand in India is found to be highly correlated to GDP/capita and not as much to other consumption drivers like private financial consumption expenditure, gross domestic saving, and several high-income households (Source Link: http://www.fi cci .com/s pdocument/20332/i ndiajewelry-revi ew-2013.pdf). Though Bangladesh has no rigorous study in this area, as both the country have the same cultural heritage, it can say that the GDP growth would also increase the consumption of gold and jewellery consumption. The earning and spending capacity of the population of any country drives growth. Bangladesh's per capita and disposable income is growing consistently, and the middle-class population is also rapidly increasing; the poverty level is reducing very fast. Various studies on the expenditure behaviour of Indian consumers predict that rising income levels with population increase will lead to an overall rise in consumer spending and a shift in the consumption basket of consumers from essential products to more luxurious ones. Gems and Jewelry fall in the category of luxury goods.

Increasing female labour: Comparatively, women are more hunker after the Gold and Jewelry. Increasing female labour force participation in the last few decades and resultant financial independence will also contribute significantly to the increasing demand for gems and Jewelry.

Role of jewellery in weddings: Weddings are universally considered one of the most important events in an individual's life and are celebrated in Bangladesh with pomp and show. Gifting jewellery and other precious metals are very traditional for Bangladeshi weddings. The demand for Jewelry, in this case, is therefore wholly priced inelastic; that is, it is purchased irrespective of price fluctuations in the market.

Gold as an investment option: Two types of demand drive the Bangladesh gems and jewellery industry -investment-oriented and consumption-oriented demand. The demand for gold coins, gold bars, and some amount of Jewelry is considered investment-oriented demand.

b. Cost competitiveness: As labour cost is a significant component in production costs, Bangladesh is advantageous globally as the country is highly labour-abundant. The highly fragmented and family-run industry benefits from in-born artisanal skills passed down from generation to generation and an abundance of an informally trained skilled workforce, making labour cheap due to the inherent competition. Family-run businesses in the unorganised sector also do not require extensive infrastructure and investment in fixed assets. Thus, they can maintain lower processing/production costs due to lower indirect expenses.

c. Emerging organised sector and brands: An organised sector lift the industry in terms of best practices, better customer services, better after-sales service, and a better price command. As this sector will organise and the government is interested in formulating the policy, this sector indeed developed a matured industrial industry to contribute to the national output. Better designs and innovative marketing are the factors contributing to the growth of the organised sector. Modern segmentation methods, targeting various consumer segments with specific designs and exclusive ranges and new usage styles attract a new set of consumers and create new markets. Thus, it is essential to gain and sustain momentum in this direction and focus on consumer research & innovation in design.

d. Gold tourism: The World Gold Council, in its "Vision 2020" presented at the India International Bullion Summit 2014, has proposed the setting up a 'Gold Tourism' circuit in the country to boost the production and sales of handcrafted Jewelry made in India. Which certainly impacts the gold and jewellery sector in Bangladesh. Handmade Bangladeshi Jewelry may be favourite among tourists and obtain a better price than machine-made Jewelry. This move is expected to generate immense employment opportunities in the sector.

Industry experts have suggested various ways of promoting the gold tourism

circuit. Using Dubai as a model, where gold is a tourist attraction, it is proposed that Bangladeshi Handcrafted Jewelry can be upgraded similarly. Handicraft hubs like Kolkata, Jaipur, Ahmedabad, and Surat, the country of Bangladesh, also may be developed as tourist destinations for handcrafted Jewelry. Tourists can learn about various gems and Jewelry, while jewellers and artisans can also showcase their skills and products and sell them. The imposition of tight curbs on gold imports into the country resulted in a shortage of gold for jewellers. Industry sources indicate that the country lost many skilled artisans during the past few years. As a result, other areas of work are for their livelihood. Implementing the 'Gold Tourism Circuit' could help bring them back into the industry.

e. Government policies: Government rules and policy interventions play a vital role in the growth of the gems and jewellery industry. The Government of Bangladesh will take every possible initiative to boost this industry. This section sets out some of the policy initiatives that can drive growth in the industry.

Gold monetisation scheme: The government may propose a Gold Monetization scheme in the upcoming budget to mobilise gold held by households and institutions in the country. It is expected to boost the gems and jewellery sector by making gold available as a raw material on loans from banks and reducing reliance on gold imports.

Foreign Trade Policy (FTP): To promote the gems and jewellery sector, including handcrafted Jewelry, the government can take several steps such as providing financial assistance for participation in international fairs, organising buyer-seller meets, etc. the aid of the EPB under the Ministry of Commerce. The government can also announce several measures in the Foreign Trade Policy (FTP) to promote the export of gems and jewellery products.

Foreign Direct Investment: The government allows 100% FDI in any sector except four. There is no bar on FDI gold and jewellery sectors. If the sector gets the formal approval of the raw material imports quickly, this sector has an excellent opportunity for FDI.

Other policies and initiatives: Bangladesh can take policy initiatives like India to develop this sector. India has signed a Memorandum of Understanding (MoU) with Russia to source data on the diamond trade between the two countries. India is the top global processor of diamonds, while Russia is the largest rough diamond producer. In another significant development, the Gems and Jewelry Skill Council of India will train over four million persons by 2022. The sector is facing a shortage of skilled workforce. The council aims to train and skill 4.07 million people by 2022. It will tie up with existing training institutes, including the Gemological Institute of America (GIA) and the Indian Gemological Institute (IGI), and plan to set up new institutes in major diamond cutting and processing centres. Bangladesh can follow the same types of activities.

8.5 Present Rules and Regulations Regarding the Import of Gold and Jewellery and Business or Trade in Bangladesh

A. In the present Import Policy Order (IPO), there is no restriction on importing gold and Jewelry. This item is not on the negative list of the IPO. That is, officially, it is an importable item.

B. Section 8. (1) of the "The Foreign Exchange Regulation Act-1947" mentions that "The Government may, by notification in the Official Gazette, order that, subject to such exemptions, if any, as may be contained in the notification, no person shall, except with the general or special permission of the Bangladesh Bank and on payment of the fee, if any, prescribed bring or send into Bangladesh any gold or silver or any currency notes or bank notes or coin whether Bangladesh or foreign.

Explanation: The bringing or sending into any port or place in the territories of Bangladesh of any such article as aforesaid, intended to be taken out of the territories of Bangladesh without being removed from the ship or conveyance in which it is being carried, shall nonetheless be deemed to be bringing or as the case may be sending, into the territories of Bangladesh of that article for this section.

8. (2) of the "The Foreign Exchange Regulation Act-1947" is "No person shall, except with the general or special permission of the Bangladesh Bank or the written permission of a person authorised on this behalf by the Bangladesh Bank, take or send out of Bangladesh any gold, jeweller or precious stones, or Bangladesh currency notes, bank notes or coin or foreign exchange."

C. At present, there is no tariff rule for the insurance for importing gold. As per the instruction of the Insurance Development and Regulating Authority (IDRA), Bangladesh Marine Controller of Insurance Rule, Import Tariff section-3 mentions as below:

"3. Scope of the tariff

i. This tariff applies to all imports into Bangladesh
   a. By Steamer of Power Vessels
   b. By mechanised goods carryings vehicles via land routes including rail. Rates as per the tariff.
   c. By Air: The rates to be charged for imports by Air will be as per air tariff.

ii. Exclusions: Specie, Bullion, Currency Notes, Securities, Paper of values, Precious stone and Jewelry, Precious Metals, Personal Effects, Postal Dispatches and Bulk Petroleum Oil are excluded from the scope of this tariff. All non-petroleum oil (e.g. Edible oils) in bulk comes within the scope of the tariff."

This gives us clear information that the insurance company has no option to take the risk of importing gold.

D. Only 234 grams of Gold can be imported under the Baggage Rules of Bangladesh.

E. Only Renessa Jewellers import gold under the supervised bond for industrial purposes.
   Though gold is not restricted to import, as per the Bangladesh Bank official, no gold has been privately imported for industrial purposes since 30 November 2017, in such a situation, most of the gold is illegal and is used in the gold and jewellery sector, except few of them are imported under the Baggage Rules.
F. Every Deputy Commissioner provides the gold and jewellery dealing license for purchasing, selling and stocking gold and jewellery under the "The Essential Commodity Control Order-1981".

The conditions of the license are:

1. The dealer will stock his commodity only in the mentioned area or warehouse. If he/she would like to change the place, he has to inform it to the Director, Market Intelligence and Enforcement.
2. The dealer is bound to show the stock account and all other information as desired by the Director, Market Intelligence and Enforcement or empowered by him.
3. The dealer must carry any order passed by the Market Intelligence and Enforcement Director.
4. The dealer has to keep all records of sell, purchase, stock and counter part of the cash memo for at least one year to show the Market Intelligence and Enforcement.
5. If the licensee fails to follow any rules applicable to him, the Deputy Commissioner would have the power to cancel the license, which would not create any bar to taking any measure as per law.

8.6 Gold Reserve in Bangladesh Bank

Gold Reserves in Bangladesh remained unchanged at 13.97 Tonnes in the second quarter of 2017 from 13.97 Tonnes in the first quarter of 2017. Gold Reserves in Bangladesh averaged 7.63 Tonnes from 2000 until 2017, reaching an all-time high of 13.97 Tonnes in the first quarter of 2017 and a record low of 3.29 Tonnes in the first quarter of 2000 (source: https://tradingeconomics.com/bangladesh/gold-reserves). Official gold (including gold deposits and, if appropriate, gold swapped) reserve assets are 586.0159 Million USD as of 29 September 2016, as per the source of Bangladesh Bank.

8.7 Multiplier Effect of Gems and Jewellery Industry

GIS (2015) study on the Indian economy regarding the gems and Jewelry industry (Available at: http://tari.co.in/wp-content/uploads/2015/11/The-Gems-Jewelry-Industry-For-website.pdf) has estimated the multiplier effect of the gems and Jewelry industry for all the variables of interest. The results tabulated below show why it is a sector for policymakers to focus on.

Table 5: Multiplier Effect of Gems and Jewelry Industry in India

Multiplier	Estimate
Output	2.68
Value-Added / Income	4.22
Employment	5.20
Tax	3.10

Source: *GIJ, 2015*

The output multiplier shows that an increase in gems and jewellery demand can increase the economy's overall output by approximately three times. This shows the solid backward linkages of the sector with others, i.e. ancillary industries.

The production process is closely associated with employment, value addition and taxes. In terms of all these variables, the gems and Jewelry industry and its future look promising. The rise in employment across the economy because of an increase of ₹ 1 in demand is more than five times the rise in employment within the sector.
Similarly, rising demand can lead to:

1. Increase in value addition of the economy by more than four times the value-added within the sector; and
2. Increase in indirect tax collections in the economy by three times that of the tax collections from the industry.

The gems and Jewelry industry is one of the fastest-growing in India. It can drive up GDP, increasing employment, gross value added and indirect tax collections. Its growth may well be seen as one of the panaceas to the economy's problems. Though there is no available data regarding this sector, it can be inferred that the multiplier effect scenario may be around the same in the case of Bangladesh.

9. Paradoxical Market Failure in the Gold and Jeweller Sector in Bangladesh

Economists define market failure in terms of a hypothetical, optimally functioning economy. When individuals are free to trade in a competitive marketplace where no externalities in production or consumption exist, the resulting distribution of resources in the economy is Pareto efficient: no person can be made better off without making others worse. In economics, the second-best theory concerns the situation when one or more optimality conditions cannot be satisfied.

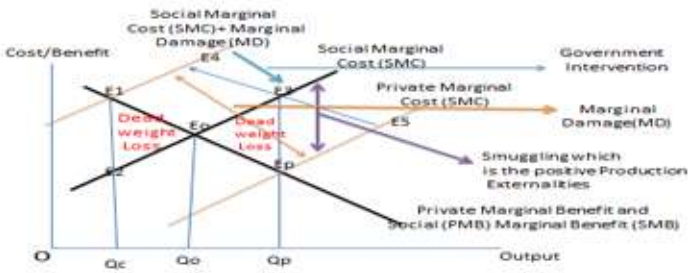
In 1956, economists Richard Lipsey and Kelvin Lancaster demonstrated that if one of an economic model's optimality conditions cannot be satisfied, the next-best solution may include modifying other variables away from their otherwise optimal values. In politics, the theory suggests that if removing one market distortion is impossible, a second (or more) market distortion should be introduced.

In an economy with inevitable uncorrectable market failures in one sector,

attempts to correct market failures in a related area to improve overall economic efficiency may reduce overall economic efficiency. In theory, it may be preferable to let two market imperfections cancel out rather than attempt to remedy one of them. As a result, it may be the best option for the government.

In the case of Bangladesh, the gold and jewelry industry is experiencing a perplexing position. A decrease in the price of gold would result in a surge in the jewelry sector. As a result, more skilled and higher-paying occupations would be created, enhancing Bangladeshi nationals' salaries. Because jewellery would be cheaper in Bangladesh, it might boost the number of international tourists buying finished goods and transporting them back to their home countries. The degree of production, on the other hand, is less than optimal, which is incongruent.

Figure 6: Market Failure in the Gold and Jewelry Sector



Let us explain it graphically. E_1E_p is the private marginal benefit curve and social marginal benefit curve. E_2E3 is the social marginal cost curve, and Q_0 is the optimal output level in the gold and Jewelry sector. As the economy is enjoying the smuggle raw materials of gold (as Bangladesh never imported any gold for commercial use), so the price of the raw materials would be less than the market. The sector would enjoy the positive externality from the negative point of view. The cost curve would be shifted to $E_pE_{5,}$ and the equilibrium output would be Q_p. Due to the overproduction, economic dead weight loss might be equal to the triangle of $\Delta E_3E_oE_p$. However, the actual equilibrium output is less than optimal as the imported finished product of gold and Jewelry is increasing, and the domestic output is reduced, as per the opinion of the Gold and Jewelry Association of Bangladesh. Suppose QC domestic production of the gold and Jewelry in Bangladesh and which is less than optimal level instead of overproduction. Again, economic dead weight loss might equal the triangle of $\Delta E_1E_oE_2$. It is happening as the cost curve is shifting from E_pE_5 to E_1E_4. Now, the question is - how this is happening and why?

Due to the illegal import of gold, the image of the economy is seriously hampered. The international authority is imposing various types of trade and business restrictions. We need 13 types of export documents and seven types of import documents; there are only three types of South Korea, both import and

export.

Table 6: Required Documents for Bangladesh

Export	Import
Bill of Lading	Bill of lading
Commercial Invoice	Cargo release order (Gate Pass)
Customs Export Declaration	Certificate of origin
Packing List	Commercial invoice
Certificate of origin	Customs import declaration
Terminal Handling Receipts	Packing list
Technical standards certificate	Technical standard/Cleanliness certificate
Cargo release order	Terminal handling receipts
Customs Transit Document	Letter of credit
Foreign exchange authorisation	
Pre-shipment inspection - clean report of findings	
Utilised Declaration for garments	
Letter of Credit	

Source: *Doing Business index, 2018*

Table 7: Required Documents for South Korea

(Export)	(Import)
Bill of lading	Bill of lading
Packing list	Delivery Order
Customs export declaration	Customs import declaration

Source: *Doing Business index, 2018*

Table 8: Few Indices Ranking of Bangladesh

Name of the Index	Position of Bangladesh	Number of Comparing Countries	Comparing Year
Doing Business Index	176	190	2018
Index of Economic Freedom	137	178	2016
Open Market Index	73	75	2015
Global Competitiveness Index	107	140	2015
Global Enabling Trade Index	115	138	2014
Business Env. Ranking	69	82	2014-18
Knowledge Economy Index	137	146	2012
Human Capital Index,	104	130	2016
Global Innovation Index	117	128	2016
Global Index of Infrastructure	111	140	2014
Technology Index	138		2012

Source: *Concern Webportal*

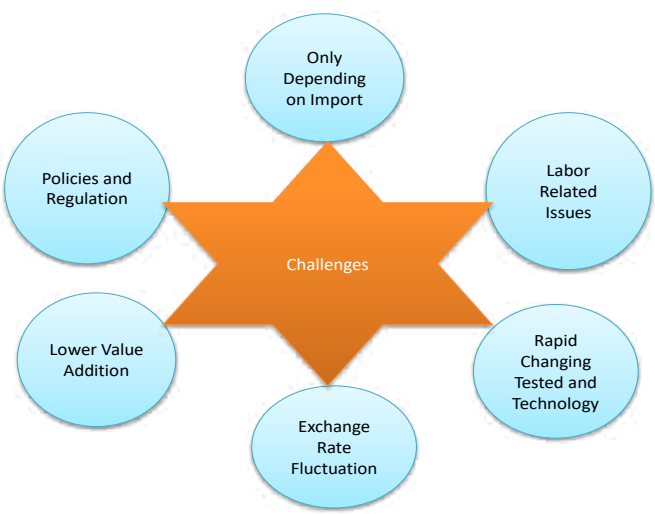
The ranking of the Overall 'Doing Business Index' in 2018 for Bangladesh is 178 among the 190 countries in the world. Considering other indices mentioned in the above table gives us clear evidence that the cost competitiveness of production in Bangladesh is in a disadvantageous position. This increased the overall cost of manufacturing, moved the marginal cost curve rightward, and resulted in a less-than-optimal final output. It creates the paradoxical situation of the negative externality instead of the positive externality. Thus, legalising importing gold for investment in the gold and jewelry sector would significantly boost the economy of Bangladesh and increase the tax base. Liberalising the gold policy, furthermore, would help Bangladesh reduce its trade deficit with India (the US $2.910 billion, 2009-10) because most of the gold bullions and the finished products would likely be exported to India (BD News, 26 December 2014, URL: https://opinion.bdnews24.com/2014/12/26/the-economics-of-gold-smuggling/).

10. Challenges of gold and Jewelry industry and recommendations for the development of this sector in the context of market failure

Market failure theories underlie most economic arguments for government intervention in the economy. When markets operate according to standard economic assumptions, no person can be made better except by making someone else worse off. The range of government activity in such a world consequently is constrained. However, when markets fail to operate following the standard model, government policy may improve economic outcomes by enhancing market failure.

The gold and jewelry sector faces specific fundamental and regulatory challenges that limit achieving its full potential. These challenges and the recommendation are analysed as below:

Figure 7: Main challenges issues in Gold and Jewellery industry in Bangladesh



a. **Mostly dependent on illegally imported gold:** Indigenous availability of raw material plays a crucial role in the growth of any industry. However, the Bangladeshi gems and Jewelry industry is almost entirely dependent on illegally imported and recycled raw materials such as gold, diamond, and other precious and semi-precious stones. An industry or a sector cannot sustain or develop based on illegal raw materials. Various criminal activities are involved in this sector, which is more vulnerable to this industrial sector and civil society. On the other hand, the reputation of customs, police, carrier, and handler was seriously hampered, so the international community could not trust us as a good partner. During the import and export, the trade partner country imposes various types of restrictions on trade, which deteriorate the multiple types of country index, like doing business, corruption perception index, and port quality index in the world. It increases the overall cost of doing business in the economy and reduces the competitiveness of the economy. In such a situation, through the Bangladesh Bank, the government can import gold and sell or purchase it through the scheduled bank and post office at the government-determined price. Except this, gold, stones, and other materials shall be imported through Sonali Bank against Special Import Authorization (SIA) to be issued against the export of Jewelry under this scheme to the extent of 75% of the F.o.b Value of the jewellers exported.

   There may be another style of importing gold, which may be the Advance gold/material supply procedure. The mode of procurement of gold and stones under this procedure shall be as follows:

   i) The authorised exporter may enter into a contract with a foreign buyer to manufacture Jewelry against an advanced supply of gold and stones free of cost by the buyer. The contract should require, among others, the period for supply of gold, the period allowed for the execution of the order, and the amount/rate of making charges of the Jewelry, which shall not be less than 25% of the Value of Jewelry exported.

b. **Lack of trained labour and unavailability of modern equipment:** Like other industries, the gems and Jewelry industry is also facing many labour-related challenges. These are mainly shortage of skilled labour, poor working conditions, and low salary. Manual methods of cutting, polishing, manufacturing, and designing gems and Jewelry are steadily being substituted with high-end automation using machines and software. Using laser machines, operating computers, and understanding modern techniques require systematic and practical training. As this is not developed in the private sector, the government can stimulate the concerned association to establish an institution like the plastic industry.

c. **Unattractive wage rate:** Considering the low wages in this industry, it is no surprise that young workers are not attracted to it. Although the market determines the wage rate, the government can play as a catalyst to create

a skilled workforce, developing the research and training institute and international linkage.

d. **Unhealthy working environment:** Inadequate working conditions and limited compliance with health and safety standards have also led to low interest in the industry. Unorganised and small-scale enterprises that form a significant industry segment are not known to use cutting-edge technology and high-quality materials in their manufacturing processes.
e. **Highly volatile exchange rate of Taka against the Dollar:** In the last few years, though the taka has been more or less stable against the Dollar, it has been frequently observed that this exchange rate is highly volatile against the Dollar. For smooth economic development and foreign inflows, a stable currency is necessary for developing countries. Hence, it is essential for the gems and Jewelry industry, particularly considering its dependence on illegal imports.
f. **Highly volatile consumer test:** The industry is highly affected by changing consumer tastes and preferences. In times of such rapid changes, it must face the challenge face-to-face and be attentive to and open to important trends, developments, and new risks. Institutional training and the utilisation of ICT can help to meet this problem.

Low value-added due to traditional test of the domestic consumer: According to industry analysts, consumer behaviour in Bangladesh plays a significant role in the lesser value addition since Bangladeshis choose pure gold Jewelry, which has limited value addition potential due to less artistic labour and design innovation.

g. Relative to the international market, value addition, particularly in the gold segment of the industry, is low in India (http://tari.co.in/wp-content/uploads/2015/11/The-Gems-Jewelry-Industry-For-website.pdf). Gemstone studded Jewelry would naturally add more Value to the product. Limited domestic brands and limited gold recycling are other reasons for a low GVA. To increase value addition, gemstone studded gold Jewelry and more value-added products may be promoted.
h. **Legacy of illegal gold import:** Still today, after the independence, not a single gram of the gold is privately imported for industrial purposes by taking special permission from the Bangladesh Bank under section 8 (1) of the "Foreign Currency Regulation Act, 1947" except baggage rule. Taxpayer thinks that if they import gold in a legal process, the government would know the money they possess. Then the government would want to see the source of funds, and the government will impose a tax. Then the large numbers of importers may not agree to import gold legally. In such a situation, government importation is essential to streamline the sector or the mainstream industrial sector.
i. **Legally illegal procedure to import the gold and Jewelry:** Internationally, the HS Code of gold Bar is 71, 71.04, and the HS Code of ornaments is 71.01, but as per the baggage rule of Bangladesh, people can carry gold and Jewelry under HS Code of 98.01. It is a special provision. Under this provision, an importer must

not pay any tax or maintain importing rules and regulations. Recently, a circular is issued that for every 10 grams, 3000.00 taka has to pay as custom duty. But, the only rules are that the importer can import a minimal amount (234 grams) of gold and Jewelry. For commercial use, many entrepreneurs use the passenger to carry the gold for their commercial services. They are paid a small amount of benefit to have this gold or jewellery. There is a legally illegal procedure to import gold and jewellery using the baggage rule. When only the legal framework of this sector is institutionalised, the legally illegal system would be minimised. Under the baggage rule, the amount of tax may be increased to 5000.00. It will reduce the use the imported gold for commercial under the baggage rule.

j. **Disagreement of banking loan:** Bank has not agreed to provide the loan for the gold and Jewelry sector as there is no capital investment.

k. **Avoiding hazard importing tendency through the illegal channel:** Gold is imported illegally for an extended period. So, a few importers will not be agreed to legally import gold and take the hazard like opening LC and lengthy import procedures.

l. **Carrier disagreement to handling precious goods like gold and Jewelry during import and internal carrying:** The carrier would not agree to take the risk of importing gold and Jewelry, as it is riskier due to highly precious goods with consideration of its volume.

m. **Lack of special provision importing gold and Jewelry for the carrier, custom and the handling authority:** To take the risk of the importing gold, carrier, custom and the handling authority should be more trusted, or there should have a special provision that if any of the authorities fail to hand over the importing gold within the time limit, the amount of the penalty would be automatically transferred to the importer through the banking channel. After a certain period, if the lost importing gold is regained, the penalty would return by deducting the late fee penalty every day to the concerned authority after the handover of the goods.

n. **Baggage rule and huge importation of finished products:** Under the baggage rule, a lot of finished Jewelry is entering Bangladesh, discouraging domestic manufacturing of the Jewelry sector in Bangladesh. When the sector is developed, the problem will be reduced automatically. When the import duty on the baggage is 5000.00 taka, it will automatically decrease.

o. **Inadequate implication of law by the District Magistrate:** In Chittagong, there are approximately 5000 gold dealers, but only 1500 licenses are issued by the Deputy Commissioner of Chittagong (Source: President of the Gold and Jewelry Association of Bangladesh, Chittagong), who is the authority to issue the licenses under the commerce ministry's instructions. It indicates that the law is not equally applied to all at present Jewelry businesses people. The scenario is around the same all over the country. The district magistrate should be more concerned with ensuring equality before for law. It will also reduce the entrepreneur's accountability, and more revenue will be collected.

p. **Mortgage (Bondokhi) license is not equal in all places:** Gold is used as a store of value. Rural people take a loan by mortgaging this gold to the licensed gold and Jewelry businessman, which can play an essential role in circulating money and supplying capital for the rural economy. But, there is no equal treatment in all areas of Bangladesh regarding this area. In Sylhet, there is no provision for the Bondokhi licensing of the gold dealers. On the other hand, this licensing system has no strict rules and regulations. This may be an excellent strategy to use the gold and Jewelry as a Store of Value and utilise this value to get a loan in the rural area. This system should have equal opportunity all over the country for easy access to capital and ensure financial support when it will be necessary.

q. **Shortage of machine for ensuring the quality of gold and Jewelry in Bangladesh:** For maintaining the standard of quality gold, there is no sufficient machine in Bangladesh. As a result, people are facing harassment. The registered gold and Jewelry association must ensure it in every market where or District Magistrate will monitor the matter.

r. **Policing harassment due to specific rules regarding the dealing/selling/purchasing of the old gold or recycled gold:** There are no particular rules regarding the dealing/selling/purchasing of the old gold or recycled gold. When any gold manufacturer purchases gold from any individual, it becomes very tough to identify whether the gold is stolen or not or anyhow illegal. Sometimes, it becomes essential for an individual to sell the old gold or use gold for medical or other purposes. Frequently, the law enforcing authority confiscates the gold in the name of illegal, stolen property. It is one of the severe problems in developing the industrial sector of gold and jewelry. The law enforcement should have no capacity to confiscate any gold purchased from any person by any gold and Jewelry business people without the permission of the DM if the businessman is a legal licensee from the DM.

s. **Absence of proper ministerial action:** This is an industrial matter, so the industry ministry should be concerned about this sector. But, the ministry of commerce, IRD, and Bangladesh Bank are now very loosely concerned regarding the development of this sector. But, the ministry of the industry should have concerned about making the rules and regulations for the development of this sector.

t. **Bangladesh is used as the illegal route of gold trafficking:** India is the 29% user of jewellery globally due to its traditional reason. Most of the illegally importing gold is reexporting India again illegally, which is the perception of Bangladesh's gold and Jewelry business. So, the custom, BGB, Bangladesh Biman, and all other related sectors have to take serious action to control it. If this continues, Bangladesh will lose its image in the international arena, and this sector will not get the legal framework.

Other Remedial Measures and Policy Recommendations

a. Suppose the Government would like to formalise the gold and Jewelry sector seriously. In that case, all the gold possessed by the gold and Jewelry entrepreneur should be given legal status through a declaration by physical verification of the Gold and Jewelry.
b. Ten years' income tax holiday should provide for the newly set up industry if he has all modern equipment and capital machinery is more than 50 lakhs.
c. Government can import gold through the Bangladesh Bank, which could be available to all business people through the scheduled bank at a current international price.
d. An in-depth survey is required regarding the number of entrepreneurs, exporters, employment, GDP contribution, legal or illegal import of gold, and the value added of the jewellery sector in Bangladesh to give this sector a legal framework.
e. A serious study is required to identify why the gold smuggling route through Bangladesh, especially for India.
f. The only member of the association can be able to do business in this sector.
g. Ensuring the participation of gold and jewellery manufacturing and exporters' association in the national and international fare and display of their products.
h. Like the bicycle and other export-oriented industries, a 10 per cent tax incentive package should have for the exporters of the gold and jewellery sector.
i. Without taking the gold dealing license, nobody can do any business.
j. There should have specific rules and regulations regarding the old gold selling.

11. Conclusion

Gold is a precious metal and is used as a store of value. Then, it has economic importance, which is the primary issue in this article in Bangladesh. Easy importation of Gold is not allowed due to inadequacy of reserve, and jewellery is considered an extremely luxurious good. It has industrial contribution too. Gold is the raw material of the gems, stone, and jewellery sector. This jewellery industry can generate employment, production, export, and GDP. Though there is a scope of gold import by taking special permission from the Bangladesh Bank, not a single gram of Gold is imported legally except for a few baggage rules and under special supervision. Frequently, the customs and law enforcement authorities forbid and confiscate illegal gold. Perhaps an extended period, Gold is not easily permitted to import, and due to its unavoidable demand, it is entered into the economy illegally.

From the Indian experience, the government of Morarji Desai, importation of Gold mainly became restricted by the Gold Act 1962. It was very harmful to the economy, and finally, in 1968, the Indian Govt banned the law from an economic point of consideration. As Bangladesh's culture and economy are around the same, this experience tells us that the gold import restriction was not a correct decision. Currently, the Gold and Jewellery sector is not standing in very legal and proper

ways. But, there is a broad scope to create more employment and GDP by taking the appropriate policy from the government of Bangladesh. Among the various strategies for developing this sector, the availability of raw materials, that is, the availability of Gold, is essential through the legal channel. As, for an extended period, importing gold was not in a very legal way, the government should take the measure for the availability of Gold. As the market did not function properly, government intervention became essential. The government channel should import Gold for the raw materials of jewellery, and Bangladesh Bank can do it. Then these raw materials could be distributed to the manufacturers and the exporters in the country at a current international price through all scheduled Banks. Except for the availability of Gold in the proper channel, a pragmatic policy is essential for developing the gold and jewellery sector. This article suggests legally importing Gold. Importing Gold will create more employment and GDP. Still, it will also increase the law order situation and the reputation of the custom, law enforcing authority, and the state's overall image.

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Annexe

A. Official Reserve Assets of Bangladesh in USD (As of 29 September. 2016)

A. Official reserve assets	31385.8669
(1) Foreign currency reserves (in convertible foreign currencies)	27633.053
(a) Securities	11064.8732
Of which: issuer headquartered in the reporting country but located abroad	
(b) Total currency and deposits with:	16568.1798
(i) Other national central banks, BIS and IMF	4966.213638
(ii) Banks headquartered in the reporting country	147.9835
Of which: located abroad	147.9835
(iii) Banks headquartered outside the reporting country	11453.9827
Of which: located in the reporting country	
(2) IMF reserve position	
(3) SDRs	1359.0236
(4) Gold (including gold deposits and, if appropriate, gold swapped)	586.0159
-Volume in fine troy ounces	0.4431
(5) Other reserve assets (specify)	1807.7743
-Financial derivatives	
-Loans to nonbank non-residents	
-Other*	1807.7743

Source: *Bangladesh Bank*

B. Top 40 Reported Official Gold Holdings (As of September 2017)

Sl. No.		Tonnes	% of reserves	Sl. No.		Tonnes	% of reserves
1	USA	8,133.5	75%	21	Austria	280.0	54%
2	Germany	3,373.7	70%	22	Belgium	227.4	37%
3	IMF	2,814.0	-	23	Philippines	196.4	10%
4	Italy	2,451.8	67%	24	Venezuela	187.6	75%
5	France	2,435.9	63%	25	Algeria	173.6	6%
6	China	1,842.6	2%	26	Thailand	152.4	3%
7	Russia	1,778.9	17%	27	Singapore	127.4	2%
8	Switzerland	1,040.0	5%	28	Sweden	125.7	8%
9	Japan	765.2	2%	29	South Africa	125.3	11%
10	Netherlands	612.5	66%	30	Mexico	120.5	3%
11	India	557.8	6%	31	Libya	116.6	7%
12	ECB	504.8	29%	32	Greece	112.9	60%
13	Turkey	495.6	18%	33	Korea	104.4	1%
14	Taiwan	423.6	4%	34	Romania	103.7	10%
15	Portugal	382.5	59%	35	BIS	103.0	-
16	Saudi Arabia	322.9	3%	36	Poland	103.0	4%
17	United Kingdom	310.3	9%	37	Iraq	89.8	8%
18	Kazakhstan	289.3	37%	38	Indonesia	80.6	3%
19	Lebanon	286.8	21%	39	Australia	79.9	6%
20	Spain	281.6	18%	40	Kuwait	79.0	9%

Source: *IMF IFS, World Gold Council*

Note: *For information on the methodology behind this data, please see the table of the Latest World Official Gold Reserves at http://www.gold.org/government_affairs/gold_reserves/*

C. Few of the Bangladesh Gold Jewelry Manufacturer & Exporter

i. LILI JEWELLERS, [Since - 1969], Address of jewellery shop, Lili Jewellers, 22, Baitul Mukarram (1st floor), Dhaka-1000, Bangladesh, Phone: 88-02-9555836

ii. BAITUL JEWELLERS, Guinea Gold Ornament Manufacturer, Address of jewellery shop, Baitul Jewellers, 16, Baitul Mukarram (1st floor), Dhaka – 1000, Bangladesh, Phone: 88-02-9557998, 9565581

iii. MUKTA JEWELLERS, [Manufacturer of guaranteed Guinea Gold Ornaments.] Address of jewellery shop, Mukta Jewellers, 68, Baitul Mukarram (1st Floor) Dhaka-1000, Bangladesh, Phone : 88-02-9552320

iv. RINA JEWELLERS, Address of jewellery shop, Rina Jewellers, 72, Baitul Mukarram (1st floor), Dhaka – 1000, Bangladesh, Phone : 88-02-9557044

v. RAHMAN JEWELLERS, [Gold Ornament Manufacturer & Supplier], Address of jewellery shop, Rahman Jewellers, 72/A, Baitul Mukarram (2nd floor) Dhaka-1000, Bangladesh, Phone : 88-02-9559277

vi. RS BIKRAMPUR JEWELLERS, Address of jewellery shop, R.S. Bikrampur Jewellers

56, Baitul Mukarram (1st Floor), Dhaka - 1000, Bangladesh, Phone : 88-02-9555848

vii. MIZI JEWELLERS, [A house of Quality Ornament], Address of jewellery shop, Mizi Jewellers, 51, Baitul Mukarram (1st floor), Dhaka-1000, Bangladesh. Phone: 88-02-9559784

viii. FAHIM JEWELLERS, Address of jewellery shop, Fahim Jewellers, 5, Baitul Mukarram (1st Floor), Dhaka - 1000, Bangladesh, Phone: 88-02-9555829

ix. SHAHANAZ JEWELLERS, [Since-1992], Address of jewellery shop, Shahanaz Jewellers, 17, Baitul Mukarram (1st floor), Dhaka-1000, Bangladesh. Phone : 88-02-9551222, 7160771

D. Gold and Jewellery Associations in Bangladesh

In Bangladesh, especially in Dhaka, there are four types of associations regarding this sector;

A. Bangladesh Jewelry Manufacturers & Exporters Association, 88, Anarkoli Super Market (4th floor) Siddeshwari, Mouchak, Dhaka-1000, Bangladesh, +88-02-8322314, 01713-009791
B. Bangladesh Jewellers Sommittee
C. Bangladesh Poddar (Bullion) Somittee
D. Bangladesh Jemes Stone Association
E. Besides this, in every district, there is a Branch Association of the Bangladesh Jewellers Sommittee, which the central committee controls.

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How Efficient are Commercial Banks in Bangladesh? Evidence from the Stochastic Frontier Approach

Md. Fazle Fattah Hossain[*]
Md. Abdul Wadud[**]

Abstract

The banking sector in Bangladesh includes various sorts of banks; there are state-owned and private commercial banks, conventional and Islamic commercial banks and different generation banks. All kinds of banks start the journey to contribute to the banking sector and hence economic growth in Bangladesh through, among others, mobilising deposits and providing loans. This paper aims to evaluate the technical efficiency of a sample of first-generation and second-generation commercial banks. The sample of first general banks includes Janata bank limited, Rupali Bank Limited and Islami Bank Bangladesh Limited, while the second-generation banks consist of Dutch Bangla Bank Limited and Jamuna Bank Limited.

We apply the stochastic frontier approach with the Cobb-Douglas frontier model specification. We use secondary data from 1996 to 2017 for the first-generation banks and 2002 to 2017 for the second-generation banks. We use operating income, net profit, deposit, and loans & advance as dependent variables and labour cost, occupancy cost, cost of material and other expenses as independent in the stochastic frontier model. We estimate four stochastic frontier models with four dependent variables separately, applying the maximum likelihood estimation technique. We also estimate these frontier models with both the specification of the half-normal as well as the truncated normal distributional assumptions for the inefficiency effects component and choose the specification to apply the generalised likelihood ratio test.

Efficiency results show that Dutch Bangla Bank Limited and Jamuna Bank Limited, as second-generation banks, are 73 and 55 per cent technically

[*] Principal Officer, Janata Bank Limited, Chapainawabganj Corporate Branch, Chapainawabganj. Email: fazle.hossain@yahoo.com

[**] Professor, Department of Economics, Rajshahi University, Rajshahi (Corresponding author). Email: wadud68@yahoo.com

efficient, respectively, in terms of earning a profit. In contrast, Islami Bank Bangladesh Limited, Janata Bank Limited and Rupali Bank Limited, as first-generation banks, are, on average, 59, 33 and 46 per cent efficient in achieving profit targets. It implies that state-owned first-generation banks are less efficient than other banks. Results also indicate that first general banks are, on average, 96 and 89 per cent technical efficient in mobilising deposit and supply loans and advances, while second-generation banks are 83 and 84 per cent technical efficient, respectively, on an average. It predicts that first-generation banks are more efficient than second-generation banks in mobilising deposits and providing loans & advances. Results imply that given the technology, there are scopes for improving efficiencies, especially in realising more profit, and hence appropriate policy formulations are required.

Keywords *Efficiency · Commercial Banks · Stochastic Frontier Model · Bangladesh*

1. Introduction

The banking sector of Bangladesh consists of state-owned and private commercial banks and some specialised banks. The state-owned commercial banks fall into the category of first-generation banks, while the private commercial banks enter second and third-generation banks. The banking sector is known as the backbone of an economy. A sound and stable banking process are necessary for developing the banking sector and hence the economic growth of an emerging economy of a country like Bangladesh, which is experiencing a massive change due to the far-reaching reforms implemented in the aftermath of the financial crisis. Since 2016 the banking sector has been facing some crises in the increase of the non-performing loans due to the improper selection of the borrower, relatively high interest, increase in salary and other benefits of the employees, insufficient risk management practices, and improper management governance.

Some of the banks in Bangladesh were nationalised in 1972. The purpose of the nationalisation was to reach the common masses and bring the country's financial inclusion rather than to make a profit. After that, the government liberalises the banking sector, ultimately increasing the number of private commercial banks and their branches (Bangladesh Bank, 2017). The banking industry in Bangladesh today dominates the financial sector, contributing to 74% of the whole financial industry (Robin *et al.,* 2018). The function of the banking sector is to speed up the improvement of the financial sector and largely relies on the soundness and profitability of the industry. In the banking sector of Bangladesh, there exists, *among others*, supervision gaps and market distortions.

In recent times, the banking sector has been experiencing several ups and downs, and many changes have been adopted to enhance the structural positions of the sector. The major participants of the banking industry are the commercial banks that should be competent enough because it can create anarchy and mismatch in the expansion of the financial sector and the economy in general. To

maintain market shares and survive in the competitive situation, banks must adopt the new technological advancements and efficiently enhance technical innovation capability.

The state-owned commercial banks are sometimes reluctant to give loans because of non-performing loans and spending more funds on processing loans. This causes an increase in operating costs. On the other hand, private commercial banks are heading towards extending various loans. Thus, banks face default loans or non-performing loans. Commercial banks have recently faced liquidity and deposit crises in their day-to-day operations. This negatively affects profit earnings and investment capacity and further decreases the efficiency of the banks.

Moreover, the state-owned commercial banks are not entirely using new technologies to reduce operating costs, making these banks more cost-inefficient compared to other banks. In case of timely and proper selection of the employees, the state-owned commercial banks are lagging, and hence these banks are operating with fewer employees. This causes poor and low-quality service and ultimately decreases the banks' profit.

Banks with lower efficiency are likely to be insolvent in general (Podpiera and Podpiera, 2005); this may contribute to banking and financial failure affecting the economy adversely. Again, it is argued that the breakdown of a single bank can hamper other banks' operations. Moreover, commercial banks should be not only efficient but also profitable because these banks face vigorous competition domestically as well as internationally. These banks should be efficient and competent in mobilising and utilising financial resources from surplus to deficit units.

In times of crisis and collapse, it creates a burden to take over these banks to the government of a developing country like Bangladesh. Securing efficacy in these sectors would require rigorous the efficiency of programs and policies on a grander scale, inducing uninterrupted development and pecuniary growth. Thus, we need to measure the performance of the banks and identify the gap between the efficient and the inefficient banking institutions. Therefore, the efficiency of the banks requires to be calculated to offer policy suggestions concerning the capability of the incumbents and the degree of competition in the banking industry. This study tries to add to the literature by measuring technical efficiency in operating income, net profit, loans & advances, and deposits using a sample of state-owned and private commercial banks.

2. Review of Literature

Research on efficiency analysis in the banking industry is increasing. Yildirim (2016) estimates the cost efficiency of Turkish commercial banks employing the stochastic frontier model. Empirical results suggest that the cost efficiencies of Turkish banks are improved over time, with the effects of the 2008 and 2010 crises. Niaki and Shalmani (2016) examine the branch-level efficiency of Sarman

Bank in an Iranian banking context using the stochastic frontier model and report that changes in salaries have not significantly increased total costs. Increased operational costs have led to an increase in the costs of the branches, while an increased depreciation rate has led to cost reduction.

Ngan (2014) estimates profit and cost efficiency in the banking sector of Vietnam. The paper adopts the stochastic frontier analysis approach to measure the cost and profit efficiency of 45 Vietnamese commercial banks over the years from 2007 to 2012. Results show that mergers and acquisitions can increase potential cost inefficiency and foster competition for banks. Sarmiento and Galan (2015) analyse the influence of risk-taking on bank efficiency in the Colombian banking industry. The paper employs a stochastic frontier model with random inefficiency parameters for capturing the influence of risk-taking on bank efficiency. The paper finds that more capitalised banks are more cost and profit efficient, while banks are assuming more credit risk are less cost-efficient but more profit efficient.

Aiello and Bonanno (2013) evaluate profit and cost efficiency in the Italian banking industry by employing a translog stochastic frontier model. Results show that the average cost and profit efficiency levels are around 90% and stable over time. Afza and Asghar (2017) estimate the efficiency of commercial banks in Pakistan by applying the stochastic frontier approach. The efficiency trend analysis indicates that the efficiency remains similar over the examined period, especially the banks' cost efficiency. The results, however, show that the profit efficiency of the conventional banks has fallen, whereas it increases for the Islamic banks.

Azad *et al.* (2017) analyse the efficiency of banks in Malaysia by unveiling a dynamic network data envelopment analysis (DEA). This paper uses a three-step network DEA model with slack-based variable returns to scale approach. The empirical results imply that few banks in Malaysia are performing well in transforming deposits and equities into profit and making loan-loss provisions minimum.

Warraich *et al.* (2013) investigated the scale efficiency scores of Islamic banks of Pakistan from 2006 to 2009 within the framework of the DEA approach. Both constant returns to scale and variable returns to scale specification are applied for calculating scale efficiency under input orientation. The results depict that the Dawood Islamic bank is the most scale efficient Islamic bank and that the Islamic banks had the highest mean scale efficiency scores in 2007. Shahwan *et al.* (2013) measured the profitability, marketability and social disclosure efficiency of UAE banks using the non-parametric frontier method. Findings suggest that the UAE banks perform much better in profitability and social disclosure activities than in marketability. Result also depicts the positive relationship observed between social disclosure and profitability performance.

Samad (2009) explores Bangladesh's banking industry's inefficiencies by applying a stochastic frontier production function model and using the time-invariant cross-sectional data. The technical efficiency examination indicates that Bangladesh commercial banks' efficiency lies between 12.7% and 94.7%;

the industry average is 69.5%. This paper also shows that about 30% of the commercial banks in Bangladesh are below the industry average. Qamruzzaman et al. (2016) identify the level of financial efficiency of financial institutions from 2011 to 2015 in Bangladesh. The paper considers 24 private commercial banks. Technical efficiency is calculated by applying DEA, considering both input and output variables. Results reveal that 62% of banks are efficient under constant returns scale and are efficient under constant returns to scale 75% of banks are efficient at the firm level. We design, in this paper, to calculate the efficiency performance of a sample of first, second and third-generation commercial banks in terms of operating income, net profit, deposit and loan & advances and compare their efficiency performances. Further, we apply the stochastic frontier model to measure the level of efficiency. From this viewpoint, this research is different from others and the first of its kind.

3. Theoretical Framework

The stochastic frontier model, independently introduced by Aigner et al. (1977) and Meeusen and van den Broeck (1977), is applied to calculate the technical efficiency. The general stochastic frontier model we begin with is defined as:

$$y_i = f(x_i ; \beta) e^{u_i} \quad \text{i = 1, 2, 3, ..., n} \tag{1}$$

Where y_i denotes the output quantity of the *ith* banks, x_i is a vector of inputs, β identifies a vector of parameters. The composed error u_i is divided into two parts: a stochastic random error part and an inefficiency part, that is,

$$u_i = \xi_i - \zeta_i \tag{2}$$

Where $\xi_{i \text{ represents}}$ the symmetric error and ζ_i denotes the asymmetric non-negative error representing the technical inefficiency. While ξ_i is assumed to be distributed independently and identically $N(0, \sigma^2 \xi)$, ζ_i is independently and identically distributed non-negative truncations (at zero from below) of the $N(\mu, \sigma_\zeta^2)$ distribution. The model provides variance parameters which are expressed as follows:

$$\sigma_u^2 = \sigma_\xi^2 + \sigma_\zeta^2 ; \ \gamma = \sigma_\zeta^2 / \sigma_u^2 \ \textit{and} \ \ 0 \le \gamma \le 1 \tag{3}$$

Estimators for β of (1) and variance parameters of (3) can be calculated with the help of the maximum likelihood estimation method. With the utilisation of standard integrals, we can obtain the estimate of - ζ_i *from* the expected value of - $\zeta_{i,}$ given *u,* as well as the assumption of distributions of $\xi_{i \text{ and }} \zeta_i$ as:

$$E(-\zeta_i / u_i) = [\frac{1-\Phi\{\sigma_i^* - (\mu_i^* / \sigma_j^*)\}}{1-\Phi(-\mu_i^* / \sigma_i^*)}] e^{(-\mu_i^* + \frac{1}{2}\sigma_i^{*2})} \quad (4)$$

where $\mu_i^* \equiv \frac{\sigma^2\xi - \mu_i\sigma^2\varsigma}{\sigma^2\xi + \sigma^2\varsigma}, \sigma_i^{*2} \equiv \frac{\sigma^2\varsigma^2\xi}{\sigma^2\xi + \sigma^2\varsigma}$ and $\Phi(\cdot)$ represents cumulative distribution function (Battese and Coelli, 1988). This gives the estimates of the bank-specific efficiency.

4. Empirical Methodology and Data

4.1 Empirical Specification of the Model

Estimating the technical efficiency score requires the stochastic frontier model to be specified. We specify the widely-used Cobb-Douglas stochastic frontier model to predict banks' technical efficiency (TE), and the maximum likelihood method is employed to estimate the model. The specified model is expressed as follows:

$$\ln y_i = \beta_0 + \sum_{k=1}^{4} \beta_k \ln x_k + \xi_i - \zeta_i \quad (i \text{ indicates time and } k \text{ inputs}) \quad (5)$$

Where y_i represents the output variables, operating income, net profit, deposit, loans & advance, x_{i1} is the amount of labour cost, x_{i2} is the total occupancy cost, x_{i3} is the total cost on materials, x_{i4} is other expenses., and *ln* denotes natural logarithm. The term ξ_i is defined before, and the term ζ_i is distributed independently of ξ_i such that ζ_i has non-negative truncation (at zero from below) of the $N(\mu_i, \sigma_\zeta^2)$ where μ_i can be expressed as:

$$\mu_i = f(z_k) \quad (6)$$

Where z_{i1} denotes the number of branches and z_{i2} is the business per branch.

We estimate the stochastic frontier model and the technical inefficiency effects model with the assumptions of the truncated normal and the half-normal distributional assumption for the inefficiency term. To check the suitability of the half-normal or truncated normal distributional assumption, we use the generalised likelihood ratio test, which is $\lambda = -2In[L(H_0)/L(H_A)]$ where $L(H_0)$ and $L(H_A)$ are the values of the likelihood function under the null hypothesis of the half-normal distribution and the alternative hypothesis of the truncated normal distribution, respectively. The test statistic possesses an asymptotic χ^2 distribution degrees of freedom equals the number of constraints enforced under the null hypothesis (Coelli, 1995). We therefore use and discuss results from the stochastic frontier model given the assumption of truncated normal distribution for the technical inefficiency model.

4.2 Data

Data are collected from the five commercial banks in Bangladesh. These banks are chosen from the first, second and third-generation banks. Among these banks, Janata Bank Limited and Rupali Bank Limited are first-generation banks, Islami Bank Limited and Dutch Bangla Bank Limited are second-generation banks, and Jamuna Bank Limited is a third-generation bank. Janata Bank Limited and Rupali Bank Limited are the state-owned commercial banks, while Islami Bank Limited, Dutch Bangla Bank Limited and Jamuna Bank Limited are the private commercial banks. Data from the first-generation banks and Islamic Bank Bangladesh Limited were collected from 1996 to 2017. Those for Dutch Bangla Bank and Jamuna Bank Limited are collected from 2002 to 2017. Output variables include loans & advances, total operating income, net profit and total deposit of the banks. Input put variables include occupancy cost, labour cost, cost of material, and other expenses. The environmental variable consists of the number of branches and businesses per branch.

4.2.1 Summary Statistics of Variables

4.2.1.1 Janata Bank Limited

Table 1 shows the summary statistics of variables of Janata Bank Limited. The mean of deposit, operating income, loans & advance, net profit, labour cost, occupancy cost, cost of material, other expenses and business per branch are 12.27, 9.00, 181059.01, 11.89, 8.10, 5.91, 5.81, 5.90 and 12.97 million taka respectively with a respective standard deviation of 0.71, 0.89, 118885.90, 0.68, 0.64, 0.64, 0.73, 1.00 and 9.62. The maximum value of the deposit, operating income, loans & advance, net profit, labour cost, occupancy cost, cost of material, other expenses and business per branch are 13.43, 10.14, 418612.23, 12.94, 9.20, 6.91, 7.14, 7.52, and 27.71 million taka respectively.

Table 1: Statistics of the Janata Bank Limited

	Deposit	Operating Income	loans & advance	Net Profit	labour Cost	Occupancy Cost	Cost on Material	Other Expenses	Branches	Business per Branch
Mean	12.27	9.00	181059.01	11.89	8.10	5.91	5.81	5.90	879.05	12.97
Median	12.15	8.94	131479.98	11.79	8.01	5.76	5.59	5.68	890.50	9.04
Std. Dev	0.71	0.89	118885.90	0.68	0.64	0.64	0.73	1.00	24.69	9.62
Skewness	0.25	-0.05	0.77	0.06	0.31	0.29	0.64	0.06	-0.27	0.34
Kurtosis	-1.24	-1.70	-0.75	-1.18	-1.27	-1.23	-0.93	-0.77	-1.76	-1.74
Mon.	11.23	7.65	48754.64	10.79	7.23	4.96	4.83	3.85	847.00	2.35
Max.	13.43	10.14	418612.23	12.94	9.20	6.91	7.14	7.52	910.00	27.71

5. Results of Efficiency Performance

We employ the maximum likelihood method to calculate the Cobb-Douglas frontier model with the truncated and half-normal distribution assumption and the technical inefficient model. The generalised likelihood test indicates that the truncated normal distribution assumption fits the model. Results are given in Table 6-10.[1]

5.1 Efficiency Performance of Janata Bank Limited

Table 2 shows the efficiency level of different variables of Janata Bank Limited. during the study period. During the first five years the rates are not satisfactory and the efficiency rates are 52.20%, 53.05%, 44.09%, 52.39%, 51.96% and 47.26% respectively during the year 1996 to 2001 respectively. After that the efficiency level continues to show better position and the rates are 57.18%, 67.54%, 71.89%, 78.06%, 83.51%, 68.37%, 95.53%, 97.57%, 98.75%, 99.16%, 98.71%, 98.25%, 98.31%, 98.52% and 98.81% respectively. The net profit position occupies by the bank is not satisfactory. In case of deposit collection capacity by the bank the result is satisfactory. The efficiency levels are 98.53%, 97.53%, 97.55%, 97.79%, 97.66%, 97.46%, 97.64%, 97.47%, 97.71%, 97.56%, 97.46%, 98.39%, 97.52%, 97.33%, 97.63, 97.77, 97.78%, 97.71%, 97.68%, 97.73%, 97.77% and 97.64% respectively.

Table 2: Efficiency Values of Janata Bank Limited

Year	Operating Income	Net Profit	Deposit	loans & advance
1996	0.5220	0.5083	0.9753	0.9761
1997	0.5305	0.8516	0.9753	0.9751
1998	0.4409	0.9214	0.9755	0.9769
1999	0.5239	0.9207	0.9779	0.9795
2000	0.5196	0.1416	0.9766	0.9805
2001	0.4726	0.1157	0.9746	0.9780
2002	0.5718	0.0881	0.9764	0.9791
2003	0.6754	0.1022	0.9747	0.9783
2004	0.7189	0.0090	0.9771	0.9803
2005	0.7806	0.0019	0.9756	0.9787
2006	0.8351	0.0007	0.9746	0.9780
2007	0.6837	0.0737	0.9839	0.9843
2008	0.9553	0.9010	0.9752	0.9754
2009	0.9757	0.5834	0.9752	0.9760
2010	0.9875	0.2523	0.9733	0.9776
2011	0.9916	0.2972	0.9763	0.9795
2012	0.9902	0.0002	0.9777	0.9817
2013	0.9871	0.9952	0.9778	0.9786
2014	0.9825	0.2805	0.9771	0.9785
2015	0.9831	0.2052	0.9768	0.9780
2016	0.9852	0.0386	0.9773	0.9786
2017	0.9881	0.0366	0.9777	0.9789
Average	0.7773	0.3330	0.9764	0.9785

[1] We produce efficiency results only. Results of model parameters are not produced because of lack of space as our objective is to show efficiency performances and their comparisons.

5.2 Test Results of Efficiency Series

We use a non-parametric Wilcoxon Signed Rank and t-test to check whether there is any difference between efficiency series obtained in operating income, net profit, deposit and loans & advances. We compare the pairs' results: operating Income - net profit, operating income – deposit, and operating income - loans & advances. Table 3 represents the non-parametric test results. In the case of Dutch Bangla Bank Limited, all the three pairs are not significant. For the Islami Bank Bangladesh Limited operating income - net profit is not significant, but the rest of the two pairs are significant. In the case of Jamuna Bank Limited, operating income- deposit is not significant. For Janata Bank Limited, all three pairs are significant. In the case of Rupali Bank Limited, operating income- net profit is insignificant.

Table 3: Non-Parametric (Wilcoxon Signed Rank) Test Summary

Banks	Efficiency Series	Sig.	Null hypothesis
Janata Bank Limited	Operating Income - Net Profit	0.001	Reject
	Operating Income - Deposit	0.008	Reject
	Operating Income - Loans & advance	0.007	Reject

Table 4: t- Statistics of Sample Banks

Bank	Efficiency Series	t- Statistics	Sig. (2-tailed)
Janata Bank Limited	Operating Income - Net Profit	4.651	0.0000
	Operating Income - Deposit	-4.385	0.0000
	Operating Income - loans & advance	-4.430	0.0000

Table 4 represents the t- statistics of operating income- net profit, operating income- deposit and operating income loans & advances of the sample banks. In the case of Dutch Bangla Bank Limited, all the three pairs are not significant. For the Islami Bank Bangladesh Limited operating income- net profit is not significant, but the rest of the two pairs are significant. In the case of Jamuna Bank Limited, operating income- deposit is not significant. For Janata Bank Limited, all three pairs are insignificant. In the case of Rupali Bank Limited, operating income- net profit is insignificant.

6. Conclusion

This paper aims to evaluate the efficiency of a sample of first, second and third-generation commercial banks and make an efficiency comparison. The sample chooses Janata Bank Limited and Rupali Bank Limited as first-generation banks, Islami Bank Bangladesh Limited and Dutch Bangla Bank Limited as second-generation banks, and Jamuna Bank Limited as third-generation banks. We apply

the stochastic frontier approach with a specification of the Cobb-Douglas stochastic frontier model and the technical inefficiency effects model. We use secondary data from 1996 to 2017 for the first-generation banks and second-generation Islami Bank Bangladesh Limited. From 2002 to 2017, for second-generation Dutch Bangla Bank Limited and third-generation Jamuna Bank Limited, efficiency is assessed in operating income, net profit, deposit, and loans & advances.

Efficiency results of first-generation banks exhibit that, in terms of operating income, net profit, deposit, and loans & advances, the averages of efficiency performance of Janata Bank Limited are 77%, 33%, 97% and 97%, respectively, those for Rupali Bank Limited are 87%, 46%, 92% and 71% and for Islami Bank, Bangladesh Limited are 54%, 59%, 98% and 98%. Efficiency analysis for second-generation banks shows that Dutch Bangla Bank Limited is found to be, on an average, 89%, 73%, 79% and 83% efficient in terms of operating income, net profit, deposit and loans & advance, respectively and that for third-generation indicate that Jamuna Bank Limited are 90%, 54%, 87% and 84% efficiency in terms of operating income, net profit, deposit, and loans & advance respectively.

A comparison of efficiency analysis implies that the first-generation banks are less efficient in managing operating income and net profit than their second and third-generation counterparts. In contrast, these first-generation banks are more efficient in collecting deposits and providing loans & advances. Dutch Bangla Bank Limited shows the highest efficiency in earning a net profit, and Janata Bank Limited shows the lowest. Jamuna Bank Limited holds the highest efficiency in managing operating income, while Janata Bank has the lowest. The deposit collection efficiency of Islami Bank Bangladesh Limited is the highest, and that of Dutch Bangla Bank Limited is the lowest. In providing loans & advances, Islami Bank Bangladesh Limited earns the highest while Rupali Bank Limited has the lowest position. Results reveal that there is room for enhancing efficiencies, especially in managing more net profit; hence, appropriate policy suggestions are required.

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Transformation of Waste into Energy in Pabna Municipality Area of Bangladesh: An Economic Valuation

Md. Hafiz Iqbal[*]
Md. Aminul Islam[**]

Abstract

As society becomes more affluent and urbanized, communities become more congested and waste composition becomes more complex, making it problematic through continued dumping. As a typical scenario of waste mismanagement and negative environmental impacts from the landfill waste in Pabna city, reducing GHGs emissions from landfilling and developing renewable energy supplies is essential. This study sets its objectives to assess the perceptions and preferences for waste management in Pabna, evaluate differences between landfilling and Waste-to-energy (WTE) in terms of economic and environmental costs and benefits and explore the range of parameters that support the feasibility of WTE. This study carried out both the secondary data and household interviews (n=301), followed by a structured questionnaire and used the First Order Decay Model, cost-benefit analysis and sensitivity analysis to generate an empirically supported assessment. Provision of tipping fees, waste tax, willingness to pay for waste collection and electricity bills for using electricity generated from the waste can help improve waste transformation into an energy project in the Pabna city. This study considers specific and relevant transformation ways of waste into energy to generate empirically supported explanations, identify the negative impacts of open dumping of waste and formation of waste policy in the Pabna city of Bangladesh. The findings of this study will provide a robust basis for policymakers, planners, researchers, government and development partners for further research, project implementation of the transformation of waste into energy, developed specified policies to lessen the emission of GHGs, building resilient and sustainable waste management and establish a low carbon society.

[*] Assistant Professor (Corresponding author), Department of Economics, Government Edward College, Pabna-6600, Bangladesh. Email: vaskoriqbal@gmail.com
[**] Assistant Professor, Department of Economics, Government Edward College, Pabna-6600, Bangladesh.

Keywords *Waste management · De-carbonization · Low carbon society · Smart city · Economic valuation · Pabna Municipality · Bangladesh*

1. Introduction

Waste is a part of the natural environment, but it is becoming a severe issue in urban areas of developing countries. Urban areas of Bangladesh have been experiencing rapid population and economic growth, leading to unprecedented consumption and waste generation. Like the other urban areas of Bangladesh, the Pabna Municipality area is facing a waste management crisis. Alongside the more significant quantities of waste, the characteristics and composition of waste are also becoming more complex. As societies become more affluent and urbanized, communities become more congested, and the waste composition becomes more complex-with greater portions of plastics, and other mixed and processed materials-which makes it problematic to continue dumping or burying waste (Klar et al., 2014). More alarmingly, only 40% of disposal sites in the world have leachate treatment, and fewer have gas collection systems. This meant that most disposal sites released untreated and potentially toxic leachate directly into the waterways or soil, and harmful greenhouse gases like methane and carbon dioxide are being passively released into the atmosphere or building up in the landfill, creating a risk for explosion (AusAID, 2011). Aside from GHGs emissions, the dangers of the negative impacts of improper waste management on society and the environment are also driving action for improving waste management strategies. Solid waste in landfills is from mixed streams and not sorted, allowing chemicals and harmful metals to mix with organic degradable materials. The leachate or liquid run-off produced in landfills can be toxic and seep into the soil and water supply. Heavy metals, pathogens and other hazardous substances can also contaminate the environment. Noxious odours and pests are additional nuisances to nearby communities. It is the responsibility of the local government to manage official waste disposal sites. Still, low political will and commitment, lean budgets, inadequate human resources and loose regulation often relegate waste management to low priority in political agendas (Damanhuri, 2005). Poor city governance of waste management, absence of Waste Law, low political priority, insufficient financing, and human behaviour in Pabna City are responsible for environmental degradation. The contamination of surface and groundwater expresses the environmental degradation in this area through leachate, soil contamination through direct waste contact or leachate, and air pollution by burning waste. Every household in this area dumped waste indiscriminately in the streets or the drains and later, collected solid waste by Pabna Municipality on land in a more uncontrolled manner. Such practice also negatively impacts public health and causes economic and welfare losses. Diarrhoea, cholera, dysentery, asthma, scabies and etching result from mismanagement of waste, and most people frequently suffer from these diseases. Disease-affected people cannot participate vigorously in any income-generating activity; hence they lose their living standard.

Land scarcity and exponential waste growth make stop-gap measures such as expanding landfills more complex and costlier. High land prices and dense communities are removing expansion as an option. In addition, the impact of the waste sector on climate change is another driver for improving waste management. Bangladesh ratified the Kyoto Protocol in 1997, followed by the United Nations Framework Convention on Climate Change (UNFCCC), committing itself to reduce its emissions. The primary emission from the waste sector is methane, which has 28 times the global warming potential of carbon dioxide (Global Carbon Project, 2013). Environmentally sound and sustainable waste management is one of Bangladesh's target strategies for reducing GHG emissions.

Solid waste management in Pabna is facing serious challenges. In particular, the practice of landfilling is unsustainable and no longer an adequate solution because of its adverse impacts on society and the environment. A new strategy is needed, and waste into energy through incineration can be a triple-pronged strategy that simultaneously provides long-term sustainable waste management, reduces GHGs emissions from waste and is a new source of renewable energy for the Pabna. Waste into energy by incineration is a proven and popular strategy for developed economies but has limited application in developing countries (Williams, 2011). Thus, waste into energy can be a potential solution for Pabna that can provide environmentally sustainable waste management, reduce emissions and waste in landfills, enhance income-generating capacity, and promote a feed-in tariff system and renewable energy.

This study sets its objectives to assess the perceptions and preferences for waste management in Pabna, evaluate differences between landfilling and transformation of waste into energy in terms of economic and environmental costs and benefits, and investigate the parameters in which transformation of waste into energy is a feasible alternative to landfilling in Pabna Municipality area and explore the range in parameters that will support the feasibility of the transformation of waste into energy.

2. Literature Review

Like the other cities of Bangladesh, Pabna Municipality has no Solid Waste Law. The Government of Bangladesh (GoB), the World Bank, Japan International Cooperation Agency (JICA) and other development partners of Bangladesh took many initiatives for proper solid waste management (SWM) schemes in the different urban areas of Bangladesh. These initiatives are laudable, but several weaknesses exist in implementing adequate waste management. Prior research on waste in Bangladesh finds that institutions and services are poorly organized and inadequate. This is reflected in waste's low political priority and insufficient financing.

Consequently, mismanagement and uncollected waste are dumped indiscrim-

inately in the streets and drains, contributing to flooding, breeding of insect and rodent vectors and spreading of diseases (UNEP-IERC, 1996). Collected municipal solid waste in Bangladesh has been dumped on land more or less uncontrolled manner. Such practice creates serious environmental problems that affect the health of humans and animals and cause severe economic and other welfare losses (Zurbrügg, 2002). The contamination of surface and groundwater can express the environmental degradation caused by inadequate disposal of waste through leachate, soil contamination through direct waste contact or leachate, air pollution by burning of wastes, spreading of diseases by different vectors like birds, insects and rodents or uncontrolled release of methane by anaerobic decomposition of waste. Several studies explored improvements and alternatives for waste management, but these have limitations and cannot address waste issues at the scale. Waste-to-energy (WTE) by incineration is a proven and popular strategy for developed economies but has limited application in developing countries (Williams, 2011). WTE can be a potential solution for Bangladesh that can provide environmentally sustainable waste management, reduce emissions and waste in landfills, enhance income-generating capacity and green growth and provide renewable energy.

3. Materials, Methods and Results

This section will be divided into three parts- scope of the research, description of the study area, data description and the analytical approach.

3.1 Scope of the research

This research aims to compare the costs and benefits to local governments and the greater society of two final treatment scenarios for municipal solid waste in Bangladesh: landfilling versus transforming waste into energy. As defined by the Intergovernmental Panel on Climate Change (IPCC), municipal solid waste (MSW) is waste from households, gardens and parks and commercial or institutional entities such as schools and businesses (IPCC, 2006). Wastewater, industrial waste, toxic/hazardous waste, medical waste, construction and demolition waste and disaster waste are outside this study's scope.

3.2 Description of the study area

Pabna Municipality, Bangladesh, is selected as the case study site because its population, waste characteristic and challenges with waste management are conditions faced by nearly all urban centres in Bangladesh. Thus, findings and lessons extracted from the Pabna study can be applied to other cities in Bangladesh. Pabna city is located in the Northwest region of Bangladesh.

Central Pabna City is bounded by the Government Edward College in the

North, the Icchamoti River in the East, Pabna Mental Hospital in the West and Bus Terminal in the South. It is approximately 223 km away from Dhaka, the capital city of Bangladesh. The population growth rate in Pabna is 3.00, much higher than the national growth rate of 1.22 in 2013 (BBS, 2012; World Bank, 2013). Urbanization and domestic migration from other regions into Pabna City contribute to Pabna's higher population growth. The current population and waste trends for Pabna are summarized in Table 1. Collected waste dumped in this City at Fakirpur, Chetonermore and Banglabazar. Fakirpur is a giant landfill of garbage. It is away from approximately 12 km away from the centre point of Pabna City. This landfill began operations in 2003 and was initially designed as 10 hectares and capacity to hold 2 million m^3 of waste. It had an expected life of 14 years (2003-2016), but the landfill reached capacity earlier than planned. This study depends upon the Fakirpur landfill for the economic valuation of the transformation of waste into energy.

Table 1: Population and waste data in Pabna city

Year	Population	Population change	Waste collection (tones/year)	Daily waste collection (tones/day)	Annual waste collection change from the prior year
2011	3,87,675	0.233306	144,121	395	0.041743165
2001	3,14,338	-	138,346	379	-

Source: *Pabna Municipality, 2015; BBS, 2012*

3.3 Data Description

This study employed qualitative analysis to determine society's view on waste issues and interests in addressing the challenges. Findings from the qualitative research are further applied to policy considerations. The qualitative data were obtained through focus group discussion, random survey questionnaires and personal interviews.

3.3.1 Focus group discussion (FGD)

The focus group discussion's objectives were to understand better the nuances of household waste management practices and challenges and to contribute to developing a relevant questionnaire survey. Participants in the focus group discussion were heads of locality and heads of households. The focus group participants provided first-hand individual experiences and practices with waste management that helped inform the design and content of the survey questionnaire and suggest the appropriate attribute levels used in the questionnaire. The focus group was held on 23 March 2015 and lasted three hours. There were 12 participants and one discussion facilitator, a representative from Pabna Municipality.

3.3.2 Survey through questionnaire

A survey questionnaire was conducted to identify waste management and waste disposal activities, measure the public's perception of the waste management services in Pabna City and provide information about current waste final disposal challenges and potential new waste management programs. The target respondents were adult household members with homes in Pabna and business owners or managers with businesses in Pabna. Respondents were randomly selected from throughout the City. The survey was carried out in April 2015 through face-to-face interviews. The final sample size was 201, comprising 160 households and 41 businesses.

3.3.3 Interview questions

This study also conducted interviews with local and national officials from May to June 2015 to better understand waste management policies, processes, and priorities. Individuals interviewed included bilateral donors, national ministry officials, experts from Bangladesh's Waste and Climate Change working group and local government officials working in waste management. Interview topics included the evolution of waste management policy, background and history of waste disposal sites, budgeting and finance for waste services, inter-agency cooperation and coordination for waste management.

3.4 Analytical approach and results

3.4.1 Projections for waste

An essential component of this analysis is determining the future amount of waste to be handled by Pabna. Population and waste collection data, provided by the Pabna Municipality, served as the basis for population and waste projections. Annual waste generation amounts are the product of the projected population and assumed per capita waste generation. Three projections are considered: lower, middle and upper bound based on different people and per capita generation growth rates.

3.4.2 Economic valuation

The economic valuation conducted in this study is a costs-benefits analysis comparison between the status quo landfilling waste management strategy and the alternative transformation of waste into an energy incineration strategy. All figures in Bangladesh taka are converted to US dollars following the 2014 average exchange rate of 78.80 taka per US$.

The costs and benefits parameters include both financial and environmental considerations. Financial costs include capital and operational costs, whereas environmental costs are the valuation of net emissions for each scenario. Financial benefits include revenue received through taxes and sales of electricity, while environmental benefits are the net emissions reduction for each scenario. The waste

collection cost in the landfilling scenario and transformation of waste into energy is assumed to be the same and thus are netted out of the comparison analysis. Both scenarios' economic internal rate of return (EIRR) is calculated and compared. A sensitivity analysis is conducted to determine the impact on the EIRR given some variable in the assumed parameters.

3.4.3 Landfill baseline

The landfill scenario's baseline analysis is based on financial figures listed in the 2014 Pabna Municipality budget for waste management. The budget does not itemize expenses and revenues according to the components of the waste management process, namely budget items associated with the collection, transportation, transfer and final disposal. Budget items in each category were then identified as either capital or operational expense. Capital expenses were then assigned estimates for the frequency of needed purchases. The costs per unit of waste handled ($/ton) were determined by dividing the total 2014 costs by the estimated total tonnes of waste treated by the municipal authority in 2014. These baseline costs were then projected over 20-years from 2015-to 2035 under a lower-, middle-, and upper-bound collection scenario.

3.4.4 Transformation of waste to energy

The costs and benefits of transforming waste into energy scenarios are estimated based on the data from a prior study by Hitachi Zosen (2012) for an incineration project in Greater Malang, Indonesia (see Table 2 for more details).

Table 2: Comparison of Malang region and Pabna city

Parameters of transformation of waste into energy	Malang region (Hitachi Zosen feasibility study)	Pabna City
Population	2,603,126	226,050
Population growth rate	1%	3%
Waste collection	441 tonnes/day (target in feasibility study)	395 tonnes/day (current)
Collection rate	34.7% (target)	33% (current)
Waste Moisture Content	55% – 67%, varies by season with average = 60%	Assumed to be the same
	Waste components	
Organic portion	65%	67.65%
Paper	6%	9.73%
Textiles	3%	2.50%
Wood	7%	4.20%
Plastics	16%	2.70%

Parameters of transformation of waste into energy	Malang region (Hitachi Zosen feasibility study)	Pabna City
Glass	0.6%	1.13%
Metals	0.2%	8.79%
Rubber	0.7%	2.40%
Other	1.5%	No data

Source: *Hitachi Zosen, 2012; Waste Concern, 2009; Pabna Municipality, 2015*

Parameters of transforming waste into energy adapted from the Malang study and applied in the transforming waste into energy scenario in Pabna city are summarized in Table 3.

Table 3: Transformation of waste into energy parameters of Malang WTE applied to Pabna city

Parameters of transformation of waste into energy	Malang region (Hitachi Zosen feasibility study)	Pabna City
Technical specification		
Incineration technology	Stoker grate incinerator	Same
Plant location	On landfill site	Same
Capacity of plant	800 tonnes/day	Same for lower bound scenario; varies for other scenarios
Financial specification		
Operating hours/year	8,000	Same
Investment/Capital costs	US$125 million	Same for lower bound scenario; varies for other scenarios
Interest rate on loan	6% over 20 year period	Same
Operational and maintenance costs	$35/tonne of waste	Same for lower bound; varies for other scenarios
Electricity production	7 MW (78,771,600 kWh/yr)	Same for lower bound; varies for other scenarios
Electricity consumption	152,880 kWh	Same for lower bound; varies for other scenarios
Taxes, tariffs and other considerations		
Energy from waste price	US$0.105/kWh	-
Price of emissions	US$8.50/tCO2e	US$7.20/tCO2e
GHG emissions avoided	66,874 tCO2e average/yr	61,000tCO2e avg/yr (lower bound); varies for other scenarios
Avoided landfill (savings)	US$2/tonne	US$1.93/tone
Landfill volume reduction	95%	Same

(Source: Hitachi Zosen, 2012; Waste Concern, 2009; Pabna Municipality, 2015)

Financial parameters for the 800 tonnes/day facility were adapted from Hitachi Zosen's study. Still, the estimated costs for 1,200 and 2,000 tonnes/day plant sizes are calculated from a waste technologies costs functions proposed by Tsilemou and Panagiotakopoulos (2006) following the form: $Y = \propto X^{\beta}$ (1)

where α and β constants; β < 1 and represents economies of scale; *X* is design capacity (waste to be treated annually in tonnes per year), and *Y* is the cost in Euros.

The costs and benefits, advantages and disadvantages or cost-savings

considered for transforming waste into energy in Pabna Municipality area are shown in Table 4.

Table 4: Summarization of cost-benefit of transformation of waste into energy in Pabna city

Cost	Benefit
Construction and capital Operational costs Debt service Interest paid	Waste tax Electricity sales Avoided landfilling Avoided land and capital expansion Avoided emissions

Source: *Authors' calculation, 2015*

3.5 Economic evaluation

The key assumptions that allow for the high internal rates of return are two new revenue sources for the local government: (1) per capita waste tax and (2) income from electricity sales. These revenue schemes have never been implemented in Pabna, and there is uncertainty about how accepting society will be of these new costs. Therefore, in this section, a sensitivity analysis is conducted to estimate the range of values for each of these items for the FIRR and EIRR to hold. The revised parameters and their impact on FIRR and EIRR are presented in Tables 5 and 6.

Waste tax revision: A waste tax was assumed to transform waste into energy base analysis to correct society's under-appreciation of waste services. In this analysis, the revenue from the waste tax is removed, but the tipping fee is still assumed at $38/ton, and the electricity selling price is $0.105/kWh. Only with the upper bound plant size of 2000t/d that the positive rates of return still hold. Without the waste tax levied on the public receiving waste taxes, an 800t/d and 1200t/d facility is not feasible for the local government.

Table 5: Waste tax sensitivity analysis

Revised parameter	No Waste Tax	FIRR	EIRR
Lower bound : (800t/d)	Base w/tax	0.89%	6.83%
	No tax	Unable to be determined	Unable to be determined
Middle bound: (1200t/d)	Base w/tax	15.06%	18.17%
	No tax	-1.92%	3.82%
Upper bound: (2000t/d)	Base w/tax	23.38%	25.63%
	No tax	10.89%	14.08%

Source: *Authors' calculation, 2015*

Electricity price: The assumed electricity selling price in the transformation of waste into energy base analysis is set at $0.1050/kWh, which was the feed-in tariff rate for renewable energy from waste assumed in the Hitachi Zosen for the Malang

feasibility study. But feed-in tariff system is not well established in Bangladesh. The transformation of waste into energy can ensure a feed-in tariff system.

4. Policy Implications

As shown in the analysis, the practical implementation transformation of waste into energy for Pabna is critically dependent on policy measures at both the national and local government levels. In developing countries, this uncertainty in the achievement and effectiveness of domestic policies has constrained high-cost and high-tech investments like transforming waste into energy incineration**.**

However, landfills' challenges and potential negative impact on society and the environment make ignoring the transformation of waste into energy incineration an irrational practice. The conversion of waste into energy can provide sustainable waste management and solve other challenges in Bangladesh, including the reduction of GHGs emissions and the development of renewable energy supply. It is insufficient to view waste management only in financial terms because waste management is a public good and is linked to public health and environmental amenities. A waste management project must be evaluated regarding costs and benefits to society.

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Bangladesh and the World: In 2050 and beyond

Md. Anisur Rahman*

Abstract

The millennium development goal was set to target goals for developing mainly the developing and less developed countries. After completing the goals, the world leaders are inspired to take a broader vision to take Sustainable Development Goals by 2030. The goals are targeted with 17 visions for the development of all. The development program is an interconnected system of action to bridge the gap in different sectors of the countries with the world.

4th industrial revolution is an interconnected manufacturing and business process in a cyber-physical environment. The disruptive technologies of the 4th Industrial Revolution are rapidly changing the systems and networks of business and manufacturing. These changes are seen across companies, industries, countries, and society. These technologies can also affect the environmental, economic, and social challenges of the 2030 Agenda for Sustainable Development Goals in values for business, society, and the environment.

According to a United Nations report, the current world population is 7.6 billion, expected to reach 8.6 billion by 2030, 9.8 billion by 2050 and 11.2 billion by 2100. Only in Asia will the population be 5.2 billion by 2050, more than half of the world's population. Three billion of them will live in urban areas. Urban areas will be the centres of higher education, innovation, and technological development for economic activities. The quality and efficiency of urban areas will determine the country's long-term competitiveness and socio-economic and environmental stability.

Bangladesh has a reasonable GDP growth rate and a globally compatible policy for innovation and technological development, education, health, and the environment. It will meet the demand of the world in 2050 and can contribute to the global economy from Asia with PRC, India, Indonesia, Japan, Republic of Korea, Thailand and Malaysia.

Keywords *Industry 4.0 · Industry 5.0 · Society 5.0 · TWIN 2050 and SDG ·*

* Assistant Professor, Department of ICT, Daulatpur College, Kushtia, Email: arahmankst@gmail.com

1. Introduction

In evaluating millennium development goals MDG, the data and analysis presented that, with targeted interventions, sound strategies, adequate resources and political will, even the poorest countries can make dramatic and unprecedented progress. The evaluation report also acknowledges uneven achievements and shortfalls in many areas. The work is incomplete and must continue in the new development era.

The new development era is the sustainable Development Goals set in 2015 by the United Nations General Assembly and are intended to be achieved by 2030. SDG is taken under UN Resolution 70/1, as the AGENDA 2030. The Agenda is committed to removing poverty and achieving sustainable development worldwide by 2030. It is a shared global vision toward sustainable development for all. The proposal contained 17 goals with 169 targets.

SDG vision 2030 is an agenda with 17 targets for sustainable development for all. But vision 2050 aims to achieve socio-economic sustainability within a stable earth system.

The United Nations Intergovernmental Panel on Climate Change 2018 Report stated, "Limiting global warming to 1.5°C would require rapid, far-reaching and unprecedented changes in society." In recent years, it has become clear that this scenario would require a transformation of our energy system to meet our global emissions targets and a rethinking of how we control the temperature of our homes, travel around our planet, and manufacture our goods.

The achievement of a sustainable development goal mainly depends upon sustainable economic development. There is a clear link between industry 4.0 and society 4.0 with the SDG 2030 and the industry 5.0 and society 5.0 with the TWIN 2050.

2. Development Sustainability

Development is measured using the Human Development Index. The United Nations calculate HDI. It measures average life expectancy, level of education and income for each country.

The main challenges to sustainable development, which are global, include poverty and exclusion, unemployment, climate change, conflict and humanitarian aid, building peaceful and inclusive societies, building strong institutions of governance, and supporting the rule of law.

SDG 2030 is a shared global vision toward sustainable development for all. The proposal contained 17 goals with 169 targets. These included ending poverty and hunger, improving health and education, making cities more sustainable, combating climate change, and protecting oceans and forests.

Sustainable development as a political and scientific agenda emerged as a political vision with the Report "Our Common Future" in 1987 by World Commission on Environment and Development 1987. Modern science and technology are essential for ecolizing the economy.

A strong economy implies a high rate of economic growth. It means an expansion in economic output; it will lead to higher average incomes, higher output and higher expenditure—low and stable inflation.

GDP has always been a measure of output, not of welfare. Using current prices, it measures the value of goods and services produced for final consumption, but GDP is not a measure of human welfare. It can be considered some other component of welfare like Social and environmental.

Development is measured by average life expectancy, level of education and income for each country. GDP growth has varied over the world for a long time. Developing countries have had a significant increase in life expectancy and levels of education since 1960. If the GDP growth rate in developing countries can return to the rates of the 1960s and 1970s, we can see a new world in 2050. The total GDP of the developing countries in 2050 will be higher than developed countries.

Global life expectancy at birth in 2016 was 72.0 years (74.2 years for females and 69.8 years for males). Women live longer than men all around the world. The gap in life expectancy between the sexes was 4.3 years in 2000 and had remained almost the same by 2016 (4.4). Global average life expectancy increased by 5.5 years between 2000 and 2016.

World illiteracy and the percentage of populations without schooling have already decreased, from 36% in 1960 to 25% in 2000, and in 2016 it is 14%. A higher education rate is essential for countries to achieve higher economic growth. Education is one of the fundamental factors of development. Education raises people's productivity and creativity and promotes entrepreneurship and technological advances. In addition, it plays a crucial role in securing economic and social progress and improving income distribution. There is a strong relationship between growth and income inequality.

3. Industry 4.0 is a Shared Vision of Global Growth

Industry 4.0 is the digital transformation of manufacturing, production, related industries, and value creation processes for goods and services. Industry 4.0 rapidly transforms manufacturing systems, products, and components' design, production, implementation, operation, and service.

Industry 4.0 is also called the 4th industrial revolution due to the exponential capacity of innovation and unprecedented power of productivity. It is different from the other three industrial revolutions. It enables a new production system, value creation, and real-time optimisation. Industry 4.0 is leading towards a new industrial value chain and fundamental process of transformation and innovation in industrial production.

Industry 4.0 is knowledge-based industrial processes for making manufacturing more innovative and cost-effective using disruptive technologies. Industry 4.0 depends on several innovative technological developments such as information and communication technologies, which are used for digitising information and

integrating systems at all stages of product design, development, manufacturing and service. This integrated system can be adopted inside an organisation or country and cross-organisational in different countries.

Industry 4.0 can solve *some of the world's challenges, such as resource and energy efficiency, urban production,* and demographic change. The interconnected system of manufacturing goods and its services of industry 4.0 enables *resource productivity and efficiency* gains to be delivered across the entire value network. It allows work to be organised to consider demographic change and social factors.

The transformative impact of disruptive technologies on societies and economies increases the demand for technological innovation in emerging markets, which tend to adopt technologies and develop elsewhere. To take advantage of technological innovation and disruption, national and international regulators must consider critical issues like privacy, data security, and competition if the current wave of disruption benefits all.

Reducing poverty and increasing shared prosperity in emerging markets depends on improving the rate at which these emerging markets adopt the new technologies. The exponential capacity of innovation and unprecedented productivity power of the disruptive technologies amplifies opportunities for transformation not only for production, but the interconnection will create economic and social value by enabling users to share knowledge, labour, digital or physical, as the resources.

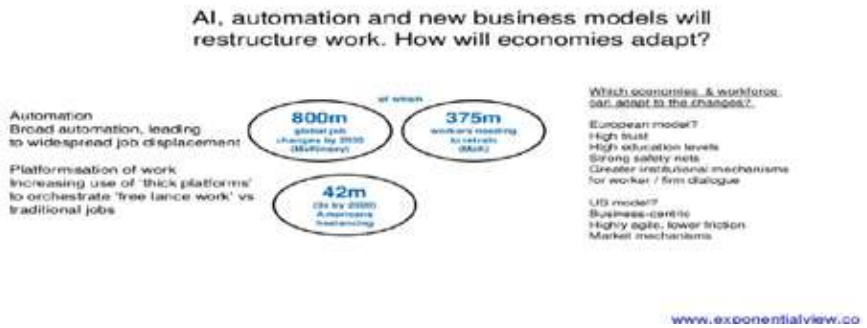
Technological innovations and their adoption as a shared vision can narrow income differences between developing and developed countries by reducing the technology adoption gap. Developing countries can come out from the late arrival of disruptive technologies.

4. Industry 4.0, Disruptive Technology and Employment

Automation of manufacturing and business services is integral to technological progress and may significantly impact the labour market. The impact of automation can be crucial in countries where unemployment is high and employment is low. Therefore, nations must prepare themselves for the potential risks associated with the impact of digital technologies on the labour market.

Automation in manufacturing and business services is the system of industry 4.0 fuelling the 4th industrial revolution by using disruptive digital technologies. It is an interconnected model of higher productivity and growth.

Figure 1: Automation and Jobs



Source: *exponentialview.com*

Automation in the manufacturing sector

One of the most critical application areas for automation technology is manufacturing. Through *automatic control, i*ndustries can process and manufacture goods with little human assistance. *In an automated industry,* control systems and data management equipment for processing, design, manufacturing goods and other activities. It can boost output and efficiency by using disruptive digital technologies at a different layer of production.

Automation in manufacturing is used to perform repetitive tasks with little or no human intervention. The manufacturing system uses software and hardware to control processes through computer programming. AI, big data, robotics, and the internet increase manufacturing automation demand. Which is transforming the nature of work very fast. Manufacturing automation destroys jobs for the unskilled workforce and creates jobs for the skilled workforce. The Fourth Industrial Revolution begins a mismatch between available workers and the skills necessary for new jobs.

Automation in the business service sector

Business automation is a component of digital transformation. It uses data, software, hardware, and the infrastructure that supports operational activities of business automation technologies to upgrade the traditional business processes.

Service automation is adopting disruptive technologies and integrating automation in different layers of business services. It is the process of automating events, processes, tasks and business functions. It increases the workflow and visibility of a business.

At the same time, these disruptive technologies are transforming the nature of work in the business service sector. Technology is doing more tasks than the human workforce. As a result, some jobs are already declined, others are growing, and many more will change.

To meet the challenges of unemployment, new employment opportunities and underemployment, slow diffusion of the technologies can make a company or a country a "late comer" in the 4th industrial revolution. Companies and governments should benefit from disruptive digital technologies' enhanced performance and productivity. The benefits of these technologies will create economic surpluses that will help societies manage workforce transitions.

Entrepreneurship and rapid new business formation will boost productivity and drive job creation. It will increase productivity growth. Investment in new business formation and adoption of disruptive technology is essential; otherwise, the productivity slowdown is risky.

Investment in developing human capital to increase the skill of workforces according to industry 4.0 is a fundamental factor now. The leaders, governments, academic institutions, industry players, and technologists have significant responsibilities for the appropriate policy at the local, regional and global level of transformational operation in the business and manufacturing sector.

5. Industry 5.0

The concept of industry 5.0 is an evaluation of industry 4.0. We are on the doorstep of a new transformation in Industry 5.0. Industry 4.0 is an interconnected manufacturing process under a cyber-physical environment using disruptive technologies, increasing safety and quality, and reducing waste. The new industrial age originates from the unprecedented innovation and production capacity of the technologies 4.0, mainly in the ICT, AI and robotics fields, leading to Cyber-Physical systems and increasingly powerful IoT devices. Industry 5.0 will cooperate more with machines and humans to add value to the goods and meet customers' requirements. Industry 5.0 will use cobots and Intelligent Software applications. Unlike the robots currently used in the production cycles, Cobots are collaborative robots programmed to interact with humans in a distributed workplace for the same goal. The differentiation and personalisation of products can't be done without the guidance of the human mind.

Not a long time industry4.0 was started as an interconnected manufacturing process. The world is not entirely connected with the connected manufacturing process at a higher percentage. The world is threatened by lower average productivity growth because of the lower affordability of modern technologies in developing economies.

Yet, visionaries are already forecasting the next revolution, Industry 5.0. Suppose the current revolution emphasises the transformation of factories into IoT-enabled innovative facilities that utilise cognitive computing and interconnect via cloud servers. Industry 5.0 focuses on returning human hands and minds to the industrial framework with a close and cooperative interaction between man and machine. There will be more upper-skilled workforces for the manufacturing operation and need more affordability for adopting these technologies.

Industry 5.0 is the revolution in which man and machine will find ways to work together to improve the means and efficiency of production. Artificial intelligence will improve the robots' more humanlike capabilities, and the interaction between computers, robots and human workers will ultimately become more meaningful and mutually interactive for the same goal. Industry 5.0 will create more productivity, increase safety and quality and reduce waste. It could ensure a healthier industrial environment by using more electric power than traditional energy.

The vision of industry 5.0 will affect the working world soon by making up new, more specialised and better jobs. Artificial Intelligence and cobots in the sector aim to facilitate employees, not eliminate them. The collaborative dimension of the next revolution will reduce workload by freeing the employees from the most complex duties.

6. Society 5.0

First was the hunting society. Second is the segrarian society. Third, the industrial society and Fourth, the information society. The fifth stage will be an Imagination Society. The combination of diverse people's digital transformation, imagination, and creativity will solve society's problems and create new values.

There is a transition to Society5.0 and the 4th Industrial Revolution. Both the concepts refer to the transformation of the world towards a new paradigm.

Industry 4.0 can be efficiently used to control and improve vital resources, energy, water, and waste by connecting and automatically exchanging information through an interconnected communication system.

The well-being of our future will be dependent on how we can produce technology that can govern our climate, health, social equity and stability. Technology 4.0 can be used to mitigate and provide a solution for enhancing our way of life by producing sustainable products and services.

In Society 5.0, any product or service will be optimally delivered according to people's needs. Society 5.0 will help overcome significant social challenges such as an ageing population, social polarisation, depopulation, and energy and environment constraints.

"Society 5.0" was presented as a core concept in the 5th Science and Technology Basic Plan, adopted by the Japanese Cabinet in January 2016. It was identified as a growth strategy for Japan. The Japanese government and business community want to seize the golden opportunity to reverse lingering adverse trends. They aim to create a society where they can resolve various social challenges by incorporating the fourth industrial revolution innovations like IoT, big data, artificial intelligence, robot, and the sharing economy into every industry and social life. By doing so, the future society will be one in which new values and services are continuously created, making people's lives more conformable and sustainable. This is Society 5.0, a super-smart society. Japan wants to take the lead to realise this ahead of the world.

The central concept of the proposal is Society 5.0, based on the idea that human society is moving into a fifth stage. They evaluate the last year that the Japanese economy grew gradually and consistently. The international environment is undergoing a dynamic transition. They have entered an uncertain world in which digital technology is bringing significant changes to the economy and the foundations of society itself.

Society 5.0 will bring profound changes to people's lifestyles and industries. Society 5.0 aims to use the potential of the digital transformation not only for economic growth but for the solution of social issues and coexistence with nature. It can also help to achieve the United Nations Sustainable Development Goals SDG. In this context, policymakers, business practitioners, scientists, and intelligent societies are working together to add sustainable value to reinforce the positive aspects of technology's effect on nature.

Japan is facing some challenging problems, but the government and business leaders see the concept of Society 5.0 as being a way to overcome these. Japan might then be able to share its own experience with the rest of the world, given that other countries may encounter similar problems sooner or later. Japan is not the only high-income country facing an ageing population and sluggish demographic growth while struggling to compete in the new digital economy. Many developing countries are also facing the same problem.

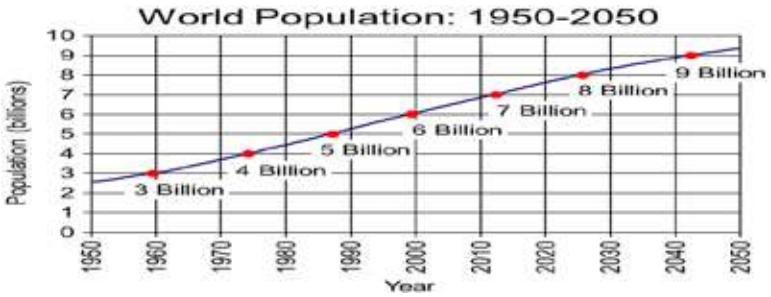
In June, the Japanese government is preparing to present its vision for Society 5.0 and the link between Society 5.0 and the SDGs at the G20 Summit in Osaka. EXPO 2025, which will be held in Osaka on the themes of the SDGs and Society 5.0, should offer Japan another opportunity to share its novel vision for the future with the world.

7. Industry 4.0 Urbanisation and Environment

The new evolution of the production and industrial process by disruptive digital technologies under a cyber-physical environment called Industry 4.0 is still moving forward with an unknown potential impact on sustainability and the environment. However, the technologies have the unprecedented capacity for innovation and increased productivity.

According to a United Nations report, the current world population is 7.6 billion, expected to reach 8.6 billion by 2030, 9.8 billion by 2050 and 11.2 billion by 2100. By 2050, 70% of the world population will live in urban areas, with more than half of them concentrated in Asia.

Figure 2: The World Population Growth by 2050



An increasing number of people live in the urban areas of the world. Almost half of the world's population will live in urban areas by 2020 because of the growing contribution of metropolitan regions to developing countries' economies.

The United Nations have projected that the global population in urban areas will reach 66% by 2050. Many studies have described that urbanisation affects CO2 emissions and heat and the circulation of water, aerosols, and nitrogen in the climate system.

The Paris agreement introduced an ambitious goal of limiting global warming to 1.5°C above the pre-industrial level. A preview model shows that transforming the land sector and deploying measures in agriculture, forestry, wetland, and bio-energy could contribute about 30% or 15 billion tons of carbon dioxide to the global mitigation needed in 2050 to meet the 1.5°C targets. Risks and barriers must be addressed, and incentives will be necessary to scale up mitigation while maximising sustainable development, food security and environmental co-benefits.

Much work has not yet been done regarding the interrelations between industry 4.0 advanced manufacturing and urban development. Industry 4.0 and advanced manufacturing are topics of high international relevance. Urbanisation is a megatrend that will significantly shape societies' economic, political, and social transformation and spatial impacts.

Integrating Industry 4.0 with the sustainable development goals in an eco-innovation platform cannot ensure environmental performance. So, the United Nations Intergovernmental Panel on Climate Change 2018 Report stated, "Limiting global warming to 1.5°C would require rapid, far-reaching and unprecedented changes in all aspects of society." In recent years, it has become clear that this scenario would require a transformation of our energy system to meet our global emissions targets and a rethinking of how we control the temperature of our homes, travel around our planet,

and manufacture our goods. Decarburizing for a zero-emissions world by mid-century would require precise and efficient measures, adopted and implemented rapidly – and we have the technologies to pursue this direction.

This work can contribute to helping stakeholders, practitioners, and governments advance solutions to deal with the outcomes emerging through the massive adoption of disruptive technologies and support the expected positive impacts through policies and financial initiatives.

8. ICT 4D

ICT 4D refers to information and communication technology for development. Industry 4.0 is an interconnected manufacturing and service system that automates service operations and manufacturing under a cyber-physical environment. Big Data is the primary source of automatic decision-making through information and communication technology and devices, requiring less human labour.

Industry 5.0 is also a related business and service sector that manipulate data for decision making and human-robot interface for customer-centric manufacturing of goods and services, where information and communication technology will play a significant role.

Society 5.0 is an integrated approach to empower humans to build a healthy environmental society for all, where manufacturing and waste recycling will occur through interconnected systems that will use digital technologies for the operation. Information and communication technology will play a significant role. It will also collect data for the requisite development priority selection through an interconnected decision-making process.

Industry 4.0, Industry 5.0, and Society 5.0 are interconnected systems of development of the existing system. Development 4.0 is an interrelated and interconnected development program; this is the global vision where faster, reliable connectivity is necessary. For international connectivity, ICT is the primary vehicle. For this reason, ICT 4D refers to Information and Communication Technology for Development.

The United Nations Development Program 2018. Development 4.0: Opportunities and Challenges for Accelerating Progress towards the Sustainable Development Goals in Asia and the Pacific forwarded the following assumption.

"Rapid advances in technology will profoundly affect societies in Asia-Pacific. The Fourth Industrial Revolution—characterised by innovations such as artificial intelligence, automation, and biotechnology—is likely to transform existing production, management, and governance systems. How countries embrace and adapt to the coming technological changes will determine whether they meet the 2030 Agenda for Sustainable Development promise and achieve the Sustainable Development Goals (SDGs)."

9. The World in 2050 is a Transformative Way to Achieve SDG

The World in 2050 (TWI2050) is declared by the International Institute for Applied Systems Analysis (IIASA) and other partners to provide a guideline for science, technology and innovation for the 2030 Agenda. It was presented at The United Nations Science, Technology and Innovation Forums and the United Nations High-level Political Forums.

In 2018, the first report by TWI2050 on Transformations to Achieve the Sustainable Development Goals identified six exemplary transformations needed to achieve the SDGs and long-term sustainability to 2050 and beyond: i) Human Capacity & Demography; ii) Consumption & Production; iii) DE carbonisation & Energy, iv) Food, Biosphere & Water; v) Smart Cities and vi) Digital Revolution.

Development is measured using the Human Development Index. The United Nations calculate HDI. It measures average life expectancy, level of education and income for each country.

There is a strong relation between industry5.0, society 5.0 and the world in 2050.

Industry 5.0 will be more cooperative between machines and human beings to add value to the goods for the customers. It will reduce workload and environmental balance by using disruptive technologies, recycling industrial waste, and renewable and electrical energy.

In Society 5.0, any product or service will be optimally delivered according to people's needs. Society 5.0 will help overcome significant social challenges such as an ageing population, social polarisation, depopulation, and energy and environment constraints.

Sustainable Development Goal is committed to removing poverty and achieving sustainable development worldwide by 2030. It is a shared global vision toward sustainable development for all. TWI2050 is a transformational way to achieve the Sustainable Development Goals and long-term sustainability by 2050.

10. Asia in 2050

By 2050 Asian region will be the highest populated region of the world and become the world's economic centre. The region is not yet sustaining its productivity by affecting a more significant percentage of sustainable development indicators. But the region is improving all the other indicators of sustainability and development. The more the region achieves productivity will impact more sustainable development.

The world in 2050 will be an interconnected world for increasing the socio-economic and environmental value of human development. Sustainable economic development is the key to ensuring sustainable social and ecological values. Sustainable productivity can boost economic development, which will impact social and environmental sustainability factors. Global sustainable productivity will depend upon the sustainable productivity of the regions and the area's

countries. Only an interconnected production system can increase the region's productivity and the world because the 4th and the 5Th industrial revolution depend upon the digital disruption by 2030 and 2050 in different nature of manufacturing and business environment and nature of work. These industrial revolutions are to increase the productivity in business, and manufacturing sectors are the key elements of the new economic world order.

By 2050 the global technology frontier could shift. The rapid adoption of disruptive technologies has considerable ways to grow fast. Asian technology has reached the global cutting edge in electronics, computers, information technology services, communications, drugs, and biotech.

In Asian economies, the capital stock growth per worker during the past two decades has been the fastest, with PRC at 8.6 per cent, India at 8.3 per cent, Vietnam at 9.3 per cent, and Cambodia at 9.5 per cent, among the fastest anywhere.

Other Asian countries, including Indonesia, Malaysia, Thailand, Turkmenistan, Singapore and Taipei, are deepening capital at 5-6 per cent a year, while the Philippines, Pakistan, Bangladesh, Kyrgyz Republic, and Kazakhstan are showing only 2-3 per cent growth in the capital-labour ratio.

The increasing rate of population in Asia will increase the demand for everyday goods and be the highest-selling goods. The consumers will drive the business, and manufacturing decisions will drive the economy because the future industrial revolution is coming for consumer-centric goods and their services.

The Asian region has an excellent adaptive capacity for the new disruptive technologies and the capital-labour ratio for productivity. The countries that do not have a good capital labor ratio need to improve their technology as a means of production. The labour should adjust to the disruptive technologies that have become the productivity enhancer, and some are the factor of production.

11. Bangladesh in 2050 and Beyond

For a country, it shows the actual gross domestic products produced by an hour of labour. Growth in labour productivity depends on Savings and Investment, Physical capital, New Technology and Human Capital.

Labour productivity is the value that each employed person creates per input unit.

The first determinant of labour productivity is human capital. **Human capital** is accumulated knowledge from the average worker's education, experience, skills, and expertise in an economy. The higher the average level of education in an economy, the higher the human capital and the higher labour productivity.

Government and firms can improve productivity by investing in physical capital, improving the quality of education and training and technological progress.

The second determinant of labour productivity is technological change. **Technological change** combines **invention,** advances in knowledge and **innovation** to produce a new product or service. Technology, mainly disruptive technologies, drive productivity and growth in transforming and developing the economy. The rapid development of the economy at a national, regional and global level changes our way of life and creates environmental pressure. But the technology cannot meet the whole problem and solution of ecological crisis. There need to develop consciousness and proper action.

The urban areas are going to more populated areas. There is a negative relationship between population density and environmental sustainability. But for the economic activities of urban areas, higher education, innovation, and technological development will be the centres of higher education. The quality and efficiency of the urban regions will determine the country's long-term competitiveness and socio-economic and environmental stability.

Only a conscious urban society can increase its quality and efficiency. A conscious urban society can use technology, innovations and cooperation to change the development trend toward a sustainable growth respectful of the environment by reducing desertification, soil exploitation and overbuilding, industrial and food waste pollution, and biodiversity loss where government should have to take support initiatives and investment in health, education, environment, transportation and infrastructure for a conscious urban society.

The environmental impact of economic growth includes the increased consumption of non-renewable resources, higher levels of pollution, global warming and the potential loss of ecological habitats. The economic growth caused by improved technology can enable higher output with less pollution.

Environmental protection itself contributes to economic growth. Somebody makes and sells the air pollution control technologies we put on power plants and motor vehicles. Somebody builds the sewage and water treatment facilities. Somebody is making and selling solar panels, windmills, and a high-capacity battery that will power electric cars. Clean air and water, healthy food and preserved nature benefit human health and result in more economic benefits than the economic cost.

The central role of growth in driving the speed at which poverty declines, economic growth is the most effective way to pull people out of poverty and deliver on their broader objectives for a better life. Sustainable economic growth

can ensure people's standard of living. Even small changes in the growth rate, when sustained and compounded over long periods, make an enormous difference in the standard of living.

GDP per capita is a useful indicator to measure a particular country's standard of living. A healthy climate for growth in GDP per capita and labour productivity includes human capital deepening, physical capital deepening, and technological gains, operating in a market-oriented economy with supportive government policies.

Bangladesh shows only 2-3 per cent growth in the capital-labour ratio. The GDP growth rate is 7.4%.

The Heckscher Ohlin model is called the factor price equalisation theorem. The theorem states that when the output goods' price is equalised between countries as they move to free trade, the price of the factor, capital and labour, will also be equalised between countries. It implies that free trade will equalise the wage of workers and the rent earned on capital throughout the world.

The theorem derives from the model's assumption, the most critical of which is the assumption that the countries share the same production technology and that markets are perfectly competitive.

The capital-labour ratio is at the heart of the 'one-sector regional growth model' (McCombie (1998) Urb. Studs, 25): people move from lower real-waged cities-regions to higher ones, the capital-labour ratio is more vital regions decreases and increases in weaker regions. The process stops as soon as the capital-labour ratio is the same in all areas. Then social welfare takes place equally.

The regions have different output abilities for growth total output, total output per worker, and increased per capita income. Low output growth of a region and higher per capita growth indicate labourers' out-migration. The total output growth per labour means growth in productive capacity and the ability to attract capital and labour from other regions. The output per capita indicates changes in economic welfare. A higher wage rate increases social welfare more and can improve environmental solutions.

Globalisation is giving importance to regional economies, including their capacity and competitiveness in the global economy. It will also open up the doors of regional development. Regional competitiveness is relevant in metropolitan and urban areas of different countries.

The quality and efficiency of metropolitan and urban areas will determine the country's long-term competitiveness and socio-economic and environmental stability.

United Nations Population Division (UNPD) released the 2004 revision of population projections for all countries. Bangladesh would reach 218

million by 2050 and finally stabilise at around 260 million in the mid-next century. We must face a new challenge of employment, income, and inequality within the region. We have to turn out our population (male and female) as human capital to face the new challenge of sustainable development goals in 2030, 2050 and beyond.

4th industrial revolution is going on over the world through automation and digitalisation in the business and service sector is an interconnected system of production and service. Bangladesh is a country not out of this process.

The capital to labour ratio allows the investors to understand if automation equipment has been deployed to replace labour-intensive tasks. A company may be lowering production costs to remain competitive or improve gross margins where there is an immediate risk of increasing unemployment.

By employing these unemployed labours to develop their production process skills, income per head can be minimised.

Unemployed, unskilled labour related to the disruptive technological production and service process should be employed in sectors requiring less technological adoption, like agriculture, fisheries, forestry, etc., to improve the income of the unemployed labourers.

The ailing industry's integration and cost minimisation can increase productivity and employment through manufacturing automation.

Integration of the present status of technologies of the country's small, medium and large scale industries to stay relevant with the global value chain to add value with the products for local demand of the goods and to include in the worldwide production line. It will increase local and international level employment and income.

The service sector, mainly in the digital service sector in business communication and outsourcing, created a good amount of employment and income contributing to per head income. There is yet a wide possibility in this sector to develop new jobs by expanding the present workforce skill.

Then the overall productivity under a full employment situation can sustain the socio-economic and environmental balance. Full employment is an economic situation in which all available labour resources are used in the most efficient way possible. Full employment embodies the highest amount of skilled and unskilled labour employed within an economy at any given time.

According to a United Nations Development Programme (UNDP) report, the population will reach between 230-250 million in 2050. If the

government fails to protect the rivers from pollution and land-grabbing, these turn into canals and deserts.

Many people will stay in urban areas because economic activities will pollute food waste. The relation between industrialisation and urbanisation will increase industrial and transportation waste pollution. These will generate heat and carbon emissions.

These environmental degradations can affect directly national health. Digitalisation can improve the environmental quality by using less natural energy, quickly recycling the waste, and detecting the level of pollution. The linkage between industrialisation and urbanisation is a demand for globalisation where environmental pollution is more significant than rural areas. Only global initiatives with local partnerships can ensure a sustainable environment for all.

River pollution and land grabbing are now about to be under the control of Bangladesh's government by taking necessary action. But the water flow depends upon the regional cooperation because many rivers of Bangladesh come from India, and these rivers are moving in the region. So regional cooperation is essential for the balance of water flow within the nations for a better environment.

Diversification of agricultural production and process industry with automation requiring less skill can compound the present situation of GNP and environment. An increase in farm production and food is essential to meet the increased requirement of the population by 2050 in Bangladesh.

After all, a human capital development process according to industry 4.0 and 5.0 through a globally consistent education policy and a particular importance on research and development can increase the country's innovation capacity.

A sound health policy and support are significant factors for increasing a nation's productivity. Currently, many diseases are costly to afford for all types of income levels in the country. Moreover, sometimes there are many global health disasters seen where there needs instant support from the government to meet the situation efficiently.

Bangladesh has a reasonable rate of total growth output. If we can positively minimise the employment situation, we will increase production per labour by humans and by adopting disruptive technologies in different layers of our production and service sector. Total growth and total output per labour ultimately increase per capita growth, improve the social welfare of the society by maintaining environmental and cultural values

for future generations, and will be genuinely a sustainable development for Bangladesh by 2050. The country could contribute to the global economy from Asia with PRC, India, Indonesia, Japan, Republic of Korea, Thailand and Malaysia.

We can calculate our future possible GDP growth rate by a simple formula that is,

Future Growth Rate (**F**) = Present GDP Growth Rate (**A**) +Expected Increased Growth Rate Per Year (%)+……. +2050 (**B**).

F=A+B.

Analysing the sources of economic growth is analysing the production **function**, turning economic inputs like labour, machinery, and raw materials into outputs like goods and services used by consumers. A microeconomic production function is the inputs and outputs of a firm or an industry. The entire economy's connection from inputs to outputs is called an aggregate production function in macroeconomics**.**

The production function determines how much output of firm, industry and country should produce under a given price of goods. The combination of inputs is to be used under a given price of capital and labour. It is a mathematical function that relates the maximum amount of output obtained from a given number of inputs.

A straightforward production function from which we can understand the relationship between capital, labour and output.

Q=K+L

Where Q denotes the quantity of output, K denotes the amount of capital, and L represents the amount of labour used in production.

This production function describes that; a firm can produce one unit of output for every unit of capital or labour employed. This production function is a constant return to scale. The amount of output will increase proportionally to the amount of inputs. It will help the firm, industry or country for future productivity output to reach the destination.

12. Global Good Governance and Sustainable Development

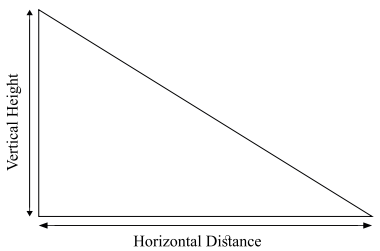
Income inequality, environmental degradation and the social and political situation of the world are gaining the lower global productivity growth, which is a barrier to sustainable development. Only a linear sequence of action cannot achieve economic growth for sustainable development. The local, regional and global governance can achieve sustainable global growth by ensuring the development following the gradient model. It is a simple nonlinear evaluation equation.

The Gradient model increases or decreases the magnitude of a property observed passing from one point to another. In economics, the gradient method

guides the analysis and recommendation of changes to find the global optimum (the most favourable situation or level for growth, reproduction or success) by available data and information for the current point of operation.

Figure 3: Gradient Evaluation

Gradient = Vertical Height/Horizontal Distance



Gradient divides the changes in height by the changes in the horizontal distance, which drag the possible point—differentiation results from gradation in the potentialities for development of various parts. Successful differentiation of a part inhibits the potentiality for similar change elsewhere in the system, reducing inequality.

The countries and areas need the finances and cooperation first, where the requirements are urgent to reduce inequality by increasing jobs and environmental degradation.

13. Conclusion

Covid-19 advancing 4IR for its potentiality proved during the pandemic, this quick adoption will grow more in the developed countries and will step up towards industry 5.0. But the low-income and developing countries have not yet completed their adoption of industry 4.0 technologies. For quicker adoption of industry 4.0 in low-income and developing countries, there needs to be financial and technological cooperation between the different nations participating in the GVC for a better world. Our country's human capital development and reediness for adopting industry 4.0 and 5.0 is an important task.

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Comparative analysis of power tiller and tractor rental services market as part of the Agricultural Machinery Development in Bangladesh: Farmers' evaluation using service quality based on SERVPERF

Madhusudan Bhattarai[*]
Md. Saidur Rahman[**]
P K Joshi[***]

Abstract

The use of farm machinery has increased rapidly in Bangladesh in the past two decades. As a result, Bangladesh's agricultural operations are performed with more intensity of use of farm machinery than that of India and several other South Asian countries. Currently, more than 700,000 power tillers and 40,000 pieces of the tractor are operating in Bangladesh. Over 90% of these farm machinery is used under locally grown rental services systems, also called farmer-to-farmer services provision or local service provider (LSP) based service provision, if the farm machinery is owned by a rural entrepreneur who provides rental services of farm machinery to a large number of fellow farmers to capture scale economy-related profit in uses of the farm machinery. The scenario was quite different in the early 1970s, with almost failed agricultural and rural development scenarios. No one would have even foreseen in the early 1970s that the country would, in 2010, become one of the most mechanised agricultural economies in South Asia. Significantly, about 80 per cent of all land preparation and other primary tillage operations are mechanised, with more penetration of farm machinery than in India and other countries in South Asia. It has happened due to the effective development of farm machinery rental market services across rural Bangladesh, done by individually operating LSPs. In this context, this paper analyses the performances of rental services of two

[*] Collaborator, IFPRI, South Asia Office, New Delhi, India.
[**] Professor of Agricultural Economics, Bangladesh Agricultural University, Mymensingh. Email:saidurbau@yahoo.com
[***] Director, IFPRI, South Asia Office.

major agricultural types of machinery widely used in Bangladesh such as power tiller (2WT) and tractor (4WT). Using the specially targeted information from 149 sample surveyed farmers from three districts of Bangladesh (Dinajpur, Jessore, and Mymensingh), this study evaluates the performance service quality of rental service of farm machinery as perceived by the farmers. This is done by adapting the famous "SERVPERF" methodology of measuring service quality to the specific content of machinery used in rural Bangladesh. Seven different dimensions of the services measured the performances of the rental services. They are tangibility, reliability, responsiveness, assurance, empathy of LSP, cost-effectiveness and social accessibility factors. The results indicate that the non-availability of an adequate number of machines in peak season was a critical problem in Bangladesh for both types of machinery studied. Likewise, low recording of service orders by the LSP causes lower reliability of the LSP services. The service providers in the study sites have been providing overall good quality services concerning tangibility, reliability except for STW, responsiveness except for thresher, assurance, empathy, accessibility, etc. Moreover, the LSPs services were medium quality regarding the dimension of cost-effectiveness on service rates. Farmers have difficulty getting reliable services, despite Bangladesh's massive growth in farm machinery. It suggests a further vast scope of expansion of machinery uses in the country. The farm mechanisation process among smallholding farmers can be effectively speed up by the public support without distorting the function of the locally grown private markets. This detailed assessment of the service market and assessment of over 27 indicators and seven dimensions of the service performance of rental services of farm machinery, as done here, would provide valuable policy implications for targeting public support to the specific areas where the performance of the services are poor or inadequate level of services are available now after having COVID-19 pandemic in Bangladesh like any other country.

Keywords *SERPERF analysis · Service quality dimensions · Service performance · Rental services · Smallholding farm mechanisation · Bangladesh*

1. Introduction

Bangladesh has achieved an impressive average GDP growth rate of 6.3 per cent from 2011- to 2015, which has surpassed growth rates in India, Thailand, Indonesia and other developing countries and is only a little behind China with 7.8 per cent growth (Planning Commission, 2015). It aims to achieve middle-income status with a per capita income rise to US$ 2000 by 2021 from US$ 1190 in 2014 (Ministry of Finance, 2016). The country's economy is also diversifying at a reasonable pace with readymade garments, shrimp and an annual remittance income of about US$ 15 billion. The agricultural gross domestic product growth rate has been around 3.5 per cent, with clear signs of reduced instability in rice production, decreased rice import dependency, increased food security and significant poverty reduction. Bangladesh also has a long history of smaller-scale rural mechanisation in which small engines in rural areas have powered boat and road transportation, pump sets,

and 2WTs, among other usages. In the year 2005, the total agricultural population of Bangladesh was 50.12 per cent of the total population (153.122 million), while in 2009, it was 46.33 per cent of the total population. It is predicted that the total agricultural population will soon decrease to 36.09 per cent of the total population. It clearly shows the need for agricultural mechanisation in the country since human labour forces are reducing daily (FAOSTAT, 2010). Currently, people are using machines at every level of operation. Another thing is that the agricultural labourers are shifting to non-farm activities and are migrating to urban areas for a better scope of work with a high wage rate. This has forced farmers to use machines for performing agricultural activities.

The use of farm machinery has increased rapidly in Bangladesh over the past three decades. More than 7,00,000 power tillers, 15,49,711 irrigation pumps (STW), and 3,70,000 threshers are operating in the country (AMRM, 2016). Hossain does another study, et al. 2017 mentioned that number of tractors, DTW and LLP were 40,000, 33700 and 140,000, respectively, in Bangladesh. The scenario was quite different in the early 1970s when some influential people in policy circles characterised Bangladesh as a basket case, and no one could have foreseen that the country would, in 2010, have one of the most mechanised agricultural economies in South Asia (Mandal, 2002). About 80 per cent of all land preparation and other primary tillage operations are largely mechanised (Islam, 2009).

The number of farm machinery increased tremendously in Bangladesh over the years. Marginal and small farmers still face problems accessing machinery due to a shortage of capital and training in those machinery. Resource endowment farmers have more scope to use AM for producing crops (Alam, 2014). Few AM is available almost everywhere in Bangladesh, but capital-intensive AM is not available everywhere, particularly tractors and combined harvesters. Group effort service markets of tractor and combined harvester need to be grown more to avoid the burden of marginal and small farmers. A rental market for machinery services has developed to provide access to services to small and marginal farmers who cannot afford to own the machines. Machine services rented to others were 76%, 91% and 75% for STW, PT and power thresher in Bangladesh, but these rental service markets are very informal and irregular (Hossain et al. 2017). This will help increase the annual use of this equipment, thereby making farming economical. Thus, custom hiring specialised farm equipment for replacement crops can greatly facilitate diversification of production of agriculture as well as generate jobs for the unemployed youth in the villages (Tewari, 2017).

2. Major Issues and Problems with Smallholding Farm Mechanisation in Bangladesh

Significant problems in rental services of farm machinery used in Bangladesh are asymmetric information, lack of awareness, small farm size, fragmented land, unavailability of appropriate machinery, lack of training to the farmers, deficiency

of capital for smallholding farmers to purchase the costly farm machinery from their nearest market place. Interested farmers are looking for reapers and mini-combined harvesters during the harvesting season but are not getting them. In recent years, the government has started providing subsidies on agricultural machines to 25 to 60 per cent depending on the type of machinery (DAE, 2016). The government declared price subsidies of up to 70 per cent on mini-combined harvesters and reapers in the Haor and coastal areas (other case is 50 per cent). Still, insignificant farmers are getting that facility (DAE, 2016). In rural areas, LSP doesn't have to maintain formal commitment since they are not registered organisations. The government has no database about this LSP, and individual farmers are operating this service market in their own ways. Since there is no regulating authority, few progressive farmers manage this service market. Small farmers who are resource-poor need to ensure service for an extended period so that the users can easily rely on it.

The individual LSP performances as perceived by the farmers

LSP is visible everywhere in the rural areas, but their service market is not well established and not known by that formal name. Individual farmers are coming into this service market for a short time and can't continue in the long run due to their personal choice since they do not feel interested in doing that. It is due to the shortage of capital, the higher price of inputs, other local farmers who think they can provide this service quickly, etc. That is why farmers cannot entirely depend on them, and they always are in doubt about getting service in future. Farmers will be happy if they have a quality service provider with a solid long-term commitment. It is found that farmers wanted to be ensured that they would receive service on time from a well-known source, and they also wanted to see the LSPs have all the AMs in good condition well before starting the respective season. Small farmers wish to depend on LSP entirely throughout their year-round activities, and equipped service-providing centres can only make them satisfied truly.

3. Problems With Evaluations of Farm Mechanisation and its Performances

Past studies reported that small land holdings and fragmented were severe drawbacks for adopting machinery, and extensive mechanisation of farming would lead to unemployment in the rural population (Ahmed, 1965; Alim, 1974). In the early 1970s, there was an apprehension that widespread unemployment in Bangladesh might even lead to social upheavals (Alim, 1974). Still, Bangladesh's development path has been completely reversed within the last 30 years. Small and medium farmers also buy irrigation pumps and power tillers primarily for their cultivation and then for hiring out their machines' services to other farmers under various contractual arrangements. As a result, a vibrant market for local service providers or rural entrepreneurs has developed to perform a whole range

of operations in Bangladesh and elsewhere, i.e., ploughing, land preparation, transplanting, seeding, irrigation, weeding, spraying, harvesting, threshing and drying (Mandal, 2002; Alam et al. 2004). The history of agricultural mechanisation is replete with rich literature about the nature and institutional pathways through which machinery development and its expansion took place in different socio-economic settings (Biggs et al., 2011; Krupnik, 2013;). It is also found that technology adoption always needs local motivation and has regional cultural practices (Justice and Biggs, 2013; Ahmed, 2014). But empirical measurements of these issues are not an easy task.

In this context, this paper measures farmers perceived performances of rental services on various dimensions of service quality of AMs.

4. Objectives and Scope of the Study

This study aims to evaluate farmers' perceived performance of alternates form of rental service market of power tillers and tractors in Bangladesh.

4.1 Specific Objectives (are)

a. To compare and assess the salient feature of rental market services of widely used power tillers and tractors in Bangladesh;
b. To analyse farmers' constraints and perspectives in rental uses of power tillers and tractors in Bangladesh;
c. To assess service quality and performance across rental services of two different farm machinery (Power tiller and Tractor, STW and POT) in meeting farmers' demand for the services.;
d. To analyse component-wise service qualities of the rental service of two selected implements and options to enhance the selected CHS-AM service quality studied.

4.2 Scope of Assessment

This study relates the expected and perceived services of AM users of AMs. The study is mainly done on the users' perception of the AMs services. Most primary information has been collected through a questionnaire survey, and also cautious to relate the experience with that of other service providers through observation. This study briefly highlights the various rental services of different agricultural types of machinery from 149 HHs of 3 districts in Bangladesh. There is scope to study more by taking more time and more samples of respective machines.

5. Literature Concerning CHS of AMs

One may wonder if there is any evidence that mechanisation benefits mainly the large farmers who can afford to buy machines and have larger farm areas to utilise machine capacity fully. Earlier studies showed evidence of higher control and benefits of DTWs, LLPs and power tiller mechanisation by the large farmers (Alam,

1974; Boyce, 1987; Jabbar et al., 1983). As the liberalisation of machinery import flooded the market in the late eighties and early nineties, small and marginal farmers' access to and benefits from STW irrigation and also from power tillers' use increased significantly (Hasan et al., 1991; Hakim et al., 1996; Mandal, 2002; Alam, 2000; In the flat land areas, where road connectivity exists and farm sizes are larger, relatively large size machinery (e.g. combine harvesters, and mobile threshers) will be the best technology and custom hiring of such expensive machinery will be a viable economic option for the vast majority of farmers (Gauchan et al. 2017). The cropping intensity and production of food crops have increased significantly in Bangladesh due to the adoption of mechanised tillage, irrigation, and spraying operations (Sarker, 2000). Although mechanisation has proliferated, most machines concentrate on irrigation and land preparation (ploughing) services (Ahmed, 2017).

Likewise, Alam et al. (2004) reported that 60 per cent of power tiller owners and almost all of the power tiller users in the Keshabpur area of Jessore district were small farmers cultivating up to 2.5 acres and that investment in PTs proved profitable in terms of gross margin as well as financial analysis. The same study also revealed that the expansion of PT technology had increased the incomes of a wide range of actors, i.e., PT owners, operators, mechanics, spare parts suppliers, and input and output traders through an extensive array of backward and forward linkages created in the rural economy. More recent results of the IFPRI study presented by Ahmed in chapter 5 show that small and medium farmers used power tillers and tractors as much as large farmers through the spread of the machine rental service market (Mandal, 2017).

Service marketing was the precursor leading to the study of service quality. Pioneer research in this area (George and Barksdale, 1974) identified several distinct differences between the marketing of "service" firms and "manufacturing" firms. Shostack's (1977) research brought the specific nature of services marketing. She noted that services were intangible, rendered, experienced, and unable to be stored. Consequently, she concluded that services should be marketed differently from tangible products. Her early work gave equal weight to " service " components as it did to "product." Enis and Roering (1970 & 1984) were unconvinced that there is a distinction between service marketing and manufacturing marketing. They concluded that the strategies used for all products are strictly a "bundle of benefits" regardless of whether tangible or intangible.

6. Methodology and Data

In this study, data have been taken from 3 areas where rice crops are prominent, and the farmers use machinery on a rental basis since all of them cannot own it. These three areas cover villages from 3 districts, i.e. Jessore, Mymensingh and Dinajpur. Two Upazila (sub-district) are selected with the consultation of the agriculture department of each particular district. Villages are selected based on the availability of targeted technologies, i.e. power tiller, tractor, and others.

6.1 Conceptual design of the study

This study first documented major typologies (models) of CHS-AM practising in Bangladesh. For this purpose, the study team consulted with stakeholders of the agro-machinery sub-sector in Bangladesh. Then, reviewed and assessed available literature on the topics. Then, key features of each type of rental machinery service have been analysed, and the findings have been summarised as needed.

The study used qualitative and quantitative data to meet the study objectives. For example, information on organisational structures, their functioning, and performances of each of the models of CHS-AM have been compiled by adopting the primary survey (household-level survey and group-level survey) in each of the targeted areas, where the specific model of CHS-AM is functioning well. The study team prepared necessary checklists for the FGD and survey instruments (household survey) for the survey. The prepared tools were pre-tested with the stakeholders before starting the survey and FGD. The detailed survey plan is mentioned in the following table.

6.2 Analytical tools and techniques

It is defined that the evaluation standard independent of any particular service context has stimulated the setting up of several methodologies (Firdaus, 2005). In the last decade, the emergence of diverse instruments of measurement such as SERVQUAL (Parasuraman et al., 1988), SERVPERF (Cronin and Taylor, 1992) and evaluated performance (EP) (Teas, 1993a, b) has contributed enormously to the development in the study of service quality. SERVQUAL operationalises service quality by comparing the perceptions of the service received with expectations, while SERVPERF maintains only the perceptions of service quality. On the other hand, the EP scale measures the gap between perceived performance and the ideal feature amount rather than the customer's expectations. Diverse studies using these scales have demonstrated the difficulties resulting from the conceptual or theoretical component as much as from the empirical part.

Nevertheless, many authors concur those customers' assessments of continuously provided services may depend solely on performance, thereby suggesting that performance-based measure explains more of the variance in an overall measure of service quality (Oliver, 1989; Bolton and Drew, 1991a, b; Cronin and Taylor, 1992; Boulding et al., 1993; Quester et al., 1995). These findings are consistent with other research that has compared these methods in the scope of service activities, thus confirming that SERVPERF (performance-only) results in more reliable estimations, greater convergent and discriminant validity, greater explained variance, and consequently less bias than the SERVQUAL and EP scales (Cronin and Taylor, 1992; Parasuraman et al., 1994; Quester et al., 1995; Lusar and Zornoza, 2000). Whilst its impact in the service quality domain is undeniable, SERVPERF, a generic measure of service quality, may not be an excellent instrument to assess the perceived quality in the rental service markets of AMs

but will be sufficient for measuring service performances. Service performance analysis was done using data from 149 HHs from 3 districts and secondary sources under this study.

6.3 Data collection and data sources

This study is based on survey data, and secondary data are also used to compare for a better explanation of the existing situation where necessary. Collected data were compiled and analysed using STATA. Both descriptive and inferential statistics were used to elaborate socio-economic profiles of the survey location, households and stakeholders. Rental rate and mode of rental services were also explained by using surveyed data in summary form.

7. Results and Discussions

7.1 Summary statistics of the households' survey

Table 1: Average family member per household (Including with children) according to land category of farmers

Land Class	Dinajpur			Jessore			Mymensingh			All Sample House Hold	Average no. of Family member/HH	Total no. of family member
	Total no. of Household	Average no. of family member/ HH	Total no of family member	Total no. of household	Average no. of family member/ HH	Total no. of family member	Total no. of Household	Average no. of family member/ HH	Total no. of family member			
Large	3	5.0	15							3	5.00	15
Medium	28	5.0	139	8	4.6	37	6	5.3	32	42	4.95	208
Small Holding	27	4.9	132	31	4.3	133	46	5.0	229	104	4.75	494
Grand Total	58	4.9	286	39	4.4	170	52	5.0	261	149	4.81	717

Note: *Land Category is Large-<750 Decimal, Medium-250> to <749, Small holding -<249*

From Table 1, it was observed that the average number of family members in large land holdings households was 5.0 in the Dinajpur district. No large land holdings households were in this survey sample in Jessore and Mymensingh districts.

In the case of medium land holding, the average number of family members per household was 5.0, 4.6 and 5.3 in Dinajpur, Jessore and Mymensingh districts, respectively. Considering these three districts, the average number of family

members was 4.95 per household of medium land holding and higher than small land holdings (4.75/household). For small land holdings, the average number of family members per household was 4.9, 4.3 and 5.0 in Dinajpur, Jessore and Mymensingh districts, respectively. So, in this case, the number of family members per household was higher in the Mymensingh district. Considering all locations, the average number of family members was 4.75 per household of small land holdings, which is lower than the other two land holding groups. So it is clear from the above observation that small land holdings households were in small family size.

Considering all land holding classes, the average number of family members per household was 4.9, 4.4 and 5.0 in Dinajpur, Jessore and Mymensingh districts, respectively. So per household number of family members is higher in the Mymensingh district than other two districts. And it was estimated that the average number of family members per household was 4.81, which is close to the national average (4.35) in Bangladesh (BBS, 2012).

Table 2: Distribution of household according to their house quality

Cast Group	RCC	Bricks wall & tin roof	Mud wall, thatched roof	Mud wall with normal roof	Luxury building	Sample: All
	%	%	%	%	%	%
Forward (n = 24	53	38	4	6	0	100
Medium (n= 67)	58	26	0	13	0	100
Lower (n= 58)	44	44	0	22	0	100
Total (n= 149**)**	54	36	3	8	0	100

Note: *We consider the Cost category as follows -Forward -Miah, Mondol; Medium-Sheikh,* Morol; Lower- Sardar, Gazi, Sarker

Type of House: 1=Luxury Building, 2=RCC wall and tin roof, 3= Bricks wall and tin roof, 4= Mud wall with thatched roof, 5=Mud wall with any normal roof.

The households' types are also proxies for household wealth and available assets.

Table 2 reveals that 53 per cent, 38 per cent, 4 per cent and 6 per cent of the household was built with RCC wall and tin roof, bricks wall and tin roof, mud wall with thatched roof and mud wall with any typical roof, respectively. For the medium cast, 58 per cent, 26 per cent and 13 per cent of the household was built with RCC wall and tin roof, bricks wall and tin roof, and mud wall with any normal roof, respectively. And in the lower cast, 44 per cent of households were built with RCC walls, and 44 per cent, 22 per cent of households were constructed with bricks and tin roofs and mud walls with normal roofs, respectively. There was no

luxury Building in any caste group. Considering all cast, 54 per cent, 36 per cent, 3 per cent and 8 per cent it was estimated that household was built with RCC wall and tin roof, bricks wall and tin roof, mud wall with thatched roof and mud wall with any normal roof respectively.

7.2 Service quality of rental services of two machinery types

Due to a severe shortage of draft animals, 2WT was used to till the land. Mechanised harvesting started in the 1990s, and thresher was used in Bangladesh agriculture (Alam, 2014). The study used data from services provided on custom hiring of farm equipment to assess the service quality of the providers on the service dimensions such as tangibility, reliability, responsiveness, assurance, empathy, cost-effectiveness and accessibility. To compare and contrast the quality of services delivered by different service providers, the construct construction of mean is used to understand the differences in the quality.

7.2.1 Tangibility dimension of service quality

The "tangibility dimension" on quality had five questions which were basically to understand the adequacy of equipment and their quality apart from space for display of equipment for customer convenience, sufficient space for farm implements, professionalism of the employees, machines conditions and the locations of the service centre (establishment) in the service area (Table 3). The results in Table 3 suggest that there is no significant difference among the attributes availability of adequate no of machines of tangibility dimension in case of power tiller, tractor and power thresher and it represents non-availability (2.0) of the services. There is a substantial difference between the machinery's good physical condition and tangibility dimension. The rest of the dimensions vary significantly among the dimensions of services in Bangladesh. This number also indicates that the availability of said machinery is inadequate during the respective seasons. It also shows the necessity of service providers at the local level.

The transaction cost issue is built with this service market. Any negotiation between two parties incurred hidden costs in time consumption, monetary, relationship, future assurance, etc. Both parties need to accept it. An example is if a service provider wants to keep all machinery equipped all the time, he has to invest more capital over the years, which has costs, and the renting rate will be higher. For this, if he fixed a service centre instead of his own house which also incurred cost, etc.

Table 3: Tangibility as a quality of services provider of farm equipment across the machinery services

Level of Tangibility	Model Power tiller Mean	Tractor Mean	Sample All Mean
T1. Availability of adequate no. of machines	2.0_{a}	2.0_{a}	2.2
T2. Good physical condition of machinery	6.4_{a}	6.3_{a}	6.1
T3. Enough space available to keep machine	6.7_{a}	6.5_{a}	6.4
T4. The machinery are new and good quality	$6.3_{a,b}$	6.6_{b}	6.3
T5. Location of service provider (centre)	6.6_{a}	6.9_{a}	6.3
Sub-total	$5.1_{a,b}$	5.0_{b}	5.5

Note 1. *A detailed statement of questions asked for T1 to T5 is provided in the Appendix note*

Table 3 shows that the availability of machines is very inadequate, particularly in the peak period of the respective activities. It indicates that there is a scope to provide more to users with increasing relevant machines in the study areas. It is also revealed that the physical condition of machines, particularly STW and thresher, is not so good. The service provider of STW needs to improve their movement across the village so that the farmers can get irrigation smoothly.

The tangibility score is relatively low for all types of machinery used here. The main reason behind this is the service market is not well established and well known. Sometimes, the machine owner does not have enough money to buy a new machine, and new service providers are coming to the market with no experience and training. Even they don't know the service market in agricultural machinery. They don't have a specific service centre location from where they can provide service and information regularly to the users. If it were a formal market known to all, it would have a higher score on the survey. This service market has demand, and it is growing over time. The tangibility score will increase if all relevant issues are adequately addressed.

7.2.2 Reliability dimension of rental service markets

The "reliability dimension" on quality had five questions which were basically to understand timeliness and high level of dependency with confidence, provide the implements with high reliability, be sympathetic and reassuring in problem-solving to the client, keep financial order records of users on the custom hire centres for their services. The ability to perform the promised service dependably and accurately is reliable. The empirical results indicate significant differences among the mean scores on reliability in the case of four services. The power tiller and tractor mean scores are the same for their services. In the case of dependable

service by LSP, the mean value is high; 6.8 represent almost strongly agree. The dimensions the service orders are recorded well shows mean three near to disagree. The rest of the questions vary significantly among the dimensions of services in Bangladesh.

*Table 4***:** *Reliability quality of services provider of farm equipment across the machinery types*

Degree of reliability	Model Power tiller Mean	Tractor Mean	Sample All Mean
R1. Reliable service performance of the LSP	6.8_{a}	6.6_{a}	6.2
R2. Dependable service by LSP	6.8_{a}	7.1_{a}	6.8
R3. The Service orders are recorded well.	$2.9_{a,b}$	3.2_{b}	3.0
R4. LSP provides services to individual needs	5.0_{a}	4.9_{a}	4.8
R5. Convenient operating hours/scheduled by LSP	6.6_{a}	6.4_{a}	6.2
Sub-total	5.6_{a}	5.6_{a}	5.4

Note 2. *A detailed statement of questions asked for T1 to T5 is provided in the Appendix note*

The reliability of the service order is not recorded well. The farmers usually talk with the service provider for the said service or make phone calls. Since there is no permanent agent, the individual service providers are not used to keeping a record. Another thing is that the providers are not well educated and don't have training for this type of work. If agent service is available, the reliability would be more as desired by the users. It is good that service performance, assurance and operating hours are more or less standard, but they need improvement.

7.2.3 Responsiveness dimension of rental services

The "responsiveness dimension" on quality had three questions which primarily pertained to the attributes including promptness of service, willingness to help customers, never being too busy to respond to farmer's request, informing farmers in advance when the service will be performed, providing information or services which are easily obtainable to the farmers. Results on the responsiveness dimension also indicate significant differences in mean scores among the services of PT, TR, STW and TH, representing medium response. There is no significant difference among the attributes of willingness to help farmers in the case of the power tiller and tractor. The service provider is not dedicated or committed to providing service, but it is a highly informal and first-come basis for getting assistance.

Table 5: Responsiveness quality of services provider of farm equipment across the machinery types

Degree of Responsiveness	Power tiller Mean	Model Tractor Mean	Sample All Mean
Res1. Prompt Services are provided by LSP	4.5_{a}	4.7_{a}	5.0
Res2. Genuine willingness to help farmers	6.7_{a}	6.6_{a}	6.5
Res3. Service information is provided to farmers in advance.	3.9_{a}	3.7_{a}	4.0
Sub-total	5.1_{a}	5.0_{a}	5.2

Note 3. *A detailed statement of questions asked for T1 to T5 is provided in the Appendix note*

It is noted that the responsiveness of the service providers is limited in all cases due to an unorganised service market and poor quality market. At the village level, the service providers are not that will maintain a well-accepted system and inform farmers about their services in advance. Many have cell phones, but both responsiveness and performance need improvement.

7.2.4 Assurance dimension of service quality.

The "assurance dimension" on quality had three questions which indicate the employees' trust, safety in their transaction, politeness in dealing with farmers, knowledge and courtesy of employees and their ability to convey trust and confidence. The empirical results reveal no significant difference among the attributes farmers can trust on LSP for quality assurance services in the case of power tiller and thresher. The dimension LSP/driver is knowledgeable in operating machines also had the same result in the case of PT and TR services, except these the mean score had significant variation.

Table 6: Assurance dimension of the services across the machinery types

Degree of assurance	Power tiller Mean	Model Tractor Mean	Sample All Mean
As 1. Farmers can trust LSP for quality services	6.1_{a}	6.5_{b}	6.3
As. 2. Farmers can feel safe while dealing with the LSP.	$6.8_{a,c}$	7.0_{c}	6.7
As. 3. LSP/driver is knowledgeable in operating machines	3.8_{a}	3.8_{a}	4.3
Sub-total	5.6_{a}	$5.8_{a,b}$	5.8

Note 4. *A detailed statement of questions asked for T1 to T5 is provided in the Appendix note*

In the study areas, the LSPs are very informal, and mainly machine operator or driver operates the machine. The driver doesn't have any good training in 2WT and 4WT operation. It usually happens that the machines go out of order and don't have sufficient knowledge to fix or repair them instantly. This unwanted issue makes the user's work assurance vulnerable. The drivers of the machines need to

have adequate knowledge about machines.

7.2.5 Empathy dimension of service quality

The "empathy dimension" on quality had five questions which indicate the provision of caring, individualised attention to customers, having their customer's best interest at their heart, understanding the farmers' specific needs, and operating hours convenient to all a good rapport with farmers. The results reveal that there is no significant difference among the attributes of the individual dimension attention is given to farmers in the case of TR, STW and TH. In contrast, there were substantial differences among the mean scores of other dimensions except for PT and TR in the third dimension, LSP provides the best services from their heart. The overall empathy dimensions for the farmers represent a high score.

Table 7: Empathy quality score of services provider of farm equipment

Level of empathy	Model		
	Power tiller	Tractor	Sample All
	Mean	Mean	Mean
Em 1. Individual attention is given to farmers	5.1_a	5.0_a	5.0
Em. 2. Politeness in dealing with farmers by LSP	7.0_a	6.7_a	6.6
Em. 3. LSP provides best services from their heart	6.6_a	6.6_a	6.4
Em 4. LSP are sympathetic to farmers' problems	6.4_a	6.5_a	6.3
Em 5. LSP make good rapport with farmers.	7.7_a	7.4_a	7.0
Sub-total	6.5_a	6.5_a	6.3

Note 5. *A detailed statement of questions asked for T1 to T5 is provided in the Appendix note*

Individual-level attention to the farmers is a critical issue in the service market. The table above shows that the LSPs are careful about politeness, service quality, sympathy and rapport building for all cases. Individual farmer level attention is below standard for 2WT, 4WT, STW and thresher. It is because of awareness problems and a lack of motivation among the service providers at the field level.

7.2.6 Cost-effectiveness dimension of service quality

The three questions of "cost-effectiveness dimension" on quality, which indicates the rental charge for the renting of the machinery and flexible payment system of rental fees, payments to be allowed even after harvest of the crops had the similar mean scores, with only minor variation was found in case of TH in the dimension rental payment to LSP is a flexible mode of payments. And finally, there were significant differences in the cost-effectiveness dimension of services as the mean scores differ significantly among all machinery services except PT and STW.

*Table 8***:** *Cost-effective dimensions of service quality across service providers*

Level of cost-effectiveness	Power tiller Mean	Model Tractor Mean	Sample All Mean
Cost1. Rental service charges are fairly okay	5.0a	5.0a	5.0
Cost2. The rental payment to LSP is flexible	6.0a	6.0a	6.0
Sub-total	4.3_{a}	4.4_{a}	5.5

Note 6. *A detailed statement of questions asked for Cost1 to Cost5 is provided in the Appendix note*

Here the flexible mode of payments scores under the level of cost-effectiveness is meagre, but this is not the actual score. It is mainly the average number of choices (choice code 2) where they pay cash just after service. There were five options. So the average score here will be six or more in all services cases.

7.2.7 Accessibility dimension of service quality

The "accessibility dimension" on time to assist farmers on machine uses, contact the service provider quickly without any delay, and should not be any exclusion on service provision by caste or religion basis. Results on the dimension of accessibility also indicate significant differences in mean scores among the services of PT, TR, STW and TH.

Table 9: Accessibility dimensions of service performance across the farm equipment providers

Degree of accessibility	Power tiller Mean	Model Tractor Mean	Sample All Mean
Acces1. The LSP is available for service all the time.	4.7_{a}	4.6_{a}	4.9
Acces2. The LSP is approachable to the farmers (client)	$6.2_{a,b}$	6.0_{b}	6.1
Acces3. LSP does not do any form of exclusion on service provision by caste, gender or religion basis	4.5_{a}	4.4_{a}	4.4
Sub-total	$5.1_{a,b}$	5.0_{b}	5.1

Note 7. A detailed statement of questions asked for T1 to T5 is provided in the Appendix note

The LSPs are not supposed to do any form of exclusion from their services. Still, some negligence on quality of service might have happened for lower caste and minority people since their monitoring system is poor. They don't exercise sufficient bargaining power to get the service. In the case of STW, the score is very low and indicates that the female and minority people don't follow up on the water supply in their plots. For example, the STW service provider delivers sufficient water on a timely basis to the influential users or rice farmers since they can make

problems quickly if they do not get irrigation. It is a widespread phenomenon in rural areas in Bangladesh. It also depends on the social status of the service provider in the same society. It cannot be generalised easily, but it is happening silently.

7.3 Overall service quality as perceived by uses across the schemes-

The service quality of AMs is not the same in terms of performance. Farmers are happy with tillage and irrigation performance. They want those services from the local provider regularly and granted services.

Table 10: Overall Service quality scores across service providers' machinery hiring by machinery types

Level of different service quality	Model Power tiller Mean	Tractor Mean	All Mean
Tangibles	$5.1_{a,b}$	5.0_{b}	5.2
Reliability	5.6_{a}	5.6_{a}	5.3
Responsiveness	5.1_{a}	5.0_{a}	5.2
Assurance	5.6_{a}	$5.8_{a,b}$	5.8
Empathy	6.5_{a}	6.5_{a}	6.2
Cost effectiveness	4.3_{a}	4.4_{a}	4.3
Accessibility	$5.1_{a,b}$	5.0_{b}	5.2

Note: *Values in the same row and sub-table not sharing the same subscript are significantly different at p< 0.05 in the two-sided equality test for column means. Cells with no subscript are not included in the test. Tests assume equal variances.*

In this table, the score is also lower for cost-effectiveness, indicating the users are not getting effective service from the LSP. It is because the service centre employee is reluctant to provide services to the farmers. LSP has a lot of things to do to improve the service performance at the farmers' level.

7.4 Farmers' weightage rank across the dimensions of rental services

This section will explain the relative weightage of any particular service. The calculated summary table showed the current status of the service performance. It can be easily assessed that the service quality varies among the technologies. Types of services are also factors in this comparison. As already mentioned, service markets for agricultural machinery are still under development, and in some cases, it is very insufficient.

Table 11 is used to show the picture of the service market in Bangladesh agriculture. It can be easily explained that the tangibles, reliability and empathy rank for PT, STW, TH and TR are higher than any other types of service performance. It indicates the poor performance in terms of cost-effectiveness, accessibility, responsiveness and assurance, and these ranks are almost similar by

types of technologies or models. Service performance studies of AMs are very limited in Bangladesh, but it is essential to see and evaluate them over the years. That can give thoughts to improve service performance sufficiently.

Table 11: Farmers' weightage ranks across the dimensions of services by rental service of farm machineries in Bangladesh, 2016.

SERVPRF: Survey dimension of the performance of services Rank of Importance (Weight rank)

SERVPRF	Power tiller Mean	Model Tractor Mean	Sample All Mean
Tangibles	6_a	6_a	6
Reliability	6_a	$5_{a,c}$	5
Responsiveness	$3_{a,c}$	3_c	3
Assurance	4_a	5_b	4
Empathy	6_a	$6_{a,b}$	6
Cost effectiveness	1_a	1_a	1
Accessibility	2_a	2_a	2

Note: *Values in the same row and sub-table not sharing the same subscript are significantly different at $p< 0.05$ in the two-sided equality test for column means. Cells with no subscript are not included in the test. Tests assume equal variances.*

8. Conclusions and Implications

The above empirical findings suggested that the empathy quality of the service provider of farm machinery is a prerequisite to effectively speed up rental market services of agricultural machinery among smallholding farmers in Bangladesh, which consequently develop the rural agricultural machinery service provision. It is also suggested that data related to each machine's quality service provision arrangement should be included in future agricultural censuses, which will help evaluate particular government policies. To enhance the service quality of CHS-AM, credit service with a low-interest rate and insurance for agricultural machinery have to be ensured. Further training on operating agricultural machines and technical support for repairing and maintenance is needed. The government should voluntarily reduce import restrictions and tariffs on farm machinery to facilitate this process and develop sufficient subsidies to offset fixed costs.

The government of Bangladesh has encouraged agricultural intensification and mechanisation as an avenue to increase productivity with cost-effectiveness and move towards rice self-sufficiency for ensuring food and nutrition security. The increasing trend of custom hiring services of agricultural machinery (CHS-AM) not only improves access to the machinery reach to many smallholding and marginal farmers but also provides better services to farmers due to better management and timely fashion. The use of agricultural machinery yearly is

deficient, as it is used only on a seasonal basis, so small farmers cannot use it by owning farm equipment due to their capital shortage. Resource endowment farmers have more scope to use AMs for producing crops. Group efforts have to be used to manage potential services in the agriculture sector. Few AM is available almost everywhere in Bangladesh, but capital-intensive AMs are not available everywhere, particularly tractor, reaper and combined harvester.

Rural roads must be developed for easy movement, and the institutional link between the public and private sectors must accelerate the service provision arrangements. The good physical condition of the machinery of tangibility dimension except for STW and TH, good quality service in respect to the good physical condition of machinery, enough space available to keep the machine, new machinery and good quality and the locations of the established service centre in the study area, dependable services by LSP, recording of service orders, good quality services from the aspect of tangibility, reliability, responsiveness, assurance, empathy and medium quality services in respect to effectiveness and accessibility are the critical factors in this service markets. Finally, it is believed that expanding this service market will bring them under some regulation for long-run sustainability, which may ensure higher quality performance of the rental service market.

Finally, the rental service market study of AMs provides new information on this service market's scope, potential and shortcomings. This assessment study of rental market service will bring our small holding farmers into using newly adopted technologies in the near future by adopting new policy support by the government. AMs' service market providers will come forward with integrated service through a local-based organisation, and farmers of a locality will have more access to using new technologies with lower prices that will ensure sustainable agricultural production, particularly after having this COVID-19 pandemic. The policy of making agricultural technologies available to the farmers at a lower price will be replaced by a policy of establishing a centre or agent with equipped agricultural rental service market. Since this service market will be locally grown, farmers will accept it independently.

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Appendix A

Table A1. Bangladesh dimension of services in decimal

Dimension of services	Model Power Mean	Tractor Mean	Sample All Mean
Trangibles1	2.0_{a}	2.0_{a}	2.2
Trangibles2	6.4_{a}	6.3_{a}	6.1
Trangibles3	6.7_{a}	6.5_{a}	6.4
Trangibles4	$6.3_{a,b}$	6.6_{b}	6.3
Trangibles5	6.6_{a}	6.9_{a}	6.3
Reliability1	6.8_{a}	6.6_{a}	6.2
Reliability2	6.8_{a}	7.1_{a}	6.8
Reliability3	$2.9_{a,b}$	3.2_{b}	3.0
Reliability4	5.0_{a}	4.9_{a}	4.8
Reliability5	6.6_{a}	6.4_{a}	6.2
Responsveness1	4.5_{a}	4.7_{a}	5.0
Responsveness2	6.7_{a}	6.6_{a}	6.5
Responsveness3	3.9_{a}	3.7_{a}	4.0
Assurance1	6.1_{a}	6.5_{b}	6.3
Assurance2	$6.8_{a,c}$	7.0_{c}	6.7
Assurance3	3.8_{a}	3.8_{a}	4.3
Empathy1	5.1_{a}	5.0_{a}	5.0
Empathy2	7.0_{a}	6.7_{a}	6.6
Empathy3	6.6_{a}	6.6_{a}	6.4
Empathy4	6.4_{a}	6.5_{a}	6.3
Empathy5	7.7_{a}	7.4_{a}	7.0
Costeffectiveness1	5.0_{a}	5.0_{a}	5.0
Costeffectiveness2	6.0_{a}	6.0_{a}	6.0
Costeffectiveness3	2.0_{a}	2.0_{a}	2.0
Accessibility1	4.7_{a}	4.6_{a}	4.9
Accessibility2	$6.2_{a,b}$	6.0_{b}	6.1
Accessibility3	4.5_{a}	4.4_{a}	4.4

Note: *Values in the same row and sub-table not sharing the same subscript are significantly different at $p< 0.05$ in the two-sided equality test for column means. Cells with no subscript are not included in the test. Tests assume equal variances.*

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Provision for Lifelong Employment: A Means of Earning Sustainable Livelihood

Kazi Muzafar Ahammed*

Abstract

This article advises individuals to tighten their grips with lifelong employment and income and have overall control on expenditure for their sustainable livelihood and generate start-up capital for their future generations. This article speaks for creating better employment than the amassment of wealth. Man is born to work refrain from which may disrupt his sustainable livelihood. In the economy, some people are raised above others in ranks so that some may employ others in their work, which opens up employment opportunities. Most people start their lives with capital that has been set aside by their ancestors. This article advises including individuals into the workforce till they can work to obtain more benefits in their lifetime for earning income for their sustainable livelihood and generating start-up capital for the next generations. Provision for lifelong employment in decent work reduces vulnerabilities of all. It is also a fundamental human right that should be opened to all, regardless of age, place, time, or person. Human resources are vital because they can make management decisions and supply the necessary workforce. This article aims to capitalise on human resources as workers by imparting employability skills for getting and keeping employment throughout life. This article supports the extended family as a source of start-up capital for offspring and safety nets for old aged people and dependents of family and economy. Therefore, administrators, planners, and policymakers are urged to look into it for policy intervention for individuals' lifelong employment and income.

Keywords *Employment · Lifelong employment · Sustainable livelihood ·*

1. Introduction

Human persons earn income mainly through employment to procure their livelihood. In the economy, some people are raised above others in ranks so that some may employ others in their work, which opens up employment opportunities

* Secretary, Bangladesh Tea Association. Email: muzafarbd@gmail.com

to earn a livelihood (Quran, 43:32). The creation of employment for people by raising some of them above others in ranks is one of the leading causes of the creation of economic activities. The possession of wealth, provisions, education, training, intellects, understandings, and other visible and hidden strengths of human beings and utilisation through investment creates scope for employment and production of goods and services.

The investors, i.e. the employers, belong to the people ranking above the economy's employees, and the investors employ people of the lower rank through investment. Thus, having all people through labour-intensive investment creates a broader scope to accommodate more people in the economy. Employment is the best medium of economic activity. Therefore, employment, i.e. a measure for selling labour for decent work, is a reasonable means of earning a livelihood. Decent work implies employment where 'just and favourable' conditions are ensured for every employee (Article 7 of ICESCR). The most extended period of employment in an individual's life will maximise their income and consumption. Maximising an individual's income and consumption will lead to maximising the economy's aggregate income and consumption as the macro economy is the sum of all individuals. Therefore, lifelong employment should be provided to all without discrimination of castes, creeds, colours, ages and places.

Investments help to gather employers and employees together to produce goods and services. Employment is one of the outcomes of investment, and it is better to invest capital in investment for employment generation than the amassment of wealth (Quran, 43:32). The employees get wages, which are only fractions of the total output generated in the production process, and the investors benefit much more. However, what proportion of total output should be shared by an employee is a vital question for determining fair wages and sustainable enterprises (A Global Job Pact, 2009 of ILO).

2. Workability

Workability is the inherent ability of human beings to accomplish various tasks. Human beings acquire workability mainly for the cause of their survival. They work primarily to earn livelihood for their own and their families. Secondly, they work for the country to operate administration, perform public works for the welfare of the people and maintain its freedom and sovereignty. Thirdly, they work for society to serve humankind and the world's inhabitants. Fourthly, humans prefer to remain at work to attain discipline and punctuality and maintain vigour and vitality. Fifthly, human beings work to upgrade living standards by earning income and prosperity. Sixthly, the management of the world depends on workforces that accomplish various tasks for the proper functioning of the world. The working class keeps alive the worldly life. Seventhly, human beings want to keep continue earning for themselves as well as for the future generations as a safety net. Workability standards depend on education, training, times, ages and

places. A higher standard of workability can be achieved by improving human values through proper education and training that impart employability skills.

3. Who are the Working Class?

The existence of the poor and rich are always seen in the economy from time immemorial. However, a perpetual evolution between these two classes is evident throughout the ages. It is also noticed that the number of poor people is greater than that of rich people. Poverty is inevitable as wealth and resources are unevenly distributed worldwide among peoples, regions and countries. Thus, the possession of livelihood is the primary determinant of two classes of people, i.e. haves and have-not, i.e. rich and poor. The magnitude of wealth and resources held by rich people is greater than that of poor people. However, the existence of poor people is necessary for running the economy because this section of the population provides the workforce required for households and agricultural and industrial sectors, which are vital for accomplishing various tasks. After all, poverty compels poor people to depend on rich people to sell their labourers to earn income for their livelihood. The existence of poor people and consciousness for them in the form of fellow feelings for poor people is the primary concern of human life and regulators of the economy.

The material question in possession of livelihood. Those who possess abundant wealth and resources more than their requirements are regarded as rich who manage and maintain production and sources of livelihood. Alternatively, those with little wealth and resources less than their requirements to procure livelihood are regarded as poor. They sell their labour in the job market in many forms: household workers, agricultural labourers, industrial workforce, construction workers, army and other forces, corporate office workers, government and semi-government employees, self-employed workers, etc. Selling labour for decent works is regarded as a recognised and respectful means of earning income to procure a livelihood.

4. Employability Skill

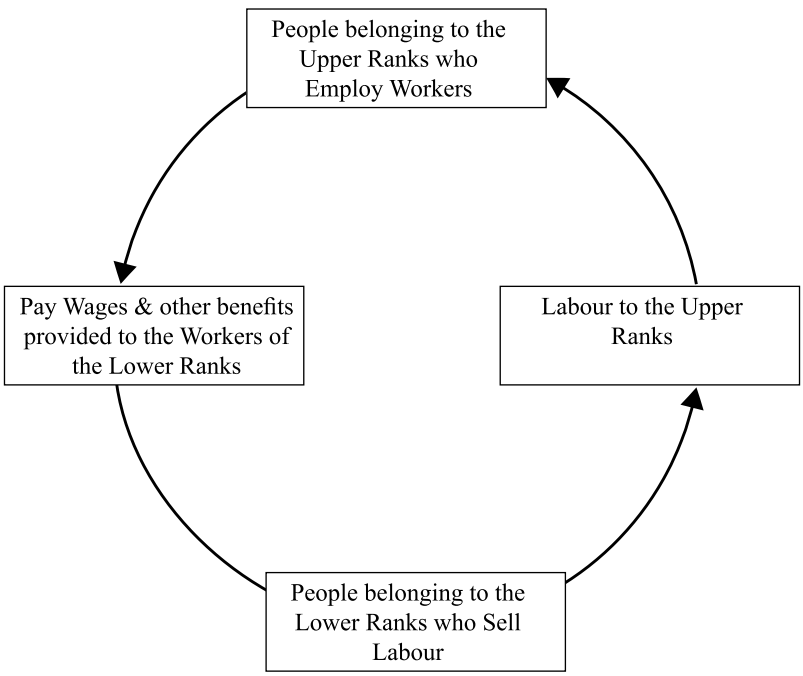
Employability skill is one of the prerequisites for lifelong employment. Employability skill is the essential capability of a worker for getting and keeping work by a person satisfactorily, which can be attained through proper education, off-job or on-job training, intellects, understandings, and other visible and hidden strengths of human beings that vary from person to person who demonstrate these while is rendering their responsibilities to accomplish assigned tasks. Provision for lifelong employment refers to an arrangement that will last for the whole of a person's life until s/he can work. Employment offers so many things to human beings for leading a better life, e.g., earning competence through educational qualification, training, employability skill, attainment of efficiency and experiences, discipline, punctuality, uninterrupted flow of income, livelihood, enhancement of consumption, social status, dignity, the capability of buying necessities, buying safety net, attract the attention of people,

authority, state, etc. Sustainable employments are those jobs requiring employees to be employed throughout life to accomplish decent work at all times. Employability skill is a means of attaining and maintaining satisfactory employment throughout life. Employment and engagement with decent work increase the prestige and acceptance of persons at all times.

5. Process of Employment Generation by Creation of Ranks of People in the Economy

The creation of ranks makes the economy's investors and workforces available. Figure 1 explains that the upper classes (the investors) employ people of the lower classes (the workforces) in their work.

Figure 1: Process of employment generation in the economy



It appears from Figure 1 that people belonging to the lower ranks who have been selling labour to people belonging to the upper classes who have been employing workforces through investment in their work to produce goods and services. The above process of creating employment opportunities for human persons is an apparent blessing for mutual benefits of the employers (people belonging to the upper ranks) and employees (people belonging to the lower classes). The people of the lower classes have been earning income from wages and other benefits through employment to procure livelihood for themselves and their families.

The above economic model contributes to employment-led growth that generates endless employment opportunities. This model includes more people in the economy to earn a livelihood. Thus, regarding having more people in the economic development, the Employer-Employee Growth Model has a broader scope to accommodate more people in the country's economic activities. The most extended period of employment in an individual's life will maximise his income and consumption. Maximising an individual's income and consumption will lead to maximising the economy's aggregate income and consumption as the macro economy is the sum of all individuals. Thus, it is better to invest capital in labour-intensive investment for employment generation than the amassment of wealth. Therefore, provision for employment should be extended to all without distinction of castes, creeds, colours, ages and places.

6. Essential Qualities for a Person to Become an Active Member of the Workforce

6.1 Mentally sound: Mental soundness is the top quality a human being has to have to become a seller of labour. Even a physically disabled wo/man with a sound mental condition can sell their labour and earn a livelihood.

6.2 Physically sound: A human must have sufficient vigour and vitality to perform a particular task.

6.3 Morally sound: For sustainable employment opportunities, the incumbent's behaviour should be correct, proper, honest, sincere and acceptable to the employers. Family, society and organisations have enormous impacts on the incumbent's behaviour.

6.4 Well educated: The incumbent should be appropriately educated with the necessary knowledge of mother tongue and international languages, religion, literature, history and culture, mathematics, general sciences, etc.

6.5 Well-trained: Training should be imparted to the incumbents continuously to acquire and update employability skills for maintaining employability to ensure employment throughout life.

If anyone wants to keep the economy alive, then s/he has to put on employment with decent work. Workforces are the engine of growth, and their availability, care and provision of share of benefits generated in the economy must be ensured to maintain sustainability.

7. Impact of Inherited Capital on Income and Consumption of an Individual

A wo/man has to perform many works in their life. Thus, the life of a wo/man in this world has a specific meaning and purpose. A wo/man takes their birth in this world with unlimited potentialities and capabilities for attaining these to fulfil their life objectives and achieve the ultimate goals of human life. The world gets ready

and is prepared, before their birth, with all the means necessary for bringing up a human child. To uphold the objectives of life, all of us are here in this world to receive the newborn baby and facilitate them to attain the goals of life in the sphere of their whole life. A wo/man gets to realise their objectives with educational qualifications and training to achieve employability skills to get decent work.

People need to work to earn income to procure their livelihood. The unevenness concerning having livelihood causes create ranks among people, which has created an atmosphere as well as scope for work and employment, which are the main driving forces of growth of the economy. The jobs offer and bring forth many good things for people, e.g. livelihood, social acceptance, discipline and punctuality. They all provide vigour and vitality in the lives of wo/men.

A wo/man has to attain competency or suitability as a worker through all sorts of qualities, education, training and efforts that help them find decent work. Thus, the incumbent must be capable of rendering responsibility to accomplish a job. It is equally important to have enough economic jobs for the working classes.

Inherited capital can be used as start-up capital for a newborn baby. Usually, human beings start their lives with the wealth, resources and property inherited from their ancestors and all ancillary facilities provided for them by their parents and other relatives, and thus they are brought up. A grownup wo/man gets their jobs offered by the persons regarded as the employers. The amount of inherited wealth, resources and property can be maintained its status quo or increased further by employing throughout life.

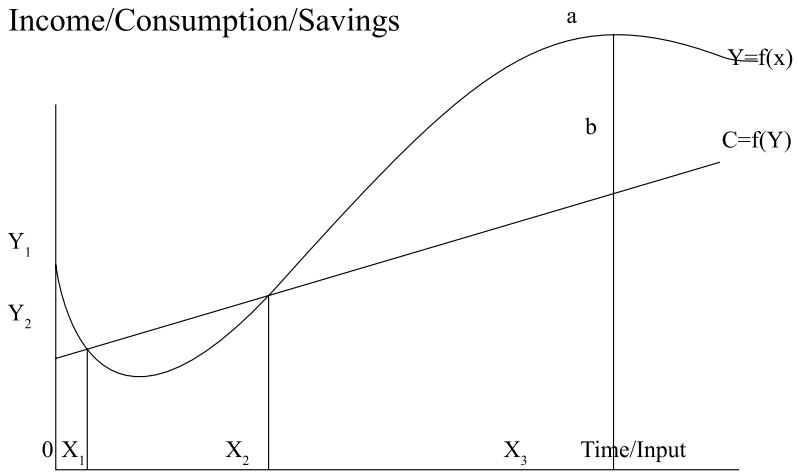
A family is the primary unit of all activities in the economy. Initially, it comes into a being and is formed into a shape with the marriage between a man and a woman. The relationship between a man and a woman in life is natural, respectful, cordial and eternal. A mother is the heart of the family. A mother is the most critical person who gives birth to a child and feeds them with milk and other essentials to be grown up. Family life is more attractive and a safety net with extended family in the economy which should be upheld for uninterrupted opportunities for employment and provision of inexhaustible livelihood.

When a child comes into this world, the inherited capital allotted to them is more significant than their consumption at that time. A child's consumption increases gradually as s/he grows up, and consequently, inherited capital allocated to them begins to decline. To some point, their consumption equals income at $x_{1,}$ as mentioned in Figure 2. Let us assume that from zero to five years of age of the individual is equal to ox_1 in Figure 2. Usually, an individual's academic life starts from 5 years of age (from x_1), where income goes below consumption. During this period under consideration from x_1 to x_2, parents, relatives, other organisations, and the state spend a considerable sum of money and give devotion and supports during the period say about 5 to 25 years of age, to educate and train up them to impart employability skills essential requirements to get decent work. Thus, children from a very early age begin to realise the role and contribution of their

ancestors, parents, grandfather and grandmother in raising them and thus begin to feel indebted to them.

Traditionally, an individual, from 25 years to 59 years, from the point x_2 to point x_3, as shown in Figure 2, can sell their labour in the job market when income is usually higher than their consumption. At an advanced age, an individual earns maximum income (ax_3), consumes (bx_3) and saves (ab), as shown in Figure 2. The amount of savings (ab) will remain an asset to be used for the rest of their life, and part of it constitutes a start-up capital for the descendants. During this period (from x_2 to point x_3), income, an individual's consumption and savings reach the highest. In the present context of Bangladesh, this period is regarded as a formal sector when the country's rules and laws protect an individual's employment; beyond this period, the individual cannot get any protection for their employment. However, in the proposed model, everybody can get employment until s/he can work throughout life. Thus, individuals will earn and consume the goods and services of choice until death. Therefore, individuals will not be supposed to stay at the old home at old age and idle away their hours.

Figure 2: Impact of Inherited Capital as Start-up Capital on Consumption and Income



This model belongs to the concept of sustainability as individuals pass on her/ asset to the next generations, who can use them as start-up capital. We can augment the inherited wealth by keeping older people in their jobs till they can sell their labour. In this way, they can set aside more money beyond their needs and contribute more to future generations. Thus, individuals with physical and mental fitness to work and employability skills must be given employment opportunities.

8. Role of Old Aged People in the Family and the Economy and Use of their Expertise

We inherit a world that has been arranged and equipped for us by our ancestors and the living legend of older people. Age bar confronts the old aged persons to remain in their jobs and also puts a barrier to getting new employments in the job markets. Suppose older people are allowed to be employed formally or informally and facilitated. In that case, they could generate more benefits and bring forth a safety net for present and future generations and positive economic growth. A few roles of old aged people in their families and the economy is described as under:

- Older people pass on their good wishes, wisdom, skills, experiences, wealth, land and other moveable and immovable properties to the next generations as start-up capital for them. In this way, even after death, old aged people survive in this world among their descendants.
- In the present context of Bangladesh and foreign countries, people are forced to go on retirement at certain ages. Older people are discarded from the workforce through retirement, which adds indescribable difficulties in the disposed persons' lives. If there is no obligation for retirement as per rules and laws, we do not need to have Old Age Home for the older people. There are so many challenges that are to be faced by older people after retirement from their services.
- Older people are the deposit of knowledge, skills and experiences. Suppose they are allowed to take decisions of their own to work freely. In that case, they can maintain an income stream to augment their income and generate more inherited capital for the next generations. Thus, older people will be a source of inspiration for future generations and a means of earning a livelihood. Old People are assets to us because of their legacy. So, they should be cared for and share benefits and facilities generated in the economy throughout their life.
- People are to be so employed and imparted employability skills that they can remain in work throughout life and earn a livelihood by selling their labour to maximise income in the entire sphere of life.
- If we extend the model of positive income over consumption, then the aggregation of all consumers will result in positive economic growth. Likewise, the economy with negative growth can experience favourable growth if the number of individual consumers with positive savings can be increased substantially by applying this model.
- Working with older people results in a very low probability of trial and error. They can work more smoothly and efficiently with fewer casualties, low accidents and low breakdowns due to their knowledge, skills and experience. Further, their demand for salary may also be low.
- Shadow pricing can ascertain and calculate the contributions of the old aged people in the family and to the economy. The older people can tie family

bonding, look after offspring in the absence or addition to their parents, earn livelihood and save for the future generations, if and only if they are allowed to work throughout life. Thus, active and workable old-aged people are an asset to the family and the economy.

9. Conditions of Old Aged People in Present Economic System

People have to earn by selling their labour to acquire livelihood. The working ages of employees are being fixed by the politicians and policymakers of the country. The Government of Bangladesh has set different active ages for the various service holders, amongst which permissible working age ranges from 18 to 59 years in most cases. However, presently the longevity of the people of the country is 71.60 years. Thus, people may have to work beyond 59 years old to earn a proper livelihood. However, the country's rules and laws are barriers to remaining in the service or getting a job beyond 59 years of age. Alternatively, to maintain livelihood some time some people may need to work before 18 years of age for earning. Politicians can work their whole life without any bar but impose a bar on others to refrain from work beyond 59 years of age. It is the irony of fate. This employment system with a fixed range of ages in life may create a miserable state for a person beyond the permissible ages. The conditions of old aged people in the formal and informal sectors can be seen as under:

- **Formal sector**: In the formal sector, the permissible ages for employment ranges from 18 to 59 years in Bangladesh, whereas the longevity of people in this country is 71.60 years. Thus, the scope limitation for jobs imposed by the state causes difficulty for the old aged people to get employed and earn livelihood beyond 59 years of age. However, the old aged population can still work and earn for themselves and their family members if they are allowed to work. Barriers and unavailability of employment opportunities for the old aged people result in indescribable difficulty for them due to lack of earning and livelihood.
- **Informal sector:** In the informal sector, the aged and retired persons try to earn by investing their accumulated savings. The declining interest rates on savings pose a severe threat for retired persons. Thus, they cannot cope with their consumption earnings and face burdens for their dependents. Soon they realise that the world is prosaic and pray for disappearing from the worldly life, which is the ultimate fate of the retired persons.

10. Decision Making for Employment and Income for Better Future

Economic fortune is in the grips of the individual who takes all sorts of decisions as an economic unit. This article regards an individual as a decision-maker in their life for employment throughout life and advocates to tighten their grips for proper and safe utilisation of income for a better future and, more importantly, for

a sustainable livelihood. This article argues not to lose one's grips at any stage of life, especially during old age, to avoid awkward situations, e.g. lack of money to pay for food, shelter and medicine and ultimate submission of themselves to the old homes. As growing older, the employee's affection for a job increases more and more because of uncertainty and insecurity in life. This is the case for an honest, sincere, dutiful, devoted and needy person. Individuals can reduce tension and insecurity through their decisions to remain in jobs and, more importantly, stay in work that will be useful for leading a better life.

Human beings are social animals and must live together in families, societies, states and the world. We know human decision-making processes are influenced by the surrounding environments, families, government policies and laws of the land and international laws. They seek employment to earn income and livelihoods for themselves and their dependents. Sometimes they have to start their work before the stipulated age as fixed by the laws of the land and international laws because of needs and urgencies. Such types of employment occur in the informal sector, for example, child and adolescent labour.

In the formal sector, individuals have to abide by the government policies and laws of the land for permissible ages for employment. They have to wait until they have attained a certain age and required educational qualifications and training skills to qualify for a job. When they cross the upper limit of the age bar, they have to wind up with the formal sector employment, and their income generation through employment is ceased due to government policies and laws of the land.

During retirement, the individuals experience a lower income level due to the stoppage of employment, though their consumption trend remains the same. Due to their consumption trend, they will have to spend much more than the income generated from their retirement benefits or accumulated wealth. Soon they realise that they cannot cope with the requirements of money to maintain the level of consumption. Once, they have to be dropped out of their life struggle. They are forced to take shelter in the old home or confined themselves in the house of their next generations as dependents. It is the crux of the problem. Individuals must be cautious about their decisions in old age to prevent such types of happenings.

11. Inherited Capital Hypothesis versus Life Cycle Hypothesis

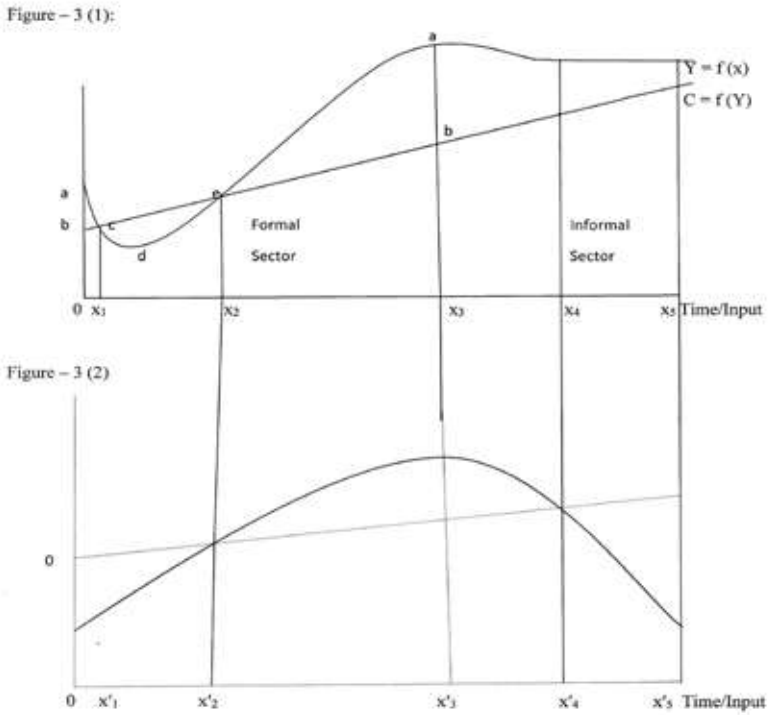
The inherited capital hypothesis of consumption function facilitates the consumer to have employment throughout life to augment income and consumption, i.e. no stoppage of work or retirement. Thus, within the purview of this model, individuals can maximise their employment, income, and consumption and leave sufficient start-up capital for their descendants. However, the life cycle hypothesis is constrained by specific starting and ending points of a consumer's life so that retirement is inevitable and s/he cannot maximise their income and consumption

and leave little or no start-up capital for their descendants due to cease employment. This unplanned life of an individual under the auspice of the life cycle hypothesis of consumption ends up in the agony of the countdown to the time of their death and waiting in nursing homes or shelters arranged by relatives with indescribable misery and unbearable sufferings at the end of life.

The inherited capital hypothesis of Consumption:

- In real life, we know the starting point of life or even we can forecast the date of birth of a child. However, we do not see the time of departure, i.e. the time of death, which is only known to Allah, and an individual has to maintain their livelihood up to the end of life.
- The uninterrupted supply of livelihood is essential and helpful to maintain life in the world. The arrangement of means of earning a livelihood, i.e. selling labour or, more importantly, the attainment of employability skills and scope for the work of sale in the job market, is also essential and helpful to maintain life in the world.
- Thus, provision for employment throughout life should be ensured and opened to all individuals irrespective of castes, creeds, colours and places so that they could earn income to procure livelihood uninterruptedly during their stay anywhere in this world.
- The inherited capital hypothesis of consumption function advocates for people to tighten their grips on employment, income and expenditure up to their end of life. The individuals leave behind land, houses, money, and movable and immovable properties to their descendants, who use them as start-up capital for consumption and investments in education and other purposes. For example, in the present situation, every employment is contractual for a period determined by fixed age. However, there will be no retirement age in the proposed model. After the expiry of the contract, the employer can retain their employees for a further period subject to physical and mental health fitness and employability skills. Alternatively, every employee can find a job based on workability and employability skills. Thus, there will be no bar or restriction for getting a job concerning specified ages.
- The life of a wo/man is divided into three parts which are (1) life in the world, (2) life in the grave after death and (3) resurrection to life by Allah in the eternal life after the graveyard. We will stick our study to economic activities of life in the world and the investment of capital in life in this world and for eternal life after death.
- For example, a Muslim spends their income mainly for maintaining a livelihood, Zakat and sets aside some of their income for their descendants. Sadqa-e-Jaria is an investment primarily for the cause of social welfare to satisfy Allah to have betterment in eternal life.

Figure 3: Inherited Capital Hypothesis of Consumption function versus Life Cycle Hypothesis of Consumption Function



- In the inherited capital consumption function, an individual starts with an income of or greater than the requirement of ob. Their income from inherited capital starts to decline as s/he is getting older due to fulfilling their consumption. After x_1 of age, his income falls from their consumption as income from inherited capital declines. From x_1 to x_2, their debt amounts to cde. Their income rises above consumption after x_2 of age as s/he begins to sell their labour in the job market. As their income rise, they start to repay the debt to their parents and other creditors. Their income, as shown in Figure 3 (1), at x_3 of age reaches the highest, covering the formal employment sector from x_2 to x_4. Their income from x_4 starts to decline (shows a downward trend) because the income from retirement benefits and other income from the informal sector starts to fall. Sometimes, principal amounts are expended due to their expenditures for education and matrimonial purposes for children and the rise of other expenses.
- The critical question is whether the individual is employed or unemployed. Those who can work for earning even in the old age and in the entire span

of life, their income of them may not go below their consumption. Under the above circumstances, control will be desirable over income and consumption for a sustainable old-age livelihood. Otherwise, the incumbent will face indescribable difficulties in leading a life in old age. However, if rules and laws of the country prohibit employment in old age, then, in that case, an individual's income must be slopping downward and may be lower than the requirement for consumption too. In the state of unemployment, the meagre savings out of retirement benefits will be dried up, and the individual will face a situation where Ando-Modigliani's Life Cycle Hypothesis starts working, as stated in Figure 3 (2).

- Ando-Modigliani's life cycle hypothesis has proposed a vicious cycle for the old aged people. Ando-Modigliani's life cycle hypothesis says that an individual takes birth in this world with a clear debt, i.e. at 0 (zero) years of age, the income of the individual is less than their consumption, as shown in Figure–3 (2). Alongside the increase of consumption as the individual is getting older, their income is also increasing but at a faster rate than the former since the individual can sell their labour due to gradual attainment of employability skills. At $x'_{2,}$ income catches up with consumption, and from x'_{2} to $x'_{4,}$ his income is higher than consumption, so that he can save. Their savings are used to repay debt and spent for old age when income from retirement benefits is lower than consumption. According to Ando-Modigliani's life cycle hypothesis, everything is completed through death, and nothing is available for future generations. However, we will investigate this proposition in due course.

12. How Does an Individual Behave in the Inherited Capital Consumption Function?

Employment is one of the main instruments the individual uses for earning income to procure livelihood in this world. The provision of employment is one of the ways of empowering human beings so that they can acquire a decent livelihood through decent work. Some of the essential qualities of an individual to obtain a decent work for a decent livelihood are as follows:

1. This study assumes that the individual buys or sells their labour through employment in decent work, which is the primary decent way of earning income to procure livelihood in this world.
2. The individual is dutiful and good to parents and kinsfolk and speaks well to them.
3. The individual who eats lawful and wholesome food.
4. An individual possesses wealth, resources and property for a certain period in their lifetime and loses control over them with death, which plays a pivotal role in passing them to the next generations.
5. The individuals will enjoy their wealth, resources and property until their

death. Many of them set aside by the individual due to death or gesture will form the start-up capital for the next generations.

6. The individual spends their wealth as Zakat or its equivalent as charitable for poor people.
7. The individual provides Sadqa-e-Jaria (Ceaseless charity), an investment in worldly life intended to have grasped the betterment of eternal life after death.
8. The individual is critical because he can take the management decision. Retirement cannot deter individuals from their responsibilities of expenditures for their current consumption, buying a home or car, and educational and matrimonial expenses of offspring. However, an individual's decision to remain employed is good insurance for old age. To get and retain a job throughout life, one must make the right decision to improve human values for lifetime workability and employability skills.
9. The ability of human persons to decide on a matter depends on physical ability combined with mental power, spiritual power, intelligence, and visible and hidden strengths of human beings enable them to gather knowledge based on their values and norms on the surrounding environments, which make them able to understand, recognise, comprehend, identify, compare things and enable to make decisions on a particular matter based on individuals' conscience.
10. Individual is advised not to lose their grip at any stage of their life with wealth, employment, income and expenditure to avoid any shock in old age. Income beyond need must be saved for old age, and savings must be put into a safe investment with a continuous flow of income. During the old age, lending has to be strictly prohibited as the non-realisation of money from the debtor may cause severe discomfort for the lender. Expenditure must be economical in old age as the incumbent's income begins to fall. Ownership of properties (moveable and immoveable) must be retained in the hand of the individuals until their death because the owner will be passed to their heirs usually and automatically.
11. The individual must plan for the future to have a sustainable livelihood, especially in old age.

13. The Scope of the Inherited Capital Consumption Function in the Economy

Goods and services are produced for consumption through employing the workforce by the employers. The ultimate objectives of labour-intensive investments are diverted toward all economic activities to generate more employment opportunities so that more people can earn their livelihood. Thus, labour-intensive investments can increase the chances of having more employment opportunities and goods and services. Employment is considered a medium of income distribution that can only ensure sustainable livelihood for people, and better income distribution can be achieved through better wages.

Economic society is uneven concerning people's physical and mental health, intellect, vigour, cultures, places, possession of wealth and resources, hidden strengths and other complex factors that create ranks. The people belonging to the upper classes usually create jobs for the people (employers) of the lower classes (employees). The latter derive benefits from the former in the form of wages. The inherited capital consumption function includes more people in the economy through labour-intensive investments and ensures better income distribution by generating more employment for people. Thus, the article's primary concern is employment, which must continue throughout an individual's life.

14. Shortage of Workforce, Immigration and Growth

Wealth and resources are unevenly distributed among people and different geographical locations. Therefore, the availability of employment opportunities and workforce varies from place to country. People migrate from one region to another region and country to another country for searching jobs. The world economy can grow further through immigration. It is a process of placing appropriate persons in the right place through competition among people of many countries. People immigrate mainly to earn livelihood and some of them for better livelihood. During the colonial era, Europeans migrated to Asia, Africa, North America and Latin America to search for jobs to earn more and enjoy a better life.

All economies of the world sum up the global economy. Economics deals with the rational human being whose behaviour is the standard for the whole world economy. The existence of ranks supports immigration. Immigration helps to pick up the workforce from places beyond the boundaries. Thus, immigration can fill up the gap in the workforce of an economy and boost the economy. The workforce inflow may be derived from outside the rich country through immigration. Immigration will also increase the housing sector of the economy.

If we look back to the history of economic activities which were done by drafting workforce from home and abroad to complete the gigantic tasks, e.g. Construction of the Pyramids of Egypt, the Taj Mahal of India, the Great Wall of China, digging Suez Canal, English Channel tunnel of England and France, etc. Presently, richer countries have been drafting workforce from poorer countries to maintain their economy. It is why immigration from poorer to more affluent nations should be open and uninterrupted for economic development.

15. Impacts of Employment and Unemployment on the Life of an Individual

Life with Employment

The economy shares of livelihood are distributed among the people mainly through employment. Employment is a means of earning livelihood for the individual and

their family. The underlying causes are the needs of the people for goods and services that compel them to be active in work. Thus, the peoples' wants for goods and services are the leading underlying causes for people to work, thereby causing the economy to be active and vibrant. For the economy to remain dynamic and energetic, active persons in the country who will work for a livelihood should be available. Employment embraces so many good things, some of which are as follows:

(a) Employment in decent work is a recognised and respectable means of earning a livelihood.
(b) Employment in decent work reduces poverty.
(c) It provides a persistent flow of income for the sustainable livelihood of their own family.
(d) Employment empowers people to earn livelihood and establish themselves in their families and societies.
(e) Through investment, people can work for themselves and serve the country and inhabitants of the world.
(f) Employment opens scopes for engaging workforce in households, agricultural and industrial sectors and helps make a possible investment.
(h) It brings discipline, punctuality, vigour and vitality to life.
(i) It helps to have inherited capital or a safety net for future generations.
(j) It helps keep worldly life alive and causes sustainable economic development.

Life without Employment

- Unemployment is scarce for people with the ability to work.
- Unemployment among the old aged people makes it difficult to earn livelihood for themselves as well as for their families
- Without employment opportunities, people may engage in unsocial activities to earn their livelihood.

16. Plan your Future, especially for our Old Age, to have a Sustainable Livelihood

The laws and rules of the states and socio-economic perspectives and traditions have been driving old aged people from their jobs and pushing them towards economic hardship, and their children are becoming helpless. However, the socio-economic perspective of the recent past was not as brutal and cruel to the children and old aged people as the conditions of the present time. A few years back, our national poet Kazi Nazrul Islam had to work in Moktab at 8 to write songs for the rural theatrical group Letor Dal at 11 and work in the bakery at 14 years to earn a livelihood. However, the present national and global perspectives and legal structures do not permit child labour. Non-cooperation, one-eyed attitude and ages specified for jobs by the states have been creating obstacles directly and indirectly

between sustainable livelihood and the children and old aged people. In the absence of specific objectives and goals of the states and societies, employment of the vast majority of children and old aged people is impossible because their safety net cannot be attained. However, we cannot accept the present conditions of employment for children and older people. By keeping the workable, employable and meaningful life of the grownup and old aged people, we can transform the lives and well-being of the children, adolescents and young into an easy-going way with a firm foundation. However, rules and laws have become obstacles to getting a job for wo/men of all ages.

Without government and society's direct and indirect facilitation, the individual must take the initiatives and decisions for sustainable livelihood in old age. Firstly, individuals have to tighten their grips with lifelong employment and income and overall control on expenditure for their sustainable livelihood and generating start-up capital for future generations. Secondly, the individual must accumulate savings and plan for a safe investment. Thirdly, the individual must tighten their grip on controlling their wealth, resources and property. Fourthly, the individual has to control expenditure at the start of retirement as the flow of income begins to slow with the stoppage of getting wage/salary. Fifthly, the individual should have tried to find a job during the retired life to earn income and pass the time with punctuality and discipline. Sixthly, individuals should try to start a business on a small scale like shop, cattle raising, goat raising, poultry farms, fisheries, etc., if there is no employment after retirement. Seventhly, an individual should try to engage in an activity to remain disciplined and retain punctuality and vitality. Eighthly, the individual must keep provision for start-up capital for future generations and make it a safe investment. It will serve dual purposes; for example, the investment dividend can be used to procure their livelihood, and the principal may be set aside for offspring. Thus, accumulated savings of the old aged persons will form a safety net for the children and old aged. Ninthly, the individual has to decide on their wealth, resources and property independently, guard against the nursing homes and, in the absence of unemployment, s/he has to open avenues for income-generating activities until death.

17. Inherited Capital: A Safety Net for Generations

Inherited or start-up capital comprises good wishes, knowledge, wisdom, experiences, skills, expertise, wealth, land and other moveable and immovable properties of the individual that pass on to their descendants. This article supports the extended family as a source of start-up capital for offspring and safety nets of old aged people and dependents of the family and an economy as a whole. This article advises including individuals in the workforce until they can work to obtain more benefits in their lifetime for maximising income and increasing start-up capital for the next generations. An extended/joint family for the individual is needed to create inherited wealth. The individual must attain primary education

and employability skills so that s/he can get a job and retain it. The wage and salary should be enough so that s/he can maintain their livelihood and save for the future, especially for the old age. The individual will use their savings and other income as capital for earning a livelihood.

The individual needs enough income for his old age because of the increasing consumption trend. Older people's physical and mental syndromes compel them to spend vast sums of money on their children's health, education, matrimony, and other expenses. Old age is the last chapter, destiny and the ultimate truth in life that cannot be escaped if and only if the individual faces any premature death by an accident. Generally, older people face various health problems few of which are as greying and falling hair, wrinkled skin, sunken eyes, loss of hearing, memory becoming dull, reduced muscle power, bone erosion, functions of liver and kidney reduced, and other functions of the body begin to decline (Abdullah, 2019: 4). As a matter of fact, due to unemployment and reduction of income, old aged people cannot spend as much on their consumption and other responsibilities as they could during their service life. Due to a lack of work opportunities for old aged people, they lose their punctuality, discipline and vitality. They become mentally disabled in their consciences, considerations, thinking and workability and often long for death.

The happenings of old aged people can be averted to some extent by deciding at the right time for providing scope to employment so that they can generate inherited capital which will serve dual purposes of the individual and their descendants as mentioned above. The old aged people can generate inherited wealth for the next generation in many ways. They can invest their lifelong savings in safe investments. The investment dividend can be used for procuring their livelihood, and the principal amount may be set aside for the next generations. To facilitate them, they must be provided with an employment opportunity after retirement. The income tax of the old aged persons from the age of 60 must be exempted from augmenting their income.

18. Working Class of Old Aged People - A Safety Net for Present and Future Generations

The employment of old aged people will generate more income and savings and set aside more money as start-up capital which will provide a safety net for the future generations. Most of the old aged people remain active and vibrant even after 15 to 20 years of their retirement in our country because the average life expectancy has increased considerably in Bangladesh. They may continue their work until they have employability skills. However, the old aged people cannot continue their jobs as they are excluded from their job markets through laws and rules of the states. To facilitate old aged people to get jobs, the age bars imposed by state laws and rules have to be waived.

They can contribute work, earn more, and save more, which are favourable for the economy if the job markets are open to them. Therefore, the government and

the society should not discriminate between people to have their jobs but extend it to all until they can work without distinction of castes, creeds, colours, ages and places. For example, many people in our societies have been living and working, earning and contributing more to their families after retirement. They have also been saving more money beyond their needs that will constitute start-up capital for future generations.

19. Job Market for the Old Aged Persons

The old aged people are the deposit of knowledge, skills and experiences. The present formal job market for the Government and other sector jobs in Bangladesh is open to the qualified citizens of the country who fall in the range of 18 to 30 years of age. The permissible age range to remain in service is 18 to 59. People ages 18 to 59 years can seek employment anywhere. However, the pensioners have been prohibited from employment; otherwise, they may lose their pension benefits. The related laws, rules and circulars may be rectified, and the job market has to be opened for the old aged persons to seek employment as long as they have employability skills. Thus, the age bar has to be removed so that everybody, especially the old aged persons, can seek employment of their choice.

It is a matter of the fact that most retired persons desire to remain in work to earn a livelihood as well as for their fellow people and their country with their knowledge and experiences at any stage of life. We have learned that the average retirement age for doctors in France is 67. However, a French doctor, Christian Chenay, has been treating patients at 98 years of age (Prothom Alo, 25 November 2019), intending to serve his long-time patients for decades and retain his vibrancy and vitality. It is mentionable that many retired secretaries are fortunate who have been working as secretary/senior secretaries of the Government of Bangladesh on a contractual basis. Recently we have come across the news published in the national dailies that some 42 former/retired secretaries of the Government of Bangladesh have decided to form a think tank to assist the government in formulating and implementing various policies. The ex-bureaucrats agreed to create an organisation that believed they could serve the country with their experience and knowledge (The Daily Star, 30 January 2020). It appears that former/retired secretaries spoke for themselves only. Apart from the top civil servants, thousands of retired aged persons with employability skills can contribute a lot in many sectors of the economy and the country. A different job market can be established with the government's permission, and a separate curriculum vitae website for the retired and old aged people can be published, among which the employers can employ any person of their choice. These appointments will be contractual as all other countries' employment with mutually agreed terms and conditions.

20. Extended Families have to be Upheld for Old Aged People and Offspring

The extended family is a support system that provides financial, mental and social security and rights over property to all family members at all times. It provides a safety net, especially for children and old persons in economic hardships. The workload of an extended family is shared among the members where abled elder persons provide constant care for raising children, guidance, education, training, and support for old family members. The extended family has a significant role in preserving desired behaviour and cultural values essential for the family and the economy. The young couples' members of the extended family will be able to work freely as the grandparents will look after their children. The old-aged family members will pass on their wealth, resources and property to the offspring, who will use them as start-up capital.

21. Creation of Employment versus Amassment of Wealth

This article found the Quran's stance on creating employment and accumulating wealth. The Quran says that the creation of employment is better than the amassment of wealth (Quran, 43:32). Investment in wealth creates employment opportunities. Thus, it is better to invest capital in labour-intensive investment for employment generation than the amassment of wealth. Accumulating wealth in the hands of few rich people puts an obstacle between employment and growth. Employment is an apparent blessing for the unemployed workforce and the investor. It is an easy and graceful way for people to earn an income for a sustainable livelihood. However, wealth accumulation is not an unconditional blessing for its owners. A wealthy Muslim individual must trickle down 2.5% of their accumulated wealth worth 85 grams of gold to poor people through Zakat to redress the poor's sufferings and alleviate poverty. Above all, accumulated idle wealth has to be utilised by investment to produce goods and services for the betterment of people. The workforce needs care for their sustainable livelihood and deserves a fair share of the benefits of income generated in the economy. The creation of employment is an instrument for income distribution generated in the economy, and a better wage helps better income distribution. Therefore, provision for employment should be extended to all without distinction of castes, creeds, colours, ages and places.

22. Policy Recommendations

1. To tighten anyone's grips to avoid any awkward situations in old age through arranging lifelong employment, income and exertion of overall control on expenditure for their sustainable livelihood to avoid economic hardships as well as generating **start-up capital** for their future generations.
2. To remain in employment is good insurance for old age.

3. Both the formal and informal employment opportunities can be explored for retired and old persons.
4. The excellent relationship between the employers and employees must be upheld for sustainable enterprises and the smooth functioning of the job market.
5. It is a legitimate demand of the working class to increase the working-age with the increased life expectancy.
6. Inequality is prevalent in societies that can be brought to a tolerable level through the distribution of wealth and charity. The ultra-wealthy holders must set aside a certain amount of their wealth, say about 2.5% (equivalent to Zakat), at the minimum per annum. However, the charitable has no ceiling.
7. Employability skills have the criteria for employment rather than the age of the workers.
8. Distribution of amassed wealth has to be done by the owners through labour-intensive investments for creating employment opportunities in addition to Zakat, charitable and philanthropic activities.
9. Employment is considered a medium of income distribution that can only ensure sustainable livelihood for people. Better distribution of income can be achieved through better wages.
10. The state's laws and rules must be recast and waived to enable older people to find jobs in the job market as long as they have employability skills.

Notes and Definitions

Provision for *lifelong employment* refers to an arrangement that will last for the whole of a person's life until s/he can work with employability skills.

Employability skill is the essential capability of a worker for getting and keeping employment by a person satisfactorily, which can be attained through proper education, off-job or on-job training, intellects, understandings, and other visible and hidden strengths of human beings that vary from person to person who demonstrate these while was rendering their responsibilities to accomplish assigned tasks.

Creation of ranks among people: Economic positions of individuals in society are uneven concerning the physical and mental health of people, intellect, vigour, cultures, places, possession of wealth and resources, livelihood, hidden strengths, and so many other complex factors that created ranks among people.

Start-up capital for offspring refers to money, wealth, resources, and movable and immovable properties set aside by ancestors to meet the initial costs of people's livelihood after birth.

Decent work implies employment where 'just and favourable' conditions of work are ensured for every employee.

Workability is the inherent ability of human beings to accomplish various tasks.

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Income Inequality and Poverty in Pabna Municipality, Bangladesh: An Empirical Analysis

Md. Enamul Haque*

Abstract

Pabna District is located in Bangladesh's Rajshahi division. It covers 2371.50 square kilometres and is situated between 23°48' and 24°21' north latitudes and 89°00' and 89°44' east longitudes. Natore and Sirajgonj districts on the north, Padma River, Rajbari and Kushtia districts on the south, Manikganj and Sirajgonj districts and the Jamuna river on the east, Padma River, Natore and Kushtia districts on the west and the Padma river on the west.

It has a total population of 2176270, with males accounting for 1126084 and females accounting for 1050186; Muslims account for 2099160, Hindus for 73839, Buddhists for 3023, Christians for 78, and others for 170. An extreme concentration of wealth or income in the hands of a small population is known as income inequality, and it has been referred to as the wealth gap between the wealthy and the rest.

According to the Urban Institute's research of 50 years of economic statistics, the poorest have gotten poorer while the wealthiest have gotten significantly wealthier. Between 1963 and 2016, the world's richest 1% owned 45 per cent of the world's wealth. Poverty is a state of being unable to meet one's necessities.

These can be defined as "those required for survival" or, more broadly, as "those reflecting the community's current standard of living." The quantity and scope of poverty in any country are determined by the average level of national income and the degree of economic disparity—clearly, the greater the national per capita income disparity, the more uneven the distribution.

Keywords *Income Inequality · Poverty · Pabna Municipality · Bangladesh*

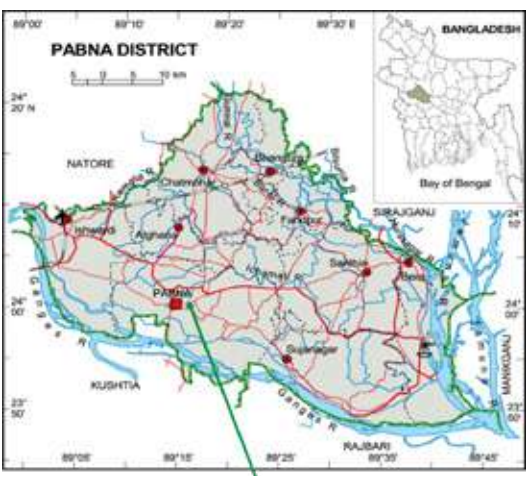
* Assistant Professor, Department of Economics, Pabna University of Science and Technology, Pabna, Bangladesh. Email: enam1875@yahoo.com

1. Introduction

Poverty and income inequality are critical roadblocks to growth in developing nations such as Bangladesh. Global inequality has become a significant concern in recent years and is increasing at an alarming rate. According to a recent Oxfam analysis, the richest 1% of the global population received 82 per cent of the wealth generated last year, which includes the 3.7 billion people who make up the world's poorest half who did not make any increase in their wealth.

To put it another way, the poorest half of the planet received nothing. The top ten per cent of South African society earns half of all wage income, while the poorest half of the workforce gets only 12 per cent. The current study aims to quantify poverty and economic inequality in Bangladesh's Pabna municipality. Economic inequality develops from the distribution of income, consumption, wealth, or assets, and it is a big problem worldwide to minimise or regulate it. According to Bangladeshi household data, income distribution is far more unequal than the distribution of consumption.

In Bangladesh, the top 5% of income earners account for 95% of total income, indicating an unequal distribution of wealth. The GINI coefficient, which measures income inequality, has been widely utilised as a measure of income disparity in recent decades. Bangladesh's economy is one of the most promising in the twenty-first century, although poverty and wealth inequality are widespread in Asian countries. A well-organised questionnaire obtained required data from 80 respondents who were selected using the simple random sampling technique to measure income inequality and poverty in Pabna municipality.



2. Objectives of the Study

The overall goal of this research is to determine income inequality and poverty in Pabna, Bangladesh. This study aims to achieve the following objectives to achieve the goal:

i. To depict the overall picture of Bangladesh's poverty and income inequality, notably in Pabna municipality.
ii. To determine the research area's socio-economic characteristics.
iii. Determine the poverty and economic disparity level in the study area.
iv. To determine the causes of poverty in the research region, as well as the degree of poverty and income disparity;
v. Recommending policies in the study region to minimise poverty and income disparity.

3. Review of Literature

A literature review is necessary for any research because it allows for a review of the research's pool of knowledge and information, which serves as a guideline for developing future research problems. Here are some essential works on the subject of the current study.

In Bangladesh, Zaman, K.A.U., and Akita, T. (2012) did research on "Spatial Dimensions of Income Inequality and Poverty." The study explores income inequality and poverty in Bangladesh, focusing on their spatial dimensions, using data from the Household Income and Expenditure Survey (HIES) in 2005 and 2010.

Given the modest disparity in administrative divisions, such inequities, particularly in metropolitan areas, require governmental attention. Raising the level of general education is critical, as education appears to influence rising urban inequality significantly. Similarly, wages and salaries help reduce inequality, indicating more opportunities to obtain formal revenues. Transfer programs could be increased to raise earnings among the poorest people, even if the impacts are expected to be minor. Providing primary education throughout the country and boosting general educational levels is vital to alleviate poverty. Increasing agricultural productivity in rural and urban sectors is critical, and Non-agricultural activities should also be fostered following the comparative advantage model.

S. Ferdousi and W. Dehai (2014) published a study on Bangladesh's "economic development, poverty, and inequality trend." According to this survey, Bangladesh has one of the highest rates of poverty in the world, and poverty affects millions of individuals around the world. Currently, one-third of the country's population (31.5%) lives in poverty.

Inequality also contributes to poverty's continuance. Bangladesh had the second-highest average yearly rate of poverty reduction among south Asian countries from 2000 to 2005. However, Bangladesh's rate of poverty reduction is far slower than that of faster-growing east Asian nations such as China, Thailand, and Vietnam, highlighting the significance of higher growth for attaining even faster poverty reduction. The current research focuses on Bangladesh's poverty trends, economic growth, and inequality. This paper also decomposes inequality and poverty by household type (rural, urban, and national). The research is based on secondary data.

Poverty decreased from 1991-to 92, dropping from 56.7 per cent in 1992 to 31.5 per cent in 2010. According to the findings, the incidence of poverty is higher in rural areas than in urban areas, and the rate of poverty reduction is likewise higher in rural areas (1.24%) than in urban areas (1.13 %). In Bangladesh, both general and food inflation are to blame for widening wealth disparities. Despite consistent GDP growth over the last decade, the general public has suffered more due to rising family expenditure and food inflation than income growth. The study paints a clear picture of the current state of affairs.

Stanhope (2016) studied income disparity, incarceration, and the disparities in poverty rates between black and white people. Using each state's Gini coefficient estimate as to the inequality measurement, this article seeks to investigate and isolate the effects of income inequality on the difference between poverty rates among the Black and White population by state in 2010. Furthermore, the author suggests an alternative income distribution measurement to understand better the effects of a state's income distribution on its poverty rate disparity. This article will discuss and quantify other factors that may affect the discrepancy in poverty rates between Black and White Americans. According to the author, a higher state Gini coefficient corresponded to a lesser magnitude of difference between Black and White poverty rates. In contrast, a higher variation in income bracket allocation corresponded to an increase in the extent of the poverty rate differential.

Feldstein (1998) studied "income inequality and poverty." The first section of this research report argues that income disparity is not a problem that must be addressed. The usual practice of viewing an increase in the Gini coefficient measure of inequality as a negative thing violates the Pareto principle and is akin to applying a social welfare function that gives negative weight to increases in high-income persons' income. Poverty, not inequality, is the real distributional issue. The study examines three causes of poverty and wonders what, if anything, can be done about them: unemployment, inadequate earning ability, and human choice.

Islam and Khan supervised an empirical study in Bangladesh on "income disparity, poverty, and socio-economic development" in 1986. This article examines Bangladesh's income distribution pattern and poverty from 1963 to 1977. It contrasts the country's socio-economic condition in the mid-1970s with other emerging countries in Asia, Africa, and Latin America. Inequality and poverty have risen dramatically in recent years. This alarming trend is exacerbated by the fact that Bangladesh ranks last in the Third World in terms of a composite social index. Within the poverty population, the poor suffer, and the rural sector was the most affected by the increase in poverty. The basic policy advice is that while allocating resources for the country's future development, more emphasis should be paid to the social sectors.

4. Concepts about Income Inequality and Poverty

4.1 Income inequality

The unequal distribution of family or individual income among the various economic actors is known as income inequality. The percentage of income to a portion of the population is a standard measure of income inequality. For example, a statistic can show that 20% of a country's people control 70% of its income.

The concept of income "fairness" is frequently related to income disparity. Most people think it is "unfair" if the wealthy own a disproportionately significant share of a country's wealth compared to the rest of the population. Income inequality can be caused by various factors, including geography, gender, education, and social standing, and economists are split on the implications.

Since the 1980s, when the top ten per cent of earnings received 30 to 35 per cent of national income, income inequality has gotten worse. Since then, the percentage of income going to the top 10% has risen to 50%, resulting in a massive economic discrepancy between rich and low workers. Regarding the core cause and suitable answers, the topic has become politically and economically controversial. While most economists believe that rising disparities are due to unequal education, the environment, and social interactions, they disagree on the mechanisms causing the rise.

Contributing factors to income inequality

Education has been shown to have an impact on social equality. In the United States, many socio-economic groups lack access to high-quality education, particularly at the secondary school level. There is substantially less income difference in countries that give higher-quality secondary education to people from all walks of life.

Salary disparities arise as a result of the talent competition. Because of the increased rivalry for high-quality executive personnel, executive wages have risen about the amount of product delivered. Executive wages have been raised due to large bonuses and other incentives. Stagnant wages exacerbate inequality. Since 2007, the median salary for low- and middle-income workers has remained largely unchanged, while CEO remuneration has risen. Workers' earnings have remained steady or have decreased as labour unions' power has waned.

Earning potential is influenced by family and social relationships. In economically challenged places with many unstable families, social and emotional skills are not sufficiently developed to lead a quality life.

A rising wage disparity is exacerbated by increased demand for high-skilled jobs. Companies are investing more extensively in developing a high-skilled workforce, driving up high-skilled worker wages. As a result, low-skiing is deemphasised or automated.

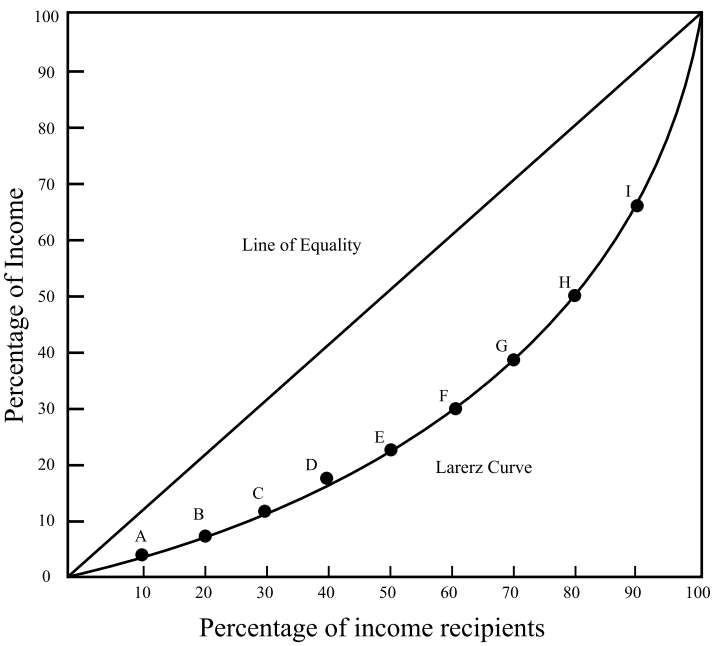
Measurement of income inequality

The Lorenz curve and the Gini coefficient can calculate income inequality. The ratio of incomes earned by the top 20% and bottom 40% of the population is a popular measure of income inequality. This ratio, also known as the Kuznets ratio after Nobel Laureate Simon Kuznets, is frequently used to measure the degree of disparity between the extremely poor and very rich. This inequality ratio in our example is 87/4, or nearly 22, indicating an unequal income distribution.

The Gini coefficient is another frequent technique for assessing inequality based on the Lorenz curve. The deviation of the size distribution of income from perfect equality is depicted by the Lorenz curve (Michel P Todaro, and Stephen C. Smith, 12th Edition)

The graph is a Lorenz curve that depicts income distribution in the United Kingdom in 2009.

The proportion of the population, organised in order of their incomes from least to wealthiest, is plotted along the horizontal axis. The scale ranges from 0% to 100% of the population of the United Kingdom.



Lorenz curve

The society's income proportion is represented by the vertical axis, which ranges from 0 to 100%. The 45-degree line depicts what 'perfect' equality looks like; everyone has the same income along this line (i.e. 10 per cent

of the population holds 10 per cent of the income, and so on). The line of complete inequality depicts the extreme circumstance in which the wealthiest individual owns 100% of a society's revenue. The lower a Lorenz curve sags below the line of perfect equality, the more unequal a society becomes. For example, the Lorenz curve for the United Kingdom reveals that the poorest 40% of the population receive only 16% of total income, while the poorest 80% receive around 53% of total income.

4.2 Poverty

Poverty can be either absolute or relative. The number of people living below a given income criterion, or the number of households unable to afford certain basic goods and services, is referred to as absolute poverty. Relative poverty is a household's financial resources falling below the economy's average income criterion.

Poverty lacks sufficient funds to cover basic requirements such as food, clothing, and shelter. Poverty, on the other hand, is much more than a lack of resources.

Poverty is defined as follows by the World Bank Organization:

"Hunger is poverty, and poverty is defined as a lack of shelter. Being sick and unable to see a doctor is a sign of poverty.

Poverty is defined as a lack of access to education and the inability to read. Poverty is defined as not having a job, anxiety about the future, and daily living.

Poverty has numerous faces, which change from place to time and are described in various ways. Poverty is frequently a circumstance from which individuals wish to be free. So, poverty is a call to action for everyone, rich and poor, to transform the world so that many more people have enough to eat, a safe place to live, access to education and healthcare, safety from violence, and a say in what happens in their communities.

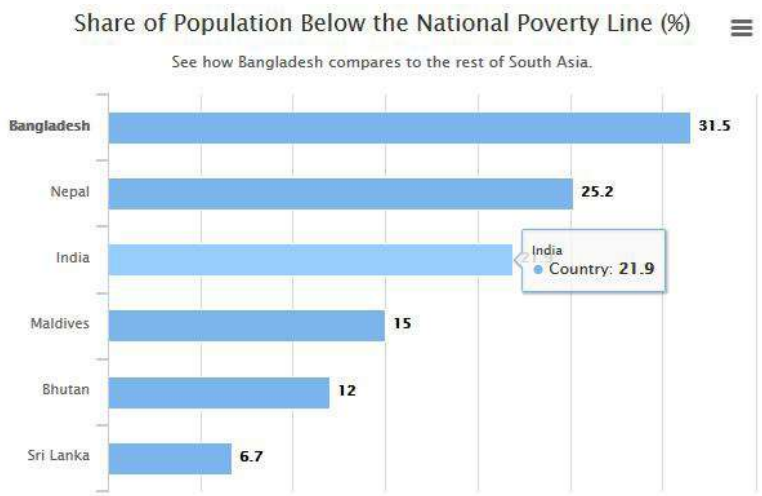
Types of poverty

Absolute poverty: It is a severe form of poverty characterised by a persistent lack of necessities such as food, clean water, health, and housing. People living in abject poverty often struggle to survive, and many children die from preventable diseases such as malaria, cholera, and disease caused by contaminated water. This type is usually long-lasting and frequently passed down through generations.

Relative poverty: This type is frequently about other community members and their families. For example, a family may be considered poor if it cannot afford vacations, Christmas presents, or university tuition for its children. Despite receiving government assistance for food, water, medication, and free housing, they are considered poor because the rest of the community has greater services and amenities.

Situational poverty (Transitory): People or families can become impoverished due to natural disasters, such as earthquakes, floods, or significant sickness. People can often help themselves out of a sticky situation if they are given a little help, as a single unlucky incident caused the causes of their predicament.

Generational or chronic poverty: This is more complex; we will see an example here. It occurs when people and families inherit poverty from previous generations. There is frequently no way out of this type since people are imprisoned in the causes and do not have access to resources that can help them get out.



Source: *ADB (2016)*

MEASUREMENT OF POVERTY

The Headcount Index:
The headcount Index (P0) measures the proportion of the population that is poor.

$$P_0 = \frac{N_P}{N}$$

Poverty Gap Index:

The poverty gap index (P1) calculates the percentage of people living in poverty (the poverty gaps) as a percentage of the poverty line. If transfers were perfectly targeted, the sum of these poverty gaps would yield the lowest cost of eradicating poverty. The indicator does not account for changes in poverty inequality.

$$P_1 = \frac{1}{N}\sum_{i=0}^{n}\frac{G_i}{z}.$$

Squared Poverty Gap Index:

The researcher uses the squared poverty gap index to create a measure of poverty that accounts for the disparity among the poor. The squared poverty gap index is just a weighted sum of poverty gaps, with the weights being the proportionate poverty gaps. Measure implicitly gives extra weight to observations that fall considerably below the poverty threshold by squaring the poverty gap score.

$$P_2 = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{G_i}{z}\right)^2$$

The Foster- Greer- Thorbecke Index:

Because of the measures, poverty is not so easy to interpret, and it is not used very widely. It may be thought of as one of a family of measures proposed by Foster, Greer and Thorbecke in 1984, which can be written as below:

$$P_\alpha = \frac{1}{N}\sum_{i=1}^{N}\left(\frac{G_i}{z}\right)^\alpha$$

5. Methodology

This study has used the data of the Household Income and Expenditure Survey (HIES) of 2019. These are the primary source of data conducted by a well-prepared questionnaire regarding the sources of income and the types of expenditure of households in Pabna municipality. I also used different data sources like World Bank Data Bank, ADB, Bangladesh Bank, etc. In addition, various statistical reports and published articles were reviewed to write the paper. Different statistical techniques, graphs, charts, line charts, and pie charts, are used to analyse the data.

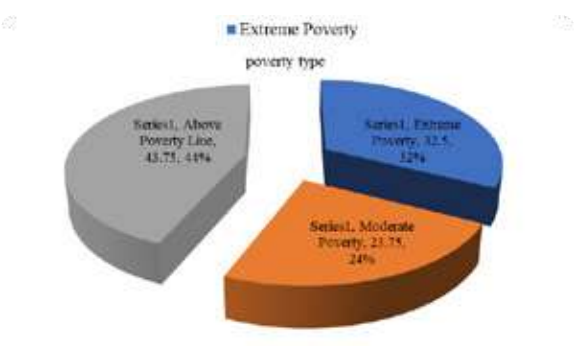
6. Discussion of Results

In October 2015, World Bank set extreme poverty at US$ 1.90 per person per day and moderate poverty at US$ 3.10 per day per person. In this study, primary data on income and expenditure from 80 respondents through a well-organised questionnaire in Pabna municipality. The data reveals that some households spend more than their income and go into debt. On the other hand, some households earn more than their expenditure and save a lion proportion of their income. In Pabna municipality, people live with different income levels, and they collected data. The income collected from 80 households, their family members, per capita income, per capita income per day and the poverty are given in the following table.

The income of the households is arranged in ascending order. The poverty types ep, mp and ap represent the people under extreme, moderate, and above the poverty line.

Income of the household	Family member	Per capitaincome	Per capita income per day	Poverty type
9000	2	4500	150	ep
10000	3	3333.333333	111.1111111	ep
10000	3	3333.333333	111.1111111	ep
10500	4	2625	87.5	ep
11000	5	2200	73.33333333	ep
12000	2	6000	200	mp
14000	6	2333.333333	77.77777778	ep
14000	7	2000	66.66666667	ep
14612	2	7306	243.5333333	mp
15000	2	7500	250	mp
15000	2	7500	250	mp
15300	3	5100	170	mp
15300	3	5100	170	mp
15400	3	5133.333333	171.1111111	mp
15500	4	3875	129.1666667	ep
15600	6	2600	86.66666667	ep
16000	7	2285.714286	76.19047619	ep
16000	2	8000	266.6666667	ap
16500	5	3300	110	ep
17000	6	2833.333333	94.44444444	ep
18000	9	2000	66.66666667	ep
18000	3	6000	200	mp
19000	10	1900	63.33333333	ep
19300	3	6433.333333	214.4444444	mp
20000	2	10000	333.3333333	ap
20000	6	3333.333333	111.1111111	ep
20000	5	4000	133.3333333	ep
21000	4	5250	175	mp
22000	7	3142.857143	104.7619048	ep
22000	8	2750	91.66666667	ep
22000	9	2444.444444	81.48148148	ep
22000	6	3666.666667	122.2222222	ep
23000	3	7666.666667	255.5555556	ap
23000	2	11500	383.3333333	ap
24400	4	6100	203.3333333	mp
25000	5	5000	166.6666667	mp
25000	7	3571.428571	119.047619	ep
25000	8	3125	104.1666667	ep
25000	9	2777.777778	92.59259259	ep
25900	6	4316.666667	143.8888889	ep
26000	3	8666.666667	288.8888889	ap
26000	3	8666.666667	288.8888889	ap
27000	5	5400	180	mp
27000	4	6750	225	mp
27400	6	4566.666667	152.2222222	ep
28000	4	7000	233.3333333	mp
28500	5	5700	190	mp

Income of the household	Family member	Per capitaincome	Per capita income per day	Poverty type
30000	6	5000	166.6666667	mp
30000	5	6000	200	mp
30000	4	7500	250	mp
30000	3	10000	333.3333333	ap
31000	4	7750	258.3333333	ap
32000	3	10666.66667	355.5555556	ap
32000	4	8000	266.6666667	ap
35000	3	11666.66667	388.8888889	ap
35000	4	8750	291.6666667	ap
36000	5	7200	240	mp
40000	6	6666.666667	222.2222222	mp
40000	3	13333.33333	444.4444444	ap
45000	4	11250	375	ap
45000	5	9000	300	ap
45000	3	15000	500	ap
47300	4	11825	394.1666667	ap
49000	5	9800	326.6666667	ap
62500	3	20833.33333	694.4444444	ap
65000	6	10833.33333	361.1111111	ap
70000	3	23333.33333	777.7777778	ap
92000	4	23000	766.6666667	ap
130000	5	26000	866.6666667	ap
190000	3	63333.33333	2111.111111	ap
260000	4	65000	2166.666667	ap
270000	5	54000	1800	ap
300000	3	100000	3333.333333	ap
350000	5	70000	2333.333333	ap
385000	4	96250	3208.333333	ap
520000	3	173333.3333	5777.777778	ap
800000	4	200000	6666.666667	ap
1140000	5	228000	7600	ap
1200000	3	400000	13333.33333	ap
5500000	4	1375000	45833.33333	ap

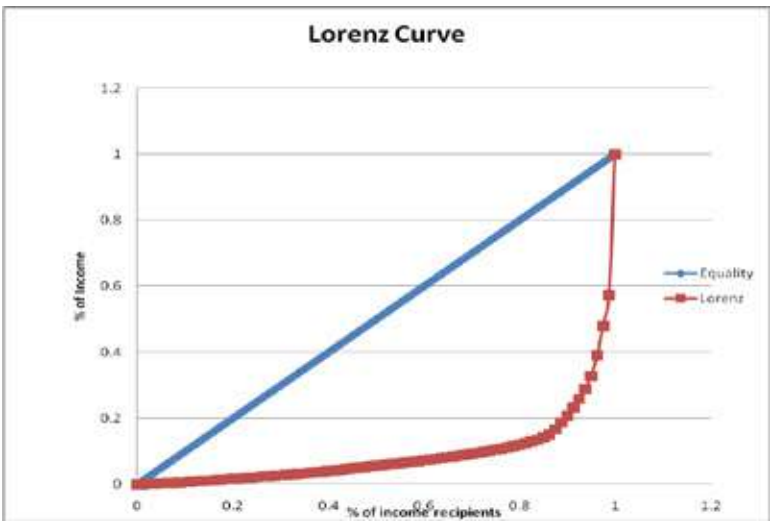


Source: *Field survey, 2019*

Family income distribution: among the respondents

Income Category	Share of Total Income %	*L*= Cumulative Share of income %	*P*= Cumulative Share of population %
lowest 20%	1.527201	1.527201	20
2nd 20%	2.519805	4.047006	40
3rd 20%	3.465897	7.512903	60
4th 20%	5.435757	12.94866	80
Top 20%	87.05134	100	100
Total	100		

Source: ***Field survey, 2019***



Calculation of Gini coefficient

Area A + Area B	½*base*height	5000
Area 1	½*20*1.527201	15.27201
Area 2	½*20* (1.527201+2.519805)	40.47006
Area 3	½*20* (1.527201+2.519805+3.465897)	75.12903
Area 4	½*20* (1.527201+2.519805+3.465897+5.435757)	129.4866
Area 5	½*20* (1.527201+2.519805+3.465897+5.435757+87.05134)	1000
Area B		1260.3577
Area A	5000-1260.3577	3739.6423
Gini		0.7479 or 75%

7. Major Findings and Conclusion

Poverty is a barrier to the development process of any country. So, poverty should reduce as much as possible. That is why it is crucial to know the current poverty status of Bangladesh. This study represents the poverty and income inequality status of the Pabna municipality district in Bangladesh.

By reviewing the literature comprehensively, it is found that there is a relationship between poverty and income inequality. By investigating the previous literature, it has become possible to measure the poverty and income inequality in the study area. Conceptual issues related to poverty, poverty, poverty measurement criterion and measurement of income inequality and brief descriptions of theoretical tools necessary for the present study are discussed. The study found that 24% and 32% of the households live in extreme and moderate poverty, respectively. The Gini coefficient measured from the Lorenz curve is 0.75, indicating a highly unequal income distribution among the Pabna municipality households. In this situation, the government should take necessary steps to reduce unemployment and invest in the education sector so that the masses can access education as poverty is severe among the illiterate.

8. Policy Recommendations

Based on the findings of this research, the following recommendations can be made.

1. Ensure the education facilities in the study area: Poverty is severe among illiterate people. If they can be educated, there will be a chance of getting a job, and unemployment will reduce.
2. Controlling population: It is seen from the study that with a larger family, there is a significant incidence of poverty. They should adopt family planning to control the birth rate.
3. Income generation activities: To boost the income of the poor, they should be involved in income generation activities. Job diversification among the dwellers can be a good solution in this regard.
4. Credit facilities: The city dwellers can do small business. For this, they need credit, and NGOs can play a good role in disbursing small loans.

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Women Entrepreneurs of Small and Medium Enterprises: Failures and Remedies

Tasnim Sultana[*]
Bidduth Kanti Nath[**]
Sujan Kanti Biswas[***]

Abstract

Women entrepreneurship is an increasingly growing phenomenon in Bangladesh and an inevitable part of the country's development. The prime objective of the study is to explore the overview of women entrepreneurs in Chittagong city. To fulfil the study's purpose, the data have been collected from the annual reports and the selected 145 women entrepreneurs in Chittagong city. In collecting primary data, printed developed questionnaires are used. Women participated in various small and medium enterprises take on the challenges of working in a male-dominated society, competitive and turbulent and complex economic and business environment. Seeing women in business in Bangladesh two decades ago was almost beyond imagination. Now, women's entrepreneurship is the vital basis of women's empowerment. They are also running manufacturing and service sector businesses. This study also explores some problems women entrepreneurs face and suggests some measures. This study is also valuable to a reading community, especially for the people working for SME development in Bangladesh. Government and non-government organisations take proper steps to develop women entrepreneurs and create a more favourable business environment.

Keywords *Women entrepreneurship · Empowerment · SME*

1. Introduction

Small and medium-sized enterprises play a significant role in local economies in most developing countries. As a part of the economy, the role of women SME

[*] Assistant Professor, Department of Management, Premier University, Chittagong.
Email: tasnimmosharrof@yahoo.com
[**] Assistant Professor, Department of Economics, Premier University, Chittagong.
Email: biddutheco.yahoo.com
[***] Assistant Professor, Department of Business Administration, Premier University
Email: sujankbtpu@gmail.com

entrepreneurs also has tremendous potential to empower women and transform society. Nowadays, SMEs have drawn much interest among policymakers, academics, businessmen, and people. The current sex ratio in the demographic structure of Bangladesh indicates that women comprise almost 50% of the total population, which means the considerable potential to be utilised for healthy socio-economic development of the country. Meaningful and active participation of women in regular economic activities can provide a dynamic and sustainable economic development. A sustainable economy is a precondition for national growth and prosperity, including institutionalising a democratic system (Reza, Gazi & Doula, 2014).

In Bangladesh, at least 60% of its population lives in moderate or absolute poverty; women suffer more because of traditional social norms. They are undernourished, underprivileged, illiterate and poor. They have less access to education, employment and productive resources. The roles of men and women in society tend to be different in a particular culture. Against the backdrop of the overall socio-economic situation in the country, the rise of women entrepreneurs is quite tricky. The country's cultural environment still cannot be judged as congenial for women's entrepreneurial development. There is not enough employment opportunity for women. Therefore, self-employment has become essential for potential working women. Women entrepreneurs or women in business is a new concept in Bangladesh. Women complete postgraduate education in Bangladesh, and many work full-time in various organisations, both in the public and private sectors.

Some are employed in small and micro businesses, while others are self-employed on a limited scale. The constitution of Bangladesh Article 28 (1) and 28 (2) grants equal rights to women and men in all spheres of public life. Article (10) also states that the state must ensure women's active and meaningful participation in all spheres of public life. Bangladesh is one of the countries that rectified the United Nations (UN) Convention on eliminating all Forms of Discrimination against Women (CEDAW). The Bangladesh Government has initiated institutional measures to enhance women's economic position and status in society by considering international concerns. (Al-Hossienie,2011)

SMEs constitute one of the major driving forces of economic growth in developing countries. According to the Bangladesh Economic Review, in 2009, around 6 per cent of the country's $ 90 billion economies came from SMEs, the largest sector in employment generation (The Daily Star, Dec. 1'2009 cited MIDAS). This sector is currently showing remarkable dynamism by registering an average annual compound growth of over 7-8 per cent in their value share to GDP. Although their potential contribution to the country's growth processes, their financial insolvency because of restricted access to sources of institutional finance acts as a severe deterrent to the sector's perspective of growth, expansion and dynamism. So systematic and institutional barriers cutting across supply and demand-related factors inhibit credit flows to the SME sector.

Bangladesh's urban and rural women are now turning the situation into crucial progress in national development. SMEs help reduce disguised unemployment and underemployment in the farm sector, poverty alleviation through economic growth, and employment generation on a mass scale is heavily dependent on the development and expansion of SMEs. It also prevents migration of the rural poor to urban centres in search of jobs and reduces the burden on the already strained urban infrastructure. However, through many programs, women are moving up the scale, emerging as creators and innovators.

The government and non-government agencies are initiating various programs to motivate women in income-generating and self-employment activities. There is a social program for women's entrepreneurship development in the country. The increasing participation of women in business activities suggests that entrepreneurial potential exists among the women, which needs to be explored for the country's overall economic development. Hence, special efforts are required to support and promote women's entrepreneurship because their task is challenging. The study's findings are expected to generate valuable information, which could be used for women's entrepreneurship development policy and programs in Bangladesh.

Objectives of the Study

The study intends to assess the present status of women's entrepreneurship concerning their nature, features and problems. In such a context, the specific objectives of the study are as follows:

1. To identify the nature of women entrepreneurs
2. To determine the reasons for failure that have faced by women entrepreneurs
3. Construct possible recommendations to overcome the problems.

2. Literature Review

In the given socio-cultural context of the country, the rise of women as entrepreneurs is not easy. The prevailing atmosphere of the country is yet not friendly to women's entrepreneurial development. Even then, women completing postgraduate education are coming forward full-time in various organisations in the public and private sectors. Though limited, some are employed in small and micro businesses, and others are self-employed. Small and medium enterprises can significantly raise income-generating employment opportunities, contribute to Gross National Product (GNP), and raise living standards. In light of the scarce resource endowments and the country's socio-economic realities, small businesses have been gradually developing in Bangladesh, significantly contributing to economic development. Many studies were done on the different aspects of small enterprises in Bangladesh by considering the gravity of the situation. Anjum (1995) outlines an overview of the entrepreneurial development in northern Bangladesh and finds out problems of entrepreneurship development, suggesting recommendations and outlining the opportunities for the development of entrepreneurs in the area. Hossain, (1998)

describes that the development of SMEs in developing countries is generally believed to be desirable, especially concerning the perceived contribution of SMEs to decentralised job creation and output generation. SMEs constitute the dominant source (80 per cent) of industrial employment in Bangladesh, and about 90 per cent of the industrial units fall into this category. Solaiman & Ghosh (2000) describe that the project's success depends on poor women's skill development and entrepreneurial training through a participant-centred approach. The existing widespread knowledge is required, and new knowledge is built based on existing knowledge. The paper pointed out how entrepreneurial training can motivate rural women toward self-employment activity as a career. The nature of the rural unemployment problems and the success of the projects depends on developing the skills of the poor women. Solaiman (2000) has conducted a survey highlighting the issues and challenges for women empowerment through women entrepreneurship development in rural Bangladesh. The survey purports that entrepreneurship as a tool for developing women's economic status and empowerment has been widely recognised in Bangladesh, which has led to the creation of a supportive environment for women over the years, and more women are involved in micro-enterprises.

Mazumder & Choudhury (2001) purposefully establish the hypothesis that the performance of Bangladesh's SME sector is not good. Against such a backdrop, they explore the critical factors that impede the growth and expansion of SMEs in the country. Mujeri (2005), in his work on small and medium enterprise development and poverty reduction, described the development of SMEs and how it assists in reducing poverty in Bangladesh based on some selected issues. Agbeibor (2006) focuses on SMEs' low capital investment per unit of output and gives rise to more significant direct or indirect employment opportunities. SMEs offer sustainable business solutions that simultaneously fight poverty and accelerate economic growth in a positive environment. Momen & Begum (2006) measures the impact BRAC's micro-credit program had on rural women's entrepreneurship development. Afrin, Islam and Ahmed (2008) aimed to identify the factors related to entrepreneurship development among the rural women borrowers through micro-credit programs. Mintoo (2006) suggests that the least developed countries (LDCs) in the eastern hemisphere have started refocusing their attention on SMEs to enhance their role in bringing about structural changes in their economies. For Bangladesh, SMEs have assumed special significance for poverty reduction programs and potential contribution to industrial and economic growth. Miah (2007) presents the Government's view on the SME sector, basically all of the Government SME initiatives and the main objectives of the Bangladesh Banks Small Enterprise Fund (SEF). He also includes an overview of SMEs in Bangladesh, growth trends of SMEs, the Government's policy commitment, the 2005 SME policy strategy, SME Foundation (SMEF) and definitions of SMEs given by the Government. Bhuian & Abdullah (2007) presents the issue of empowerment, a description of women-owned business in Bangladesh and some

of the motivational factors behind them, their characteristics, the effectiveness of training in developing women entrepreneurs in rural and urban areas, and challenges and opportunities they face. Siddique (2008) carried out an overview of the existing condition of women entrepreneurs in Dhaka city in line with their problems and prospects. This study also shows that if the women are provided with appropriate training and need-based financial and related assistance, they will enter into the entrepreneurial occupation in a large number and prove their worth in contributing to the economy of Bangladesh. Both the government and private sector have a significant responsibility to promote entrepreneurship development for women. He also suggests addressing existing problems to encourage a gender-friendly business environment.

Chowdhury (2008) describes the problems faced by the women entrepreneurs, and some of these are in terms of resources, marketing, raw materials, utility services, infrastructure, and official formalities. Ahmed (2008) analyses the governmental policies to elevate the overall scenario of the women entrepreneurs in Bangladesh. Huda (2009) examines that women entrepreneurs of Bangladeshi engage in both formal and informal sectors of the economy and have a growing interest in extending their business commercially. Rotaru (2009) provides a case study on the Bangladesh Women Chamber of Commerce and Industry (BWCCI), established in 2001 as the country's first trade body working exclusively for women's economic and social empowerment. Nawaz (2009) emphasises various critical factors of women's entrepreneurship development in rural Bangladesh. She depicts an analytical framework based on institutional theory, which focuses on regulative, normative, and cognitive aspects. Regulative factors refer to different rules and regulations of the Government that facilitate women's entrepreneurship development in rural Bangladesh. Kabir & Huq's (2011) study adoption of a comprehensive approach to socio-economic development through the involvement of rural women with small enterprises led to increased income, higher level of employment, and increased participation of women in the decision-making process. The study also revealed that rural women could contribute additional income to their families by practising different enterprises. With the help of various government and non-government organisations, they got financial and technical support to carry out their enterprise. Jahed, Kulsum & Akther (2011) attempts to investigate the available support services for developing women's entrepreneurship in Bangladesh. The paper also focuses on issues of concern and challenges of women's entrepreneurship development in Bangladesh and finally provides some strategy recommendations. Zaman & Islam (2011) examine the role of SMEs in the economy of Bangladesh, and their current status, identifying major financing problems faced by SMEs in Bangladesh and suggesting some policy measures to overcome those constraints.

Al-Hossienie (2011) focuses on exploring the socio-economic impact of women entrepreneurship in Sylhet city and found that about half of the women entrepreneurs use their income for family purposes, and most do not need

permission from their husbands to use their income. Women's involvement in business is greatly needed, not only for their development but also for the country's economic growth. This paper recommends that policymakers undertake suitable and practical policies for women's development.

Parvin, Jinrong & Rahman (2012) reviewed the literature on women's entrepreneurship development in Bangladesh, focusing on government and financial intermediaries' support, identified significant challenges that obstruct women entrepreneurs' smooth development, and provided some valuable academic support insights offer some practical solutions.

Sultana (2012) explored the socio-demographic profile of women entrepreneurs, types of women-owned enterprises, regulatory procedures, training and capacity building, and human resources development through women's empowerment. She focused on SMEs' role in promoting women entrepreneurs. She made an analytical framework to analyse the factors relating to problems and development in used institutional theory, and her finds show that women's entrepreneurship in Bangladesh is growing at an accelerated rate and their contribution to socio-economic development is significant, and 62.5% of the respondents took the SME loan to establish and run their business smoothly.

Nawaz (2012) explores the problems of woman entrepreneurship development narrated by female entrepreneurs financed by RAKUB. Her study focused that most of these entrepreneurs are illiterate and have no concept of the market, and face some significant problems like problems in taking loans, lack of knowledge and experience in marketing products, poor managerial and technical skills, as well as low amount of capital, colossal interest burden, and social and cultural obstacles.

Anis & Hasan (2013) examines various aspects of women entrepreneurs, the opportunities and challenges faced by the women entrepreneur of SMEs in the Rajshahi area, and also find out the role of women entrepreneurs of SMEs, various SMEs industries for women entrepreneurs, financial and technical aids for the women, problems faced by entrepreneurial activities and opportunities to increase entrepreneurial skills among the woman entrepreneurs and recommends suggestions.

Reza, Gazi & Doula (2014) explore the significant challenges women entrepreneurs face that hinder their smooth development flow, socio-demographic profile of women entrepreneurs, their condition and position in the family. This study also examines whether the women get exact training and financial assistance; they would contribute to Bangladesh's economy and vastly prove their worth.

Chowdhury and Rahman (2014) focus on the potentiality of the women entrepreneur in Bangladesh taken as a study area Sylhet and found that the women entrepreneurs of this region are more industrious, self-confident, dynamic, ambitious, adaptable and possess the risk-taking capacity and last but not the least is creative and innovative.

Kabir & Khatun (2014) describe women's position in society and various barriers the women entrepreneur faces and provide measures to overcome these problems. They emphasise how different groups, i.e. women SME entrepreneur, SME stakeholder, and students, can take their plans to SME entrepreneurs, especially those working for SME development in Bangladesh.

Rahmatullah & Zaman (2014) investigate the constraints female entrepreneurs faced during their initial stage and continued operation of their business and the work-family conflicts they face. It also looks at the reasons for starting a new business and their success factors.

3. Research Methods

This study is exploratory and based on both primary and secondary data. Primary data has been collected through personal interviews and printed questionnaires. It describes the overall research methodology, strategies for data collection, statistical tools and techniques, research location, and sample collection. Descriptive statistics, regression analysis, and factor analysis will be used to analyse and interpret the variables and relationships among variables.

3.1 Questionnaire Development

In developing the questionnaires, an extensive literature survey has been done. To reach the study's objective, the researcher conducted a pilot survey before administering the questionnaires.

3.2 Data Collection Procedure and Data Analysis

A survey method was used to collect data to select women entrepreneurs. A structured, open-ended, closed-ended, & contingency questionnaire has been used to collect data. Sampling is critical to collecting data and information. It helps to know the character of the population by examining only a small part of it because of time and budget constraints, and there is no unique directory for women entrepreneurs; convenient sampling is used here. Finally, 145 women SME entrepreneurs were selected for this study. Due to some constraints, it was impossible to collect an equal number of responses from each organisation.

The study was conducted on Women Entrepreneurs in SMEs in Chittagong city. A personal visit was made to Chittagong district's industrial offices, like the Chittagong Chamber of Commerce and Industry, Chittagong Women Chamber of Commerce, Chittagong City Corporation and many NGOs, to get the lists of women entrepreneurs enrolled with them. These lists and information made a preliminary list of women running enterprises (small and medium).

The study aimed at understanding the entrepreneurial development among women. Women entrepreneurship in Bangladesh is of recent origin. The scope of the present study covers women entrepreneurs of the Chittagong Division, irrespective

of their ownership pattern and type of enterprise. The study also attempts a broad view of the existing women entrepreneurs in Bangladesh. Critical factors such as personal, social, psychological and economic factors have been examined to understand whether these facilitate or constrain women from emerging as successful entrepreneurs. Women managing any business activity, manufacturing, trading, or service, were targeted for the study. The study was proposed on women's entrepreneurship development in the SME sector, emphasising and addressing the problems of these women from access to the market through technology and finance and making recommendations for the women entrepreneurs.

4. Results

In the observation table-1 in the issue of the age of participants, it is revealed that among 145 women entrepreneurs, 55.2% started their business between the ages of 30-40, and only 2.15% started their business between the ages of 51-60. Remarkably 32.4% of women also started their business between 20-30. So we can say that most women entrepreneurs take challenges to start their business in the middle age of life.

Table 1: Descriptive Statistics Regarding Respondent's Demographic Information

Particulars	Frequencies	Percentage
Respondents' age		
20-30	47	32.4
30-40	80	55.2
41-50	15	10.3
51-60	3	2.1
Total	145	100.0
Marital Status of Woman Entrepreneurs		
Married	125	86.2
Unmarried	18	12.4
Widow	2	1.4
Total	145	100.0
Education		
Illiterate	5	3.4
Primary Education	4	2.8
Class 6-10	2	1.4
SSC or equivalent	16	11.0
HSC or equivalent	64	44.1
Graduation	41	28.3
Post-Graduation	13	9.0
Total	145	100.0

Among women entrepreneurs interviewed in Chittagong city, 86.2 per cent are married, 12.4 per cent are unmarried, and 1.4 per cent are widows. So marital status is a significant factor that motivates women's socio-economic life. These data indicate that women are gradually interested in business and entrepreneurial activities after marriage. Widows women also become self–reliant through entrepreneurship.

The survey data depict that considering the educational qualification of women entrepreneurs ranging from illiterate women to post-Graduation got mixed results. The majority of women entrepreneurs have a relatively low level of education: 3.4 per cent are illiterate, 2.8 per cent have only primary education, 2.8 per cent are class six to ten, 11 per cent are SSC level, and 44.1 per cent are HSC level. However, given that 28.3 per cent have graduated and only 9 per cent are post-graduation. It is known that education has a vital role in developing entrepreneurship.

Table 2: Frequencies regarding Age of Business, Number of Employees, Form of Business, Type of Management

Particulars	Frequencies	Percentage
Age of Business	----	----
1-4	77	53.1
4-9	57	39.3
10-15	6	4.1
15-More	5	3.4
Total	145	100.0
No. of Employees		
1-9	101	69.7
10-49	38	26.2
50-249	5	3.4
250-more	1	.7
Total	145	100.0
Form of Business		
Sole Proprietorship	114	78.6
Partnership	31	21.4
Type of Management		
Myself	61	42.1
Professional Managers	15	10.3
Both	69	47.6
Total	145	100.0

It was observed that the women's involvement in their business was of different lengths. Among the respondent, 39.3 per cent have continued their business for 4-9 years, 53.1 per cent for 1-4 years, 4.1 per cent for 10-15 years and 3.4 per cent for 15 years more. So it can be easily mentionable that among women entrepreneurs, most of them are middle of the way in experience and have more experience are very few in numbers among the respondent.

The table shows that 69.7 per cent of women entrepreneurs employ 1-9 employees for their business, and only .7 per cent employ 250 –more to run their business.

The table indicates that sole proprietorship is the dominant type among the women entrepreneurs in Chittagong city. Among the enterprises, 78.6 per cent are owned by individuals, and only 21.4 per cent are a partnership. It indicates that most women entrepreneurs in Chittagong city want to run their businesses independently.

The table shows that most women entrepreneurs manage their business independently and with professional managers (47.6%).

Table 3: Frequencies regarding Initial Investment, Source of Inspirations a, Training Received

Particulars	Frequencies	Percentage
Initial Investment		
Less Than Tk 10000-50000	21	14.5
More Than Tk 50000-100000	51	35.2
More Than Tk 100000-500000	53	36.6
Above 500000	20	13.8
Total	145	100.0
Particulars	Frequencies	Percentage
Source of Inspirations		
Self	60	41.4
Parents	15	10.3
Brother-Sisters	9	6.2
Husband	36	24.8
Friends	11	7.6
Others	14	9.7
Total	145	100.
Training Received		
Yes	43	29.7
No	102	70.3
Total	145	100.0

Among the women entrepreneurs surveyed, 36.6 per cent started their business with an initial investment of more than Tk. 100000-500000, which is followed by 14.5 per cent by Tk.10000-50000, 35.2 per cent by more than Taka 50000-100000, and only 13.8 per cent started their business above 500000. So it is revealed that more women entrepreneurs do not take a risk by investing a considerable amount to start their business.

The table shows that of most women entrepreneurs, 41.4% started their business from inspiration. On the other hand, 24.8% got inspiration from their husband, and the remaining women got inspiration from their relatives or friends.

So it can be said that most women inspired themselves to be entrepreneurs as they have realised their potential to become self–reliant.

Even though the training is essential for any professional development, data in Table 3 shows that among the women entrepreneurs in Chittagong, only 29.7% have received training; the remaining 70.3% did not receive any training about their profession.

Table 4: Frequencies regarding Source of Capital

Particulars	Frequencies	Percentage
Source of Capital		
Own Savings	33	22.8
Parents	13	9.0
Husband	46	31.7
Relatives	7	4.8
By Selling Properties	8	5.5
Bank Loan	37	25.5
Loan from NGO	1	.7
Total	145	100

Capital is significant to starting any business, either small or big. For women entrepreneurs, it is more crucial. It is found that most women entrepreneurs (31.7%) initially invest by taking money from their husbands and also own savings or bank loans. Very few (0.7%) invested initially via loans such as NGOs.

Table 5: Perception Regarding Reasons for Failure of SMEs

SL	Reasons of Failure	SA	%	A	%	N	%	D	%	SD	%	Mean
1	F1	11	7.6%	10	6.9%	23	15.9%	67	46.2%	34	23.4%	2.29
2	F2	4	2.8%	7	4.8%	20	13.8%	93	64.1%	21	14.5%	2.17
3	F3	87	60.0%	25	17.2%	20	13.8%	4	2.8%	9	6.2%	4.22
4	F4	18	12.4%	36	24.8	12	8.3%	53	36.6%	26	17.9%	2.77
5	F5	35	24.1%	53	36.6%	35	24.1%	3	2.1%	19	13.1%	3.57
6	F6	22	15.2%	67	46.2%	4	2.8%	41	28.3%	11	7.6%	3.33
7	F7	84	57.9%	15	10.3%	5	3.4%	19	13.1%	22	15.2%	3.83
8	F8	65	44.8%	21	14.5%	38	26.2%	2	1.4%	19	13.1%	3.77
9	F9	81	55.9%	12	8.3%	9	6.2%	18	12.4%	25	17.2%	3.73
10	F10	78	53.8%	15	10.3%	7	4.8%	27	18.6%	18	12.4%	3.74
11	F11	30	20.7%	27	18.6%	2	1.4%	72	49.7%	14	9.7%	2.91
12	F12	22	15.2%	74	51.0%	1	0.7%	37	25.5%	11	7.6%	3.41
13	F13	40	27.6%	68	46.9	2	1.4%	16	11.0%	19	13.1%	3.65
14	F14	62	42.8	31	21.4%	5	3.4%	37	25.5%	10	6.9%	3.68
15	F15	77	53.1%	19	13.1%	9	6.2%	24	16.6%	16	11.0%	3.81

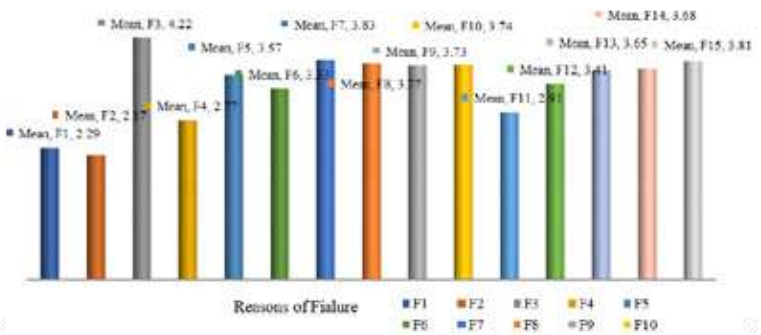
Note: *F1: Incapacity to maintain the product quality, F2: Lack of information, F3: Lack of financial resources, F4: Lack of IT support, F5: Higher interest on a bank loan, F6: Difficulty in obtaining industrial land in towns and cities, F7: Lack of investment and working capital, F8 Lack of infrastructural facilities. F9: Lack of experience, F10: Lack of skilled technicians and workers, F11: High cost of materials, F12: High cost of equipment, F13: Competition of large industries, F14: Unavailability of raw materials, F15: Unavailability of the skilled worker; N=145.*

Observation (Table 5) indicates that 46.2%respondents rated their opinion as disagreeing, and 23.4% of respondents strongly disagreed with this statement. A significant portion of the respondents (46.2+23.4), 69.6%, reject the reason (F1) to fail the business.

It is seen that most of the respondents (64.1%+14.5%) 78.6 strongly disagree that lack of information is not the cause of their failure. There are other causes, and only 2.8% Strongly agreed with F2.

The study shows that the maximum number (60.0+17.2), 72.2% of the respondents strongly agreed that lack of financial resources is the significant cause of their failure, while a great portion of the respondent, 13.8% neutral with the statement. They can manage capital, and how to run their business.

Figure 1: Reasons for Failure



It can be seen that most of the respondents (36.6+17.9) = 54.5% rejected that lack of IT support is not the prime cause for their failure, and a mentionable portion, 24.8% agreed that lack of IT support is also responsible for their failure. Table 5 shows that (36.6+24.1) 60.7% of respondents strongly agreed or agreed with statement F5 though a remarkable portion of the respondent, 24.1% neutral with the statement. Among the respondents (46.2+15.2) = 61.4% strongly agreed that the difficulty of obtaining industrial land in towns and cities due to high cost is a significant reason for selecting a location in cities to establish their venture. 28.3% of the respondent also disagree with this statement (F6). Table 5 indicates that (57.9+10.3) 68.2% of respondents either agreed or strongly agreed that lack of investment and working capital is also responsible for their failures. Only 15.2% of respondents strongly disagree with this statement (F7).

From the observation in Table 5, it can be quickly recognised that (44.8+14.5) =59.3% of respondents either strongly agreed or agreed that they suffered from insufficient utility support. In contrast, 13.1% of respondents strongly disagreed with statement F8. The study reveals that most respondents (55.9+8.3) = 64.2% strongly agreed or agreed with the statement F9, while 6.2% of respondents were neutral with this view. This study figured out that half of the respondents responded

positively that the lack of skilled technicians and workers is another cause of their failures. However, 18.6% of respondents disagree with the statement (F10). The survey data depict that most of the respondents (49.7+ 9.7) = 59.4% either disagree or strongly disagree that the high cost of materials is not the only factor for their problems in business. While 18.6% of respondents agreed with this statement (F11). Table 5- F12 indicates that 25.5% of respondents rated their opinion as disagreeing, and 51.0% agreed with this statement. A significant portion of the respondent (51.0+15.2) =66.2% reject the reasons (F12) for failing the business. More than half of the respondents (46.9+27.6) =74.5% strongly agreed that large industries' competition hinders their business, while 13.1% strongly rejected the statement (F13). The study also looks that ((42.8+21.4) = 64.2 % of respondents strongly agreed that raw materials are scary, whereas 6.9% strongly disagreed. The study shows that most of the respondents (53.1+13.1) = 66.2. % are either strongly agreed or agreed that unavailability of a skilled worker is also a significant factor in running their business smoothly. They mention that in Chittagong, there is not enough training facility for developing women entrepreneurs. 11% strongly disagree with this statement (F15)

The study demonstrates that in case of reasons of failure of SMEs, it can seem that the mean values are found to be greater than three in almost ten issues out of fifteen issues. Simultaneously, the mean values are found to be less than (3) in cases of F11, F4, F1 and F2 issues., However, the highest mean values, 4.22 and 3.83, were found for F3 and F7, indicating that most entrepreneurs emphasise that. On the other hand, respondents' emphasis less on the reasons for failure F1 and F2 suggests that they disagree less with those statements.

5. Discussion and Recommendations

The study's findings indicate that although the number of women SME entrepreneurs is gradually increasing, their conditions are unsatisfactory. Many social and operational constraints restrict women from starting and running economic enterprises efficiently, disrupting women's empowerment. The operational barriers include lack of financial resources, utility problems, unavailability of skilled workers, and higher interest on bank loans. Some recommendations are presented here, which are essential for the development of SME entrepreneurs.

1. Finance is considered a lubricant for smoothly setting up and running a business. Funds, therefore, need to be made available on time at soft terms and conditions to those who need them. Government should take the necessary step by providing proper monetary policy.
2. To ensure the available investment opportunity and the working capital for women entrepreneurs Government can establish a special wing for only women entrepreneurs, which can provide the low cost of capital and flexible loan repayment.

3. Many women entrepreneurs cannot efficiently ensure their production and marketing due to poor managerial and technical skills. So Government should emphasise ensuring skilled workers by establishing different training institutions and providing proper training to use technology effectively.
4. Infrastructural facilities such as transportation, communication, electricity supply, gas, water, and sewerage are not optimum. The Government should take necessary actions to improve infrastructural facilities that will help improve women entrepreneurs' socio-economic conditions.
5. Most entrepreneurs are plagued by the scarcity of raw materials and necessary inputs. Public and private organisations should take proper steps to ensure the availability of raw materials at the right time and amount. Backward industries could be established for the survival of such women entrepreneurs.
6. Women entrepreneurs do not have an organisational set-up to pump in money for canvassing and advertisement. Thus, they must face stiff competition marketing their product in a large industry. So Government could take steps to be competitive with large enterprises, especially tax holidays, special economic zone or any other favourable policies to secure the better existence of women entrepreneurs in the competitive business environment.
7. Technology and equipment cost is one of the most critical issues in the case of women entrepreneur decisions. So, the Government should make the right policy in importing duty-free equipment, especially for women entrepreneurs.
8. The interest rate in loans should be reduced in genuine cases. Loans should be invited on concession rates. The credit systems offered by different financial institutions and banks must be free from any complexity, and the process must be easy to realise.

6. Implications

The study is significant for the women SME entrepreneurs and SME stakeholders. This study is also valuable for a reading community, especially for the people working to develop SMEs in Bangladesh. Potential entrepreneurs can consider the findings of this study in doing business in Bangladesh. SME women entrepreneurs will create opportunities for investors, promoters, and the government to establish their business in the planning and decision-making process. Bangladesh Government has taken various initiatives to increase women's participation in the SME sector. So the study suggests that every public and non-Government organisation assist the women entrepreneurs of the Chittagong district of Bangladesh because this can create more prominent women entrepreneurs for SMEs.

7. Limitations

The most important limitation was that using convenience sampling might limit the findings' generalizability. A random sampling procedure could be the best alternative to assure the generalizability of the result. The sample size (N= 145) posed another limitation of this study. A more prominent and representative sample is needed to further investigate the women entrepreneurs in SMEs. Finally, the current study used a self–rated instrument to measure SME women entrepreneurs, short of 360^0 assessments. By incorporating 360^0 evaluations, the study could obtain a better result.

8. Future Research Direction

Research investigating the comparisons between women and other entrepreneurs could produce more exciting results; a large sample size from all over the country could explore more reasons for the failures of SMEs. Research that discovers the relationship between various factors of entrepreneurship and their success is necessary.

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Climate change and vulnerabilities of women: Voices of the victims in Dhaka City

Radia Tamim*

Abstract

The query of this study is to get a scenario on the perceptions of the women about how their livelihoods have been affected due to climate change. The broader research question of this study is: What do the women say about the economic vulnerabilities of their livelihood due to climate change? The adverse effects of the vulnerability of the women's livelihoods have been investigated in the light of the livelihood framework. This research approach was dominantly qualitative, rooted in a detailed analysis of interview texts and grounded in a broader contextualisation of the vulnerable women's socio-economic, cultural, and political situation based on the livelihood framework. This research found that most women are socially and economically vulnerable due to climate-induced migration. Though their income level rises, their livelihood expenditure, especially in the case of health expenditure, rises simultaneously. However, the most alarming issue about those women is that they become socially vulnerable and have no social security. Their children mostly do not get any form of education. Food, sanitation, and social security have worsened compared to the past.

Keywords *Climate change · Vulnerabilities · Natural shocks · Livelihoods*

1. Introduction

Currently, climate change is a global concern for all living beings. The environmental degradation, ecological imbalance, changes in the climate pattern and so on are creating an adverse effect on the socio-economic livelihoods of the people. One of the vulnerable victims could be the low-income group of people, especially the women. Listening to women's voices about the vulnerabilities of their livelihoods due to climate change is the critical concern of this study.

Climate change and its socio-economic impact is a burning issue for scholars, activists and people of all walks of life. Bangladesh is also very concerned about this issue. A lot of academic evaluation reports, news articles etc., are being

* Executive Director, Innovation Influence Impact I3 Ltd. Email: radiatamim77@gmail.com

published regularly, though the vulnerability issues of the women have gotten a little attention. Ahmad et al. (n.d.) synthesised the different dimensions of climate change on coastal areas, emphasising the socio-economic impacts. Gupta (2005) highlighted the issues of vulnerabilities due to climate change in India's context. However, the problems of women's vulnerabilities have not been addressed there.

1.1 Objective

The query of this study would be to get a scenario on the perceptions of the women about how their livelihoods have been affected due to climate change. The adverse effects of the vulnerability of the women's livelihoods will be investigated in the light of the framework presented earlier.

1.2 What is Climate Change

The climate change phenomenon refers to seasonal changes in the growing accumulation of greenhouse gases in the atmosphere over a long period. Tackling this phenomenon is of utmost importance, given the pivotal role climate plays in forming natural ecosystems and the human economies and civilisations on which they are based.

Recent studies have shown that human activities since the beginning of the industrial revolution – manifested in fossil fuel consumption for power generation, land deforestation for agriculture, and urban expansion – have contributed to an increase in the concentration of carbon dioxide in the atmosphere by as much as 40%, from about 280 parts per million in the pre-industrial period, to 402 parts per million in 2016, which in turn has led to global warming.

Indeed, the Intergovernmental Panel on Climate Change has described anthropogenic climate change as "inevitable" because of the numerous changes observed in the temperature of the atmosphere, oceans, and sea ice and some extensive changes in the climate cycle over the 20th century.

Several parts of the world have already experienced the warming of coastal waters, high temperatures, a marked change in rainfall patterns, and increased intensity and frequency of storms. Rising sea levels and temperatures are expected to be an increasing trend.

Moreover, the potential for severe and irreversible climate and environmental changes, including the continued melting of polar ice layers, such as those found in Greenland and West Antarctica, could cause sea level rises exceeding 10 meters and harmful fluctuations in ocean currents, and increased methane emissions.

The probability that most of the global warming of the last 15 years results from human actions is more than 90%. The failure to address climate change will inevitably undermine the world's economic and social stability.

The Intergovernmental Panel on Climate Change has issued an urgent call to reduce global greenhouse gas emissions and adaptation measures to respond to anthropogenic climate change.

1.3 What is vulnerability?

Vulnerability can be defined as the diminished capacity of an individual or group to anticipate, cope with, resist and recover from the impact of a natural or artificial hazard. The concept is relative and dynamic. Vulnerability is often associated with poverty, but it can also arise when people are isolated, insecure and defenceless in the face of risk, shock or stress.

People differ in their exposure to risk due to their social group, gender, ethnic or identity, age, and other factors. The vulnerability may also vary in its forms: poverty, for example, may mean that housing cannot withstand an earthquake or a hurricane, or lack of preparedness may result in a slower response to a disaster, leading to more significant loss of life or prolonged suffering.

The reverse side of the coin is capacity, which can be described as the resources available to individuals, households, and communities to cope with a threat or resist a hazard's impact. Such resources can be physical or material, but they can also be found in how a community is organised or in the skills or attributes of individuals and/or organisations in the community (What is Vulnerability (n.d.).

Physical, economic, social and political factors determine people's level of vulnerability and the extent of their capacity to resist, cope with and recover from hazards. Poverty is a significant contributor to vulnerability. Poor people are more likely to live and work in areas exposed to potential hazards, while they are less likely to have the resources to cope when a disaster strikes (What is Vulnerability (n.d.).

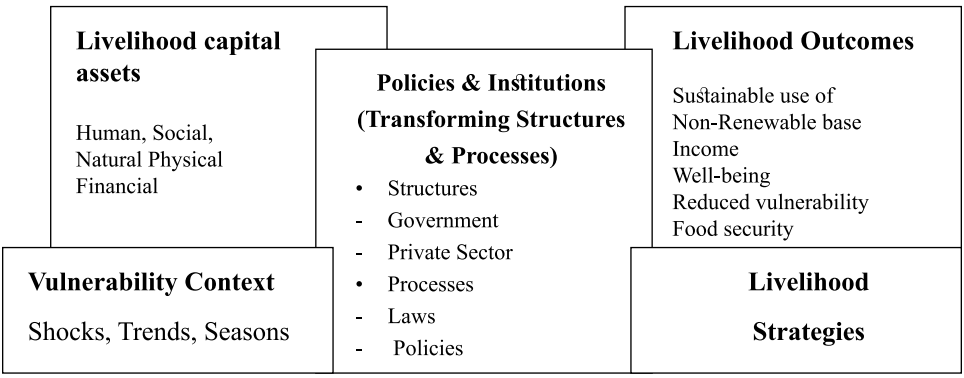
1.4 Vulnerability and women

As for vulnerability to the impacts of climate change, poverty plays a significant role. Due to the living conditions of the poor, they are often more exposed to hazards and have fewer options to avoid, or cope with, the impacts. According to UNDP, more than 70 per cent of the world's poor is female, and the share of women among the most vulnerable is significantly high. Moreover, additional factors indicate that vulnerability involves heavy gender differentials that need to be considered (Cities and Climate Change Global Report on Human Settlements 2011).

1.5 Livelihood framework

To understand the linkage between livelihood strategies and better living expectations, many socio-economic factors remain to consider. Natural, physical, human, social, financial, and political assets construct the livelihood capital assets. Moreover, the transforming structures (government, private sector) and processes (laws, policies, culture, institutions) play a vital role in utilising the livelihood capital assets. Besides them, vulnerability context (shocks, trends, seasons) is also crucial. Thus, livelihood strategies in constituted. This livelihood framework is presented in Figure 1.

Figure 1: Livelihood Framework, Pinker (1999)



1.6 Research question

This study would mainly focus on the economic consequences of the vulnerability of women due to the natural shock of climate change. The broader research question of this study is: What do the women say about the economic vulnerabilities of their livelihood due to climate change?

The sub-questions for this study would be as follows:

a. What are the financial consequences for the women due to climate change?
b. How does the natural shock impact the women's income level due to climate change?
c. How does the natural shock impact the consumption pattern of the women due to climate change?
d. How does the natural shock impact women's employment opportunities due to climate change?

2. Literature Review

Brandt and Commission on Environment and Development introduced the idea of sustainable livelihoods. Later, United Nations Conference on Environment and Development expanded the concept, advocating for achieving sustainable livelihoods as a broad goal for poverty eradication (UNDP 1997). The idea of Sustainable Livelihood (SL) differs from conventional definitions and approaches to vulnerability and poverty. It gives more attention to the various factors and processes related to vulnerable poor people, particularly women's ability to make a living economically, ecologically, and socially sustainable. So, the SL concept offers a more coherent and integrated approach to vulnerability (Krantz, 1994).

Robert Chambers and Gordon Conway (1992, p.12) proposed the following composite definition of a sustainable rural livelihood, which is applied most commonly at the household level:

> *A livelihood comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable and can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term.*

Of the various livelihood components, the most complex is the collection of assets, including tangible assets and resources and intangible assets such as claims and access. Based on them, people construct their living; here, the definitions of livelihood sustainability emphasise the ability to avoid, or more usually, to withstand and recover from various stresses and shocks. The Institute for Development Studies (IDS) and the British Department for International Development (DFID) have implemented the SL concept and approach. Leading proponent Ian Scoones (1998, p.14) of IDS proposed a modified definition of SL:

> *A livelihood comprises the capabilities, assets (including material and social resources) and activities required for living. A livelihood is sustainable when it can cope with and recover from stresses and shocks, and maintain or enhance its capabilities and assets, while not undermining the natural resource base.*

This new definition does not include the requirement that for livelihoods to be considered sustainable, they should also 'contribute net benefits to other livelihoods'. With some minor changes, this is also the definition adopted by DFID. The IDS team also outlined a tentative framework to analyse sustainable rural livelihoods. It has three elements: Livelihood resources, Livelihood strategies, and Institutional processes and organisational structures.

A range of differences remains among economists to explain the relationship between the environment and GDP growth rate. Some economists argue that economic growth will eventually improve the environment, despite past environmental degradation increases correlated with economic growth (Dinda, 2004, Arrow *et al.*, 1995). Others raise questions on the relation between economic growth and resource depletion, environmental damage, destruction of basic ecosystems or cause of reduction of biodiversity (Cramer, 1998, Beckerman, 1992). Considering both views, Barker (2005) partially explored this issue by studying the work surrounding the Environmental Kuznets Curve (EKC) Hypothesis. After analysing a wide range of literature on this issue, the author concluded that some industrial nations had achieved strong de-linking at least for a while and the EKC relationship seems to require the introduction of strong regulations. Some have feared that the resultant increases in business costs could reduce competitiveness.

This study has undertaken a literature review on climate change studies in cities. The literature review has also collated the key issues and the state of evidence by sector for cities. These relate to sea-level rise in coastal cities, infrastructure damage from extremes, health, energy use, water demand and availability, tourism and cultural heritage, urban biodiversity and air pollution. This sectoral analysis

shows a substantial variation in impacts with location and site. The review has also considered methodological approaches and how they can affect the results and economic cost estimates—it is essential to ensure that this type of information can be effectively used in city analysis. Several areas are highlighted to improve methods and consistency between impact assessments.

To understand the complex and differentiated processes through which livelihoods are constructed, Scoones (1998) points out that it is insufficient to analyse the different aspects; one must also examine the institutional processes and organisational structures that link these elements. It is essential that SL analyses fully involve the local people to let their knowledge, perceptions, and interests be heard.

2.1 Livelihood Approach: Gender aspects

The existing inequality between men and women within a community is influenced and reflected by the patterns of power. UNDP has recently issued a paper exploring how the 'five steps' procedure to program planning could be made more gender-sensitive (Krantz, 1994, UNDP 1997). CARE systematically collects data disaggregated by gender when undertaking livelihood security assessments at the community level (Rusinow,1999). Finally, DFID's Sustainable Livelihood (SL) framework highlights the need to give particular attention to vulnerable groups, including women, when conducting regular SL analyses, supplemented with specific Gender Analysis (DFID, 1999). In this sense, gender considerations are minimally covered in all three approaches' analytical procedures and frameworks.

However, it is one thing to ensure that gender is being addressed in principle and another to make it possible for women to express their genuine perceptions, interests, and needs concerning specific livelihood issues in practice. Even the otherwise quite advanced participatory techniques such as PRA frequently cannot involve women to the extent necessary to get a good picture and representation of their situation (Rusinow,1999).

Part of the problem is that such exercises tend to be organised that do not suit women's time requirements and other practical constraints. But another problem is that by their very nature, public events tend to attract only certain types of 'public knowledge' that, by social definition, is generated by men and not by women (Mosse, 1994). Furthermore, appraisal methods often do not allow sufficient time for continuous dialogue and critical reflection with the concerned women — often imperative for their ability to express their views on crucial issues (Humble, 1998).

Another potentially significant constraint in this context is that SL approaches tend to take the household as the basic unit of analysis. Thus, most of the attention is on how different categories of households relate to different types of assets, to the vulnerability context, markets, organisations, policies, legislation, etc. (Rusinow,1999). The concept of livelihood tends to direct attention to the household as the decision-making unit since it is at this level that various economic activities are combined into particular livelihood strategies.

There is a risk. However, intra-household inequalities in economic control, interests, opportunities, and decision-making power, which often have gender as a basis, are not given sufficient attention. Thus, women might figure among the poor only when they are heads of households and not when they are vulnerable, socially and economically subordinate members of prosperous households (Rusinow,1999).

In all fairness, DFID's Guidance Sheets recognise that it is not sufficient to just take the household as the sole unit of analysis, but that there is a need for disaggregation into men, women, different age groups, etc. (DFID, 1999).

3. Research Method

3.1 Research paradigm

As the objective of this research is to explore the insights of the women about their vulnerabilities on livelihood due to climate change, this study would illustrate and analyse their voices of them regarding these issues since this study wishes to create and provide a space for the women to raise their voices and views on this issue. Hence, the investigator thinks the phenomenology1 research paradigm best fits my study (Kane,1995).

3.2 Research approach or technique

This research approach would be dominantly qualitative, rooted in a detailed analysis of interview texts and grounded in a broader contextualisation of the vulnerable women's socio-economic, cultural, and political situation based on the livelihood framework. This study does not lead to generalisation but more so to insights that can assist us in better understanding the particular ways the women view their vulnerabilities in their livelihood due to climate change. However, quantitative data would be collected to get an overall impression of the participants.

This study will start with a broader overview (macro) of the livelihoods of vulnerable women. Then from there, a group of participants would illustrate the vulnerabilities' characteristics. After that, in-depth insight into the vulnerabilities of women's livelihoods as they (women themselves) perceive them would be asserted.

3.3 Collection of information

Three tools have been applied to collect the information; one, quantitative tool; two, FGD; three, in-depth interview. We have collected data from Shahbag, Polashi, Kawran Bazar, Rayer Bazar, and Kamrangir Char.

A survey questionnaire was applied to over a hundred women whose living conditions have been affected due to natural shock (which would be the symptom of climate change). This questionnaire contained income level, consumption pattern, expenditure sectors, employment status, etc. In the survey questionnaire, the data on different causes of the way of natural shocks have collected and selected the

participants whose livelihoods have been changed due to climate change. From this data, stakeholders for the FGD have been selected.

Then, six FGDs have conducted. The number of participants for each FGD was 8-12. This FGD reflected an overall voice of the nature of the vulnerabilities of the women. Considering the nature and depth of the vulnerabilities of the women, interviewees have been selected.

Then, this study purposively selected seven women who have migrated to Dhaka city due to climate change. The researcher tried to investigate their perceptions of climate change vulnerabilities. During the interview, interviewees courageously open-up their minds and had confidence. The study followed an informal conversation mode (conversation with a purpose) using a semi-structured questionnaire. The interviewees did not feel the discussion was mechanical or rigid to reflect on this subject. Hence, the interviewees had a free and spontaneous atmosphere, which is crucial for expressing their views.

3.4 Organization of information and analysis procedure

The following steps have been followed to organise the information. From the quantitative tools, an overall illustration of the livelihood of the vulnerable women would be presented.

Then, the FGD would portray the typical characteristics of the phenomenon of the vulnerabilities of the women. This would lead to digging out this issue further. After that, this study would record the interview with the interviewees' consent following the standard ethical approval process.

Then the interviews would be transcribed along with the interpretive note and memos to analyse the information. Afterwards, the data/ information would be coded using keywords, such as income-expenditure, food security, shocks, etc. After coding them, the investigator would extract themes corresponding to the research topic. Here, the `analyst-constructed typologies'[1]

based on the livelihood framework would be applied to categorise the information or reflection that the study would collect from the interviewees (Marshall & Rossman 1999).

4. Findings and Discussion

4.1 Case Studies

The following cases are selected from the in-depth interview:

[1] In analyst constructed typologies, the themes are created by the researcher and these are grounded in the date but not necessarily used explicitly by participants (Marshall & Rossman 1999).

CASE X1

A 60 years old widow from Lalmonirhat, a household worker with a monthly income of Tk 6,000/- migrated to Dhaka due to drought and river erosion. During the conversations, the following findings came out for that case.

Though the economic condition is better due to migration, social security becomes vulnerable, and total livelihood expenditure rises, especially regarding health, accommodation and sanitation.

The children do not get any education, although their income rises.

CASE X2

Thirty-eight-year-old married woman from Habiganj, Sylhet, a day labourer by profession (Kagoj Korani) with a monthly income of Tk 6,000/- migrated due to flood and excess rainfall.

According to her, though economic condition improves, social security becomes vulnerable due to migration.

In the case of child education, it is better to compare to the past, but other expenditures such as health, accommodation and sanitation become vulnerable and expensive.

CASE X3

Forty-five-year-old married woman, a household worker with a monthly income of Tk 5,000/- migrated from Kurigram due to drought.

Her income rises due to migration, but her total livelihood expenditure increases significantly in the case of health expenditure. At the same time, her social security becomes vulnerable.

In the case of children, the standard of living (in terms of monetary status) becomes better in education, sanitation, and food, but social security becomes vulnerable.

CASE X4

Forty-five-year-old married woman, a beggar by profession with a monthly income of Tk 6,000/- migrated from Lalmonirhat due to drought.

Her income level does not change due to migration, but expenditure on health rises and social security becomes vulnerable.

In the case of the children, food and health conditions improve compared to the past, but children do not get any form of education.

CASE X5

A fifty-year-old married woman, a household worker with a monthly income of Tk 7,000/- migrated from Lalmonirhat due to drought and river erosion.

She becomes more vulnerable both socially and economically due to migration.

Though her children get an education, their social security, food, health condition, and sanitation become vulnerable.

CASE X6

A fifty-year-old married woman who migrated from Jamalpur due to river erosion is a professional vegetable trader.

She and her family become more vulnerable socially and economically. Her livelihood expenditure rises due to the rise in health expenditure.

CASE X7

Thirty-two years old married women migrated from Satkhira due to salinity. Her livelihood condition becomes better compared to the past but expenditure on health increases due to climate-induced migration.

Her children's education, food, and health conditions deteriorated.

CASE X8

Thirty-seven-year-old married woman with a monthly income of Tk.7000/- migrated from Tala, Satkhira due to Salinity. She is vulnerable both socially and economically.

Her children's education, food, and health condition have worsened compared to the past.

CASE X9

Forty-five-year-old married women with a monthly income of Tk 12,000/- migrated from Barguna due to Salinity. Her livelihood condition becomes better compared to the past but expenditure on health increases due to climate-induced migration.

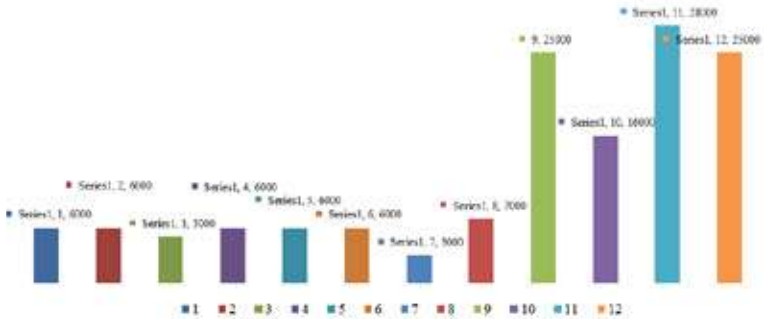
Her children's education, food, and health conditions become better compared to the past.

4.2 Outcomes of the FGD

4.2.1 Income Distribution

Figure 1 shows that in most cases, income ranges remain around Tk. 5000. However, in one case, the income level is more than Tk. 25,000.

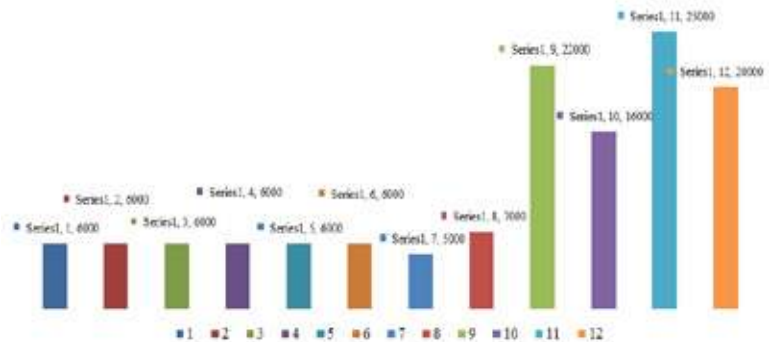
Figure 1. Monthly Income



4.2.2 Expenditure

It was observed that the number of monthly expenditures varies from about Tk.5000 to Tk.25000 (see fig. 2). So, there remains a wide range of differences from case to case.

Figure 2: Monthly Expenditure



4.2.3 Food

There was a mixed observation about their food. Some said they now have better food than before, and some deny it.

4.2.4 Education of the children

The situation is very unacceptable that most of them do not get any education, and very few get a formal education and go to school.

4.2.5 Social security

The most alarming thing during this conversation is their social security (physical). They are so vulnerable that they have no fixed shelter. They have to live in the street, footpath etc. So security is the primary concern for the women at this stage.

4.3 Discussion and Policy Implication

The low-income group in a developing country like Bangladesh is more vulnerable; women are mostly affected. Bangladesh is one of the most affected countries due to climate change. In this research, the investigator tried to find out women's social and economic vulnerability, and this study found a very exasperating scenario. Most women are socially and financially vulnerable due to climate-induced migration. Though their income level rises, their livelihood expenditure, especially in the case of health expenditure, rises simultaneously. The most alarming issues about those women are that they become socially vulnerable as they have no social security, and their children mostly do not get any education. Food, sanitation, and social security have worsened compared to the past. Achieving the Sustainable Development Goal by 2030; will be a significant challenge for policymakers without considering these women in the policymaking.

In this study, the women's problems, coping strategies, and struggles of Bangladesh were illustrated in the voice of the vulnerable population. Since our policymaking mostly follows the top-down approach in most cases, the voices of the vulnerable groups are often missing.

4.3.1 Policy Suggestion

The investigator expects that not only from the outcomes but also from the process of the study, the policymakers may get some insights from this study to incorporate them into the policymaking and application process.

The policymaker can take a different method for different types of climate change-affected people. For salinity-affected people, the first thing is to have an assurance of safe drinking water and create an alternative livelihood despite farming. The vocational training centre can be established in those areas to give them different technical and handicraft training and may provide them training in livestock farming. Govt. can arrange a soft loan for those women to start a venture to assure their livelihood income by applying the skills they have learned from the training centre. Govt. can establish different cottage industries there. If their income is guaranteed, they will not move to Dhaka as the city is more unsecured for them.

In the case of drought-affected people, food security will be the government's main priority. As there are no farming activities due to drought, alternative livelihoods should be ensured like handicrafts, livestock farming and so on by providing them soft loans and training. The establishment of cottage industries can also provide them with alternative income sources, limiting them from migrating.

Although Gucchagram is established for homeless people due to river erosion, it is not practical due to a lack of income-generating activity. So, it is necessary to develop different types of livelihood activity in those Gucchagram projects, say livestock farming and handicraft project. Many of them have a house in Gucchagram, but they have been forced to migrate to Dhaka for their livelihood.

5. Concluding Remarks, Limitations and Further to do

Climate change is a global concern for all the living beings on the earth, and this has mainly affected the socio-economic conditions of low-income women. Thus, Listening to women's voices about the vulnerabilities of their livelihoods due to climate change is the critical concern of this study.

This research found that most women are socially and economically vulnerable due to climate-induced migration. However, their income level rises, and their livelihood expenditure, especially health expenditure, rises simultaneously. However, the most alarming issue about those women is that they become socially vulnerable and have no social security. Their children mostly do not get any form of education. Food, sanitation and social security have become worsen compared to the past.

In this study, the women's problems, coping strategies, and struggles of Bangladesh were illustrated in the voice of the vulnerable population. Since, in most cases, our policymaking mostly follows the top-down approach, the voices of the vulnerable groups are often missing. This study emphasises that achieving the Sustainable Development Goal by 2030 will be a great challenge for policymakers without considering these women in policymaking.

5.1 Limitations and Further to do

This study has several limitations, and also this study explores many avenues further to do.

1. The study is based on Livelihood Framework. However, there are many other concepts regarding the relationship between vulnerabilities and. So, the design of this study has limited itself to one conceptual framework. The same subject matter can be designed and interpreted differently by following different concepts and theories.
2. The number of participants in this study is limited. The findings are derived from their insights. More insights can be found in the number of participants increased.
3. This study concentrates only on the women of Dhaka City. Further analysis can be done by including other territories.
4. There remain multiple arguments on the concept of vulnerabilities and women. In this study, the concepts of 'vulnerabilities' have been taken generally and not very clearly defined. An examination can help with a more specific meaning of vulnerabilities and women.

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Economic Impact of Climatic Catastrophes among Penniless Communities in Bangladesh

Shishir Reza[*]
Rajibur Rahman[**]

Abstract

Bangladesh is one of the most vulnerable countries to floods, cyclones, storm surges and droughts. Climate change has already impacted people's economy, life, and livelihood in the coastal regions. Bangladesh observes severe exposure to such risks because of its geo-morphological, demographic and socio-economic temperament. Climatic Hazards also remarkably affect agriculture in the haor and char region. It has a tremendous negative effect on water security and food security. SDG-10 calls for the reduction of economic inequality, whilst SDG-13 calls for mitigation of climate change. It denotes this relationship is characterised by a vicious cycle, whereby inequality makes disadvantaged groups suffer a disproportionate loss of their income and assets, resulting in greater subsequent inequality. It functions in three ways, increased exposure of underprivileged groups to climate hazards, increased susceptibility to damage caused by climate hazards and decreased ability to cope with and recover from the spoil. This paper clarifies a linkage between economic inequality and climate catastrophes in haor, char, urban and coastal regions.

Keywords *Inequality · Climate Change · Water · Food Security · Adaptation ·*

1. Setting the Scene

Looking worldwide, we see that low-income countries are more exposed to the adverse effects of climate change. More of these countries are, among other things, located in tropical areas; have low elevation; lie in hurricane, cyclone, and tsunami zones, and are situated in arid regions already facing water scarcity. Consequently, they are more exposed to climate change effects such as sea-level rise, salinity intrusion, increased incidence, scope, and ferocity of cyclones, hurricanes, and

[*] Assistant Director, Bangladesh Bank, Head Office Dhaka; Email: shishirmjs@gmail.com
[**] Executive Officer, NRB Commercial Bank Limited, Head Office, Dhaka.

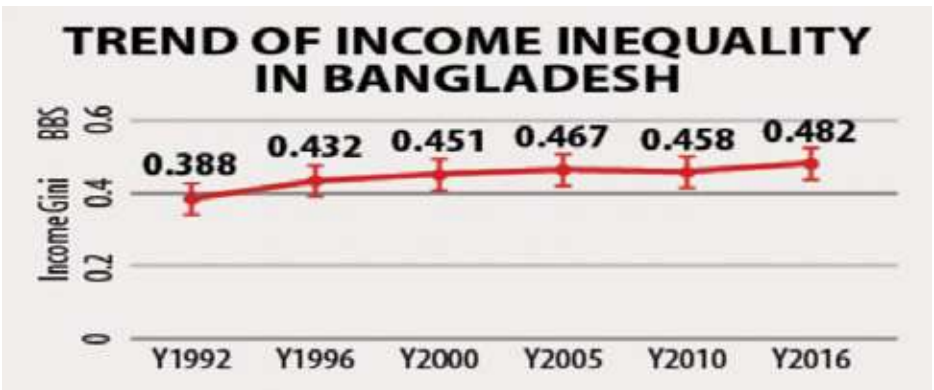
precipitation imbalance. By contrast, most high-income countries are located in cold and temperate zones, where some people welcome in- temperature crease, arguing that it will elongate the crop growing season, increase the crop area, and reduce home heating expenses, leading to leading to increase in output and well-being. While experience has tempered some of these early expectations, it remains the case that these countries are generally less exposed to sea-level rise, increase in the incidence of hurricanes, and other adverse consequences of climate change. Thus, it is historically given that low-income countries are generally *more exposed* to the adverse effects of climate change. Low-income countries are also more susceptible to the damages caused by climate change effects. The reasons are not too far to see. For example, the Netherlands – a high-income country – is low-lying and exposed to sea-level rise. However, it has built sea walls and other structures so that it is not as susceptible to damage caused by sea-level rise as many low-lying, low-income, tropical island countries. The low-income countries also have less capacity to cope with and recover from the damages caused by climate change effects. For example, unlike in high-income countries, most people in low-income countries lack insurance, so they cannot muster private resources to cope with and recover from climate damage. Also, low-income countries have fewer public resources devoted to helping the affected people overcome their losses. We thus see that low-income countries, in general, are more exposed to the adverse effects of climate change.

Unequal distribution of wealth affects the nation's overall progress in several ways, all of which produce profound adverse effects. One of the most dangerous of these is that less affluent people are so busy surviving a country that they have little time to think of progress and development. A garment factory worker's children have little hope of avoiding the fate of becoming garment factory workers themselves in the future. It is simply because standard education costs are well beyond their reach. They can dream of no luxury other than sustaining their physical existence in an unfriendly and unsympathetic world. Garment factory workers are deprived of a just salary because the owners want to pay only what would keep these unfortunate employees physically able to come back for more work tomorrow.

Along with poverty, rising inequalities have always been considered a significant policy issue in Bangladesh; such inequalities are not merely about disparities in outcomes. It is also about inequalities in opportunities regarding age, sex, disability, race, ethnicity, origin, religion, or economic status. In Bangladesh, where disparities in opportunities are so evident in every sphere of life that focusing only on economic inequalities provides a partial picture of inequality's status and policy agendas. One Sustainable Development Goal (SDG) is to reduce inequalities within and across countries. The SDG framework identifies inequality as a critical issue since reduced inequalities can ensure inclusive development and drive human progress towards sustainability and universal well-being.

The Gini coefficient or Gini index is a statistical measure (the value of a Gini coefficient varies between 0 and 1, where a value of zero signifies perfect equality and 1 indicates maximum inequality) generally used to examine a country's degree of income inequality that exists at a particular point in time. The Gini coefficient for Bangladesh fluctuates around the trend line, but the overall trend is declining from 48.9 in 2000 to 31.5 in 2010, indicating declining income inequality. But a much clearer picture of income distribution emerges when one looks at the income distribution between the poorest 10 per cent and the wealthiest 10 per cent. The notion appears: that the income share of the poorest 10 per cent is 3.85 per cent compared to 26.92 per cent for the wealthiest 10 per cent in Bangladesh. In effect, the income share held by the highest 20 per cent is 41.48 per cent. This indicates a situation where very few benefits of economic growth are trickling down to the poor, the people who need it the most.

Figure 1: Trend of income inequality in Bangladesh



At independence, Bangladesh was primarily an agrarian economy marked by largely subsistence farming. Agriculture has now become more commercialised and accounts for only 15 per cent of gross domestic product (GDP). Manufacturing and services now account for the bulk of output. Economics Nobel Laureate Amartya Sen lauded Bangladesh's social development in many fields, such as gender equity, women's empowerment, mortality rate, life expectancy and immunisation. Despite significant improvement in Bangladesh's economic performance, formidable economic challenges still lie ahead. With a per capita income of US$ 2000.00, the country remains one of the least developed countries in the world. An estimated 63 million people live under the poverty line in a country of 163 million. Bangladesh has also witnessed rapid urbanisation, with more than a third of the population now living in urban areas and continuing. Although the population growth rate has come down to 1.2 per cent per annum, the country remains one of the most densely populated countries globally. This urbanisation has been spurred by the structural changes in the rural economy resulting from the increased commercialisation of

the agriculture sector and widespread rural poverty. But this rapid urbanisation has caused heightened urban poverty with deplorable living conditions for these rural migrants and severe urban congestion.

One good indicator for looking at the worst form of income inequality is the Palma ratio, which focuses on the extremes of the inequality-the proportion of incomes at the very top to those at the bottom. In Bangladesh, the changes in these extremes are most noticeable, while the share of income in the middle is relatively stable. The Palma ratio at the national level has consistently increased from 1.68 in 1964 to 2.93 in 2016; in urban areas, it rose from 2.00 to 2.96 while, in rural areas, it grew from 1.38 to 2.51 over the same period. Over the period, the share of the middle 50 per cent has remained relatively stable; while the poorest 40 per cent have generally lost in income share, the wealthiest 10 per cent have gained. In the case of income, one of the targets of SDG10 is to progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average by 2030. The national data since the 1980s show that the average per capita household income (at 2010 prices) from 1986-to 2016 grew by 1.43 per cent while the same for the bottom 40 per cent grew by only 0.28 per cent. The worst form of widespread inequality in the country is inequality of opportunities, both the cause and consequence of inequality of outcomes. Reduced inequalities have both economic and social benefits. It strengthens people's perception of a fair society, improves social cohesion and mobility, and boosts employment and education with beneficial effects on human capital and development. Without equal opportunities, systemic discrimination and exclusion prevent the poor and disadvantaged groups from accessing economic, political and social resources, resulting in 'inequality traps' and the persistence of inequality across generations.

We always debate how climate change exacerbates economic inequality, but rarely do we think the opposite: that inequality itself can be a driver of climate change. What's missing from the conversation is what our inequality crisis is doing to our planet. How unequal societies inflict environmental damage than more economically even societies. One key topic still overlooked is how ecological degradation and climate change are the toxic by-products of our inequality problem. Many people who live in low-income communities, for example, cannot afford to retrofit their homes to make them more energy-efficient, meaning they use more power than necessary, generating more pollution. We are talking about how inequality functions in our society, which has changed since the global financial crisis. People assume that raising incomes will increase personal consumption and, as a result, also increase carbon emissions, which would do little to alleviate climate change. But there are so many more mechanisms at play, including how power disparities hobble communities from protecting, for example, their air or their water. We need good jobs, a solid tax base, a sound healthcare system, and criminal justice to preserve nature.

2. Unequal Access to Pure Potable Water in Bangladesh

Arsenic (As) concentration in natural water varies widely depending on the sources of water, sources of As and local conditions. Arsenic concentration in river water is low, between 0.1 to 2.0 mg/l, but polluted river water can have a higher concentration of As. High As concentrations are found in some alkaline closed-basin lakes due to increased evaporation and geothermal inputs. In Bangladesh and West Bengal, alluvial Gange's aquifers used for public water supply are polluted with naturally occurring arsenic, adversely affecting millions of people's health. The arsenic derives from the reductive dissolution of arsenic-rich iron oxyhydroxides, which are derived from the weathering of base-metal sulphides. As many as a million water wells drilled into Gange's alluvial deposits in Bangladesh and West Bengal may be contaminated with arsenic. Measured arsenic concentration reached up to 1,000 μg/l, which is above the limit set for drinking water in Bangladesh (50 μg/l) or that recommended by the World Health Organization (10 μg/l). Consumption of this contaminated water has led to widespread death and disease. Arsenic has been reported to derive from the oxidation of arsenic-rich pyrite in the aquifer sediments as atmospheric oxygen invades the aquifer in response to lowering the water level by abstraction. The arsenic-rich groundwater is mainly restricted to the alluvial aquifers of the Ganges delta. Therefore, the source of arsenic-rich iron oxyhydroxides must lie in the Ganges source region upstream of Bangladesh. Weathered base-metal deposits are known to occur. The Ganges basin, weathering these arsenic-rich base metal sulphides, must have supplied arsenic-rich iron oxyhydroxide to downstream Gange's sediments during Late Pleistocene - Recent times. The arsenic-rich iron oxyhydroxides are now being reduced, causing the present problem. Reduction is driven by a concentration of sedimentary organic matter of up to 6%.

Barkat's study in six arsenic-affected villages in Bangladesh showed that 10.2% of the population are affected by visible signs of arsenicosis (*i.e.,* keratosis, melanosis, and kerato-melanosis), with 16.1% among the poor, 5.4% among the non-poor, and 1.7% among the rich. The actual rate of arsenicosis would be much higher than the rate with visible symptoms because many affected persons are yet to display visible signs, and many others will have multiple organ complications with suppressed visible symptoms.

Arsenic-affectedness is not an economic status-neutral phenomenon. The above study revealed that poor people are disproportionately highly affected by arsenicosis than their non-poor counterparts in the same villages. In these rural areas, poor people (*i.e.,* land poor, income poor, food-intake poor) constitute 44% of the total population, but they represent over 70% of all the arsenicosis patients having visible symptoms (keratosis or melanosis or kerato-melanosis); non-poor constitute 56% of the total population, but 30% of all the arsenicosis patients and the rich constitute about 8% of the total population but representing only about 1.4% of all arsenicosis patients. The estimated odds ratios show that the poor and

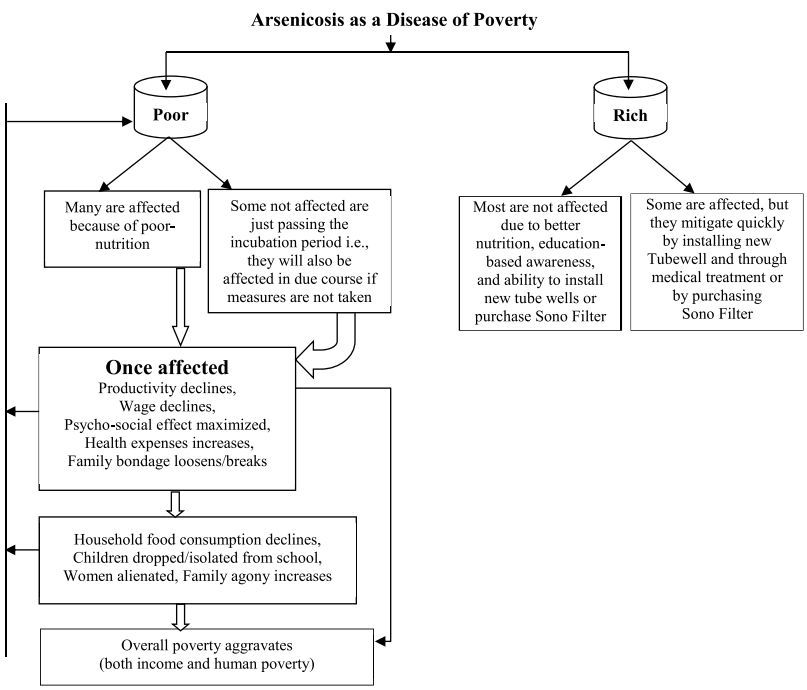
non-poor have 3.4 times greater chances of getting arsenicosis, which is about 11 times higher for the poor than the rich. This highly skewed inequality in the distribution of arsenicosis patients in rural Bangladesh provides enough evidence that arsenicosis is a disease of poverty.

The human rights challenge of *arsenicosis as a disease of poverty* gets more complex because arsenicosis is a poverty-aggravating or poverty-perpetuating disease. It is so because once a poor person is affected by arsenicosis (with multiple organ complications), s/he loses their ability to work and, in the absence of any financial assistance, the poor household gets into perpetual poverty – a new type of poverty trap (Barkat and Hussam, 2008). Therefore, we have discovered two kinds of poverty associated with the drinking of arsenic-contaminated water in Bangladesh, which are:

Type 1: *Poverty-mediated arsenicosis*, implying that poor people are disproportionately highly affected by arsenicosis compared to the non-poor.

Type 2: *Arsenicosis-mediated poverty*, implying the aggravation of poverty due to arsenicosis whereby the arsenic-affected poor people become poorer/pauper due to economic, social, and psychological reasons.

Figure 2: Arsenicosis as a Disease of Poverty



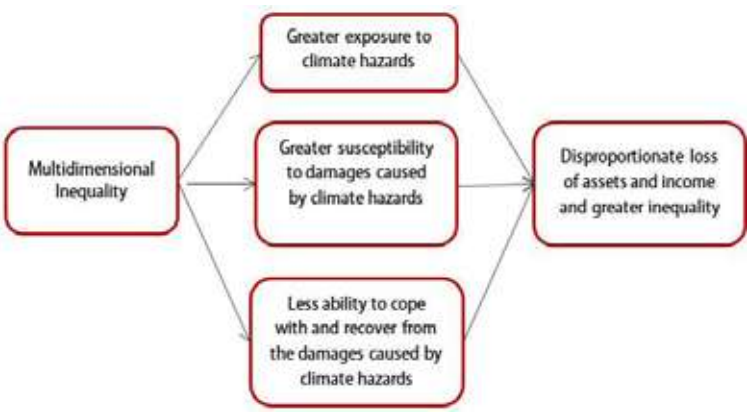
***Source**: Barkat and Ahmed, 2007.*

This dual poverty – poverty-mediated arsenicosis and arsenicosis-induced poverty – is a new type of poverty trap for Bangladesh. The income reduction effect and consumption shocks are the two major pathways through which the economic burden of arsenicosis works (Barkat *et al.,* 2002). This trap poses a real challenge to the National Goals of Poverty Reduction because the conventional approaches address everything (income poverty, consumption poverty, employment poverty, credit poverty *etc.*) – but not the poverty associated with drinking arsenic-contaminated water.

3. Constraints to Adapting to Climatic Catastrophes in The Coastal Belt

Crop agriculture in the coastal area is susceptible to climatic variations. The adverse impacts are evident, including sea-level rise, salinity intrusion, increasing frequency and intensity of tropical cyclones, storm surge, tidal surge and erratic rainfall over the study area. Different hazards have a different extent of influence on cropping patterns. To minimise the loss of crop production, it is imperative to identify the significant dangers with their time and degree of impact on cropping patterns. Salinity intrusion is one of the most significant hazards causing a huge yield reduction. Also, cyclones, storm surges, erratic rainfall, tidal surge, pest attack, and waterlogging significantly influence crop yield reduction. Local farmers identified hurricanes, salinity and tidal surge as significant constraints to crop production. Cropping patterns and seasons are changing due to climatic variability. Evidence shows that inequality often compels disadvantaged groups to live in areas more prone to flooding, thus increasing their exposure to flooding caused by climate change.

Figure 3: Three effects of inequality and climate change



Source: *Nazrul & Winkel, 2017*

3.1 Climatic State of Coastal Area of Bangladesh

The coastal areas of Bangladesh contain more than 30% of the country's cultivable land. Tidal and estuarine floodplains cover 98% of this 30% of the total area of the coastal belt (Haque, 2006). The crop production is deficient in this coastal region due to salinity intrusion, low soil fertility due to excess salinity and drought in the dry season. Delta regions are predicted to get low yields of Aman, Boro and transplanted Amon rice (Ali and Wakatsuki, 2002). The coastal belt cropping intensity range varies from 62 to 114% compared to the national cropping intensity is 179% (Razzaque and Rafiquzzaman, 2007).

3.2 Salinity Problem in Coastal Belt

Salinity is a common problem in the coastal area of Bangladesh. In the dry season, the water level drops to 240 km in the western part of Bangladesh, causing a severe saline problem in 30 Upazila in Bangladesh. Sea level rise would produce salinity impacts surface water, groundwater and soil. According to Samshuddhoa and Chowdhury (2007), 10% more land will be saline affected, and intensity will be increased by 10% in the next decade. Soil salinity can decrease crop production. In the future, the transplanted Aman crops area will cover only 18 to 20% because of high salinity.

3.3 Climate Vulnerability in the Coastal Area of Bangladesh

During the pre-monsoon and post-monsoon seasons, the coastal zone of Bangladesh is primarily prone to tropical cyclones and intense storms. The coastal site of Bangladesh has its extreme vulnerability to cyclones and storm surges. The coastal belt is a geographical death trap. The frequency of natural disasters increases daily in the coastal belt from changes in climate patterns such as increasing temperature, increasing the frequency of cyclonic storms, and rising sea levels. Salinity intrusion, river erosion and waterlogging are caused by sea-level rise. In the coastal area of Bangladesh, Climate vulnerability is a significant concern. The coastal belt of Bangladesh has been delineated based on three criteria: the limits of tidal fluctuation, salinity intrusion and cyclonic risk. The oceans and coastal resources are threatened by coastal inundation, and the need for particular interest in analysing climate change risk to coastal areas (Shea and Dyoulgerov, 1997). The coastal belt of Bangladesh is a low-lying area, so it is vulnerable to monsoon flooding and storm surges. Abnormal floods will inundate 30% of the common lying land in Bangladesh, and during insignificant flooding periods (1988, 1998 & 2004), more than 60% of the land has been inundated; the Bangladesh coastal belt faces a significant cyclone on an average once per year, and tidal surge may go up to 6-10m.

3.4 Impacts of Climate Change in the Coastal Area of Bangladesh

The coastal region of Bangladesh covers 29,000 sq. km or about 20% area of the country, and the coastal areas cover 30% of the cultivable lands of Bangladesh (Rahman and Parkinson, 2007). Ayers and Haq (2008) stated that the Bangladesh coastal area might be the front line of climate change impact and response in South Asian Countries. The coastal area plays a vital role in increasing the country's GDP. Ali and Wakatuski (2002) showed that agriculture contributed 32% to the GDP sector of Bangladesh, and 72% of this contribution comes from rice-cultivated areas. BBS (2002) declared that the modern rice varieties cover about 62% of total rice areas, contributing to about 77% of the total rice production in Bangladesh. A quarter of the population of Bangladesh lives in the coastal zone, and about 80% of people depend on agricultural activities. When Bangladesh could lose 15% of the land and up to 25 million people could be refugees with a 1-meter sea-level rise in the coastal area of Bangladesh. This condition may lead to a decline in the country's GDP from 57% to 27% through decreasing crop production.

Figure 4: Soil salinity in Shibbari, Paikgacha Upazila, Khulna

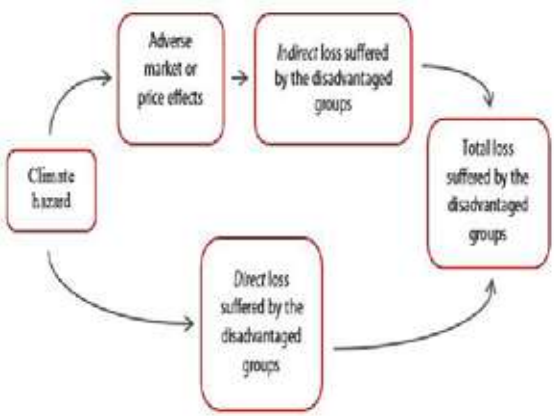
Among all living in the flood zone, the disadvantaged groups prove to be more susceptible to the damages caused by flooding. For example, their houses are washed away seriously because they are often made of flimsy materials. By contrast, the more well-to-do homes suffer minor damage because these are generally made of sturdier materials, such as brick and concrete. Finally, the disadvantaged groups have less ability to cope with and recover from the damages caused by floods. For example, the rich may buy the insurance and thus compensate for the damages. By contrast, the disadvantaged groups may not be able to afford such insurance and therefore have to absorb the entire loss, leading to a more significant loss of their asset position.

4. Environment, Climatic Vulnerability and Livelihood in the Char-lands

Bangladesh is a highly disaster-prone land, with regularly floods and cyclones affecting the country. Hazards occur when these potential threats to human lives and resources, in terms of loss and damage, emerge from the intersections between extreme geophysical events and a vulnerable human community.

Char-lands are the sandbars that emerge as islands within the river channel or as attached land to the riverbanks due to the dynamics of erosion and accretion in the rivers of Bangladesh. The Chars are, thus, home to some of the poorest and most vulnerable people in Bangladesh. These areas are particularly prone to frequent climatic shocks (floods, drought and cyclones), which increase the precariousness of poor people's lives by wiping out their assets and pushing them deeper into poverty. Char comes to about a total area of approximately 7,200 square kilometres. In addition to the significant physical risks associated with the rivers, Char-dwellers, particularly, are marginalised from the benefits of mainland Bangladeshi society through their poor communication networks. The Char dwellers mainly depend on agriculture and agriculture-related activities. Opportunities for off-farm activities are marginal.

Figure 5: Effects of climatic hazards on disadvantaged groups



Source: *Nazrul & Winkel, 2017*

Therefore, livelihood strategies linked to environmental change and variability are mobile to cope with steady erosion. These areas have not focused on the development efforts of Bangladesh's public or private agencies. The lack of essential services and governance representation and dependence on limited and seasonally variable resource access demands highly innovative and diversified livelihood strategies in the Chars, leading to considerable social inequity. High food insecurity and low-income results in the out-migration of at least one household

member to find employment, leaving women and children to exist. Many women-headed households in the Chars and poorer women are burdened with household, crop cultivation and income-generating demands.

In Char areas, interventions to increase agriculture productivity without addressing the vulnerability context of peoples' livelihood strategies will do little to affect poverty dynamics. It may not offer options for those poorest families unable to incorporate the technologies introduced from the outside. Therefore, sustainable management of disasters through mitigation measures requires increasing the livelihood options to gain more control over their lives and the environment. Sustainable development requires harmonising environmental protection and action to protect and enhance the natural resource base. Institutions are established to promote equitable growth, which is essential for reducing disaster hazard risk and vulnerability. Diversification of livelihoods will need to be addressed to relieve pressure on natural and common property resources. Poor Char dwellers need to effectively sustain their livelihoods and engage in the local and national economy by broadening economic opportunities and strengthening productive livelihood strategies. It will reduce food insecurity; increase employment opportunities and income, and permit people to accumulate assets, improving their ability to cope with future livelihood shocks without falling deeper into poverty.

Inequality implies fewer resources for the disadvantaged groups to commence coping and recovery measures. These resources can generally take four forms: households' own (private) resources, community resources, resources provided by various non-government organisations (NGOs), including religious and philanthropic organisations and philanthropic activities of private companies, foundations, and public resources provided by the government, including local governments. The interventions for the future can include a) building the influential voice of poor Char dwellers as citizens to demand services; b) building accountable and responsive institutions in public, private and civil sectors to supply pro-poor services and infrastructure; c) providing Char dwellers with choice in service provision and diversified channels for access to services.

5. Economic and Livelihood Challenges in Haor Region

The status of biodiversity and the integration of flora and fauna have made ‑ haor one of Bangladesh's most beautiful places. As the haor region is a marginalised area of the country, women and farmers face enormous challenges in the daily struggle for survival. In the haor constituency, the highest population lives in Sylhet (3.36 million) and the lowest in Moulvibazar (2.10 million).

Table 1: Geographical Distribution of Haors in Bangladesh

Haor District	No. of Haor	% of Total no. of Haor	Major Haors
Sunamganj	95	22.9	Dekhar, Kalikota, Naluar, Pagner, Tanguar
Sylhet	105	25.4	Boro Haor, Patharchuli, Dhamrir, Banaiya
Habiganj	14	3.4	Gungiajuri, Ikram-Sangar, Makalkandi
Moulvibazar	3	0.7	Hail, Hakaluki, Kawadighi
Netrokona	52	12.6	DingiPota, Medar Beel, Talar
Kishoreganj	97	23.4	Khunkumi, Mithamain, BoroHaor
Brahmanbaria	7	1.7	Dattakhola, Tikkar Par

Although a little more than half of the population (53.67%) depends on agriculture, the corresponding figures for Sylhet and Netrokona districts are not similar. Only 35% of haor dwellers depend on agriculture, while the rate is 71% in Netrokona. However, instead of limiting themselves to agriculture, the haor inhabitants depend on various occupations for their livelihood. A portion (12.52%) of haor people makes their living through business. Others are employed in non-farm labour (6.13%), service (5.65%), fishery (2.59%), and transport (2.39%). A substantial percentage (3.41%) of the population depends on remittances sent by family members working abroad.

Table 2: Flash flood in Haor Districts

Region	Crop loss (% of total)	Fish loss (% of total)	Damaged fodder (% of total)	Total loss (% of total)
Sylhet	10.26	1.88	10.26	10.22
Sunamganj	44.75	5.5	44.76	44.59
Habiganj	15.07	88.57	15.08	15.38
Netrokona	10.56	0	10.54	10.5
Maulavibazar	5.6	2.78	5.6	5.6
Kishoreganj	13.67	1.27	13.67	13.61
Brahmanbaria	0.09	0	0.09	0.09

5.1 Socio-economic and Environmental Losses

An average 50% cropped area in haor lost its crops, mainly Boro rice. However, the community reports the damage to be much higher, close to 90% in many areas. For example, according to the official statement, Kishoreganj lost 90% of its rice crops according to the community; which was 31.8 % on average. An immediate impact on the fishery was ponds being washed away. The fish loss was reported in Sunamganj, Kishoreganj, Netrokona, Moulvibazar and Sylhet. In Kishoreganj, it mainly was a culture fishery. An estimated 903 MT of fish loss was reported.

According to the fisheries office of Sunamganj, fishes of 20 haors from 11 Upazilas suffered from murrain. Among the Upazilas are Sadar, South Sunamganj, Jagannathpur, Dharmapasha, Dirai, Tahirpur, Jamalganj etc. Among the Haors are Dekhar, Dharam, Dhankuniya, Cheptir Haor, Chayar Haor etc. Haor flood not only damaged human food but also drowned animal food. It means a loss of fodder (straw), estimated to be 452,189 MT for all seven affected districts. This made the environmental biodiversity of the region vulnerable to an extreme food crisis. Farmers and the local cattle industry suffered from a food shortage and fodder for their cattle. They are reportedly selling away their cattle at low rates. In addition, poor water quality and disease have killed ducks in many areas, further adding to the damage. In the remote villages of the district, by drinking the polluted water of the haor, ducks and ducklings also died.

5.2 Common Constraints in Haor

The overriding challenge of the inhabitants of haor is that they have limited livelihood options if natural calamities disrupt their existing livelihoods. The complexity of this challenge restricts their livelihood options—holding them back from joining the journey towards national progress. The haor inhabitants mainly rely on Boro crops and fishing, while a smaller section depends on livestock rearing and small business. Hence, enhancing the climate-resilient livelihood of haor inhabitants—a livelihood that can sustain its essential functions (food, income, poverty reduction) and absorb the impacts of disasters and shocks without causing significant disruption in the day-to-day operations —is their utmost need in line with the priority of SDGs and 7th Five Year Plan (FYP) of Bangladesh. An underdeveloped communication infrastructure also leads to various challenges, insufficient private sector investment, and small-scale entrepreneurship in these areas.

6. Climate Change, Migration and Urban Poverty

The genesis of migration lies in people's quest to live or subsist in a form better than their present status. Some migrate for sheer survival, that is, to escape poverty; others improve their quality of life, while others still search for fortune. Since each of these pursuits is made by people from different socio-economic strata and hence has a different purpose for moving, migration is quite a heterogeneous phenomenon. However, in contemporary low-income economies, people mainly move due to the worsening productive-resource-to-human-power ratio, stemming primarily from rapid population growth and external demand for local resources. It has compelled large sections of the populace to migrate to look for work as a part of their survival strategy. People move seasonally, for fixed periods, or permanently depending on their needs and circumstances. In this sense, the transition economies of South-East Asia, some of which are among the poorer ones in the world, present a picture typical of other low-income countries.

6.1 Slumization and Poor Urban Settlements

The role of migration in urbanisation is evident in all societies and at almost all times since urbanisation and urban growth take place through a combination of three components such as (a) natural increase of the native urban population, (b) area redefinition or reclassification or annexation and (c) rural-urban (or other forms of internal) migration. In a condition of developing urbanisation, migration is even more pronounced. In contrast, in the state of advanced urbanisation, where urban growth is almost stagnant or even declining, internal migration plays a minor or almost no role. Rural to urban migration may again take many forms, such as (a) permanent migration, (b) temporary migration, (c) seasonal migration, (d) circular migration and (c) commuting. The process ranges from short-distance mobility (commuting) to long-distance and long-term movement or permanent migration. In the case of Bangladesh, the status of academic and planning studies on internal migration is not too bad. However, all dimensions of internal migration might not have received enough attention. Considerable literature exists on determinants or causes of rural to urban migration. A Bangladeshi scholar working at an American University has, in a recent paper, classified the models of causes of migration into two groups (i) one which isolates migration as a domestic phenomenon and (ii) the other which places causes of migration within an international politico-economic framework. Migration is the combined effect of both push and pulls factors, and it is often difficult to separate the role of the two. Within the Push-Pull model, push factors (at the rural end) may be identified for Bangladesh as 1) Population pressure, adverse person-land ratio, landlessness and poverty; 2) Frequent and severe natural disasters (particularly riverbank erosion); 3) Law and order situation and 4) Lack of economic opportunities.

The impact of rural to urban migration is diverse and deep, both at the urban destination end and at the rural origin. Most of the research has been on the urban lot. Urbanisation and urban growth due to migration has both positive and negative consequences and impacts. Some of the positive effects of urbanisation are the following: Economic benefits: higher productivity, better income etc.; Demographic benefits: lowering of the age at marriage, reduction of fertility rate; Socio-cultural benefits: modernisation; Political benefits: empowerment, democracy; Improved access to information technology; some of these have already been discussed in the preceding sections. Urbanisation is not an unmixed blessing. Its negative consequences are of great concern. These assume a critical role in the situation of rapid and uncontrolled or unplanned urban expansion. The adverse effects can be grouped as the following: Environmental consequences; Encroachment on productive agricultural land and forests; Extreme pressure on housing, growth of slums and the pressure on urban services; Economic consequences, leading to income inequality and poverty, ill effects of globalisation; Social consequences, resulting in increased violence and crime, social Degradation; Cultural influences: entry of alien culture, loss of national cultural identity; and Criminalization of politics.

6.2 Hidden Impacts of Climate Change among Urban Poor

Climate change refers to any change over time, whether due to natural variability or due to human activity. This usage differs from that of the United Nations Framework Convention on Climate Change (UNFCCC), which defines "climate change" as: 'change in climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural variability observed over comparable periods".

Climate change can directly affect health because high temperatures stress human physiology. Changes in temperatures, place, and precipitation, including extreme weather events and storms, can cause deaths or alter the environment, resulting in an increased incidence of infectious diseases. Higher temperatures and humidity can exacerbate air pollution. Finally, virtually all effects of global climate change, ranging from sea-level rise to impacts on agriculture and human infrastructures, are linked to human health.

The incidence and severity of many health problems increase with increasing temperature. As temperatures increase, the body expands added energy to keep cool. Heatstroke is the most immediate consequence if the body's temperature rises above 410 C. This disturbance to the body's temperature-regulating mechanism results in fever, hot and dry skin, rapid pulse, and sometimes progresses to delirium and coma. Also, temperature stress can exacerbate many existing health conditions, including cardiovascular and cerebrovascular disease, pneumonia, asthma, and influenza. Mortality from such diseases, especially among children and the elderly, increases dramatically during periods of usually hot weather. Quantitative algorithms based on historical data that relate morbidity and mortality to weather conditions suggest that global warming increases heat-related morbidity and mortality.

The combination of higher temperatures and potential increases in summer precipitation could create the conditions for greater intensity or spread of many infectious diseases. However, risk in the human health sector is low relative to climate change-induced risks in other sectors (such as water resources) mainly because of the higher uncertainty about many health outcomes. Increased risk to human health from increased flooding and cyclones seems most likely. Changes in infectious disease are less specific. The causes of infectious disease outbreaks are complex and often do not have a simple relationship with increasing temperature or changes in precipitation. It is unclear if the magnitude of the change in health risks resulting from climate change will be significant compared to current threats. It is also unclear if increased health risks will appear in the next few decades. Climate change is expected to present increased risks to human health in Bangladesh, especially in light of the poor state of the country's public health infrastructure.

Climate change is a recurrent phenomenon in Bangladesh. Human health will suffer from many aspects of climate change. Direct impacts include increasing incidences of thermal stress, leading to cardiovascular and respiratory morbidity and mortality. Indirect effects will probably result from increases in specific vector-borne diseases.

7. Concluding Remarks

Climate change impacts tend to be regressive, falling more heavily on the poor than the rich. Inequality is not inevitable; it is a policy preference. There is mounting evidence that the current levels of inequality are not the result of efforts and risk-taking but somewhat windfall income from 'rent-seeking' activities. The policymakers in Bangladesh will have to work to develop a more human society with greater equality as the primary aim in coastal, char, haor and urban settlements. A comprehensive policy framework is necessary to help policymakers better navigate the complexities and challenges of framing appropriate policies to address inequality based on three related pillars: moderating income inequality, closing gaps in health, nutrition and education, and addressing social exclusion by combating discrimination and transforming inequality-producing cultural norms. These can get together to empower mass people to adapt to climatic catastrophes. Regarding sustainable urbanism, policymakers should eliminate primate city favouritism; improve urban efficiency to lower the cost of the living curve by dealing with urban crowding and providing public goods; eliminate the biases that lead to squatter settlements with a reasonable titling policy and urban deregulation; and not discourage internal migration, which fosters an efficient allocation of the population and has an equalising effect across places.

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Nutritional and Recreational Benefits of Roof Top Gardening: An Empirical Evidence from the Selected Households of Dhaka City

Sanzida Tabassum[*]
Md. Saidur Rahman[**]

Abstract

Rapid population growth, migration, and poor urban planning of Dhaka city resulted in an unhealthy and fragile environment, alarming to the city dwellers. This study aims to provide information regarding rooftop gardening's nutritional, recreational, and other aspects. The study was conducted in 50 households in Dhaka metropolitan city through a direct interview method with a structured questionnaire. Tabular techniques and some statistical measures like semi-log regression were used. The study's objectives were addressed through Descriptive statistics and the Cobb-Douglas production function model. House type, area of a rooftop garden, the experience of rooftop gardening and variety in rooftop garden significantly affected the net return from rooftop gardening. The primary purpose of rooftop gardening considered by rooftop garden owners was passing leisure time and psychological health improvement. Rooftop gardening is the number one choice as recreational activity of the significant sampled garden owners. Rooftop gardening has improved rooftop garden owners' mental health, psychological well-being, and life satisfaction. Lack of time, inadequate soil nutrients, and proper guidelines were the major drawbacks for the rooftop gardener. However, people of Dhaka city are leaning toward Rooftop gardening, and they are better scope to spend their time after the COVID-19 pandemic.

Keywords *Rooftop gardening · Nutrition · Recreation and benefit analysis*

[*] Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh, Bangladesh, Email: sanzida.econ@gmail.com
[**] Professor, Department of Agricultural Economics, Bangladesh Agricultural University, Mymensingh, Bangladesh, Email: saidur.rahman@bau.edu.bd

1. Introduction

Bangladesh is an agriculture-based country. 'Agriculture' is one of the reasons for which Bangladesh is known worldwide. Rapid population growth, migration and poor urban planning of Dhaka city resulted in an unhealthy and fragile environment which is alarming to the city dwellers (Gupta, 1992; Khan & Titumir, 1992). With rapid and unplanned urbanisation, urban poverty and food insecurity have also increased alarmingly in Dhaka City (Choguill, 1995). One of the ways to mitigate this issue is doing "Rooftop gardening". Roof gardening is an art and science of growing plants on the fallow spaces within, surrounding or adjacent to the residence, most often referred to as a garden. Other conventional areas of roof gardening include atrium, balcony and window boxes. Plants are grown for various utilitarian and non-utilitarian purposes (Sajjaduzzaman et al., 2005).

Farming on the rooftop of the buildings in urban areas is usually done using green roofs, hydroponics, organic, aeroponics or container gardens (Asad & Roy, 2014). The first benefit of this practice is increasing the local supply of fresh food. In Bologna, Italy, if all suitable flat roof space is used for urban agriculture, rooftop gardens in the city would supply around 12,500 tons of vegetables annually, which would meet 77% of residents' needs for vegetables and an estimated 624 tons of CO2 would be captured each year (Science for Environment Policy, 2015). Lufa Farms, Montreal, produces over 25 varieties of vegetables, and production is adequate to supply the needs of over 1000 people (Carrot City, 2014a). It is estimated that 10,000 ha of space in Dhaka city can be brought under rooftop farming, and the residents of the city can taste fresh vegetables as well, as over 10 per cent of the demand can be fulfilled through rooftop farming (Wardard, 2014).

Presently, the residential buildings' rooftops are used for various purposes such as gardening, drying and washing clothes, playground for children, entertaining guests, and passing pleasure time. In the study, results revealed that the highest percentages of the respondents' rooftops are being used for gardening (87%), drying cloths (25.8%) and others (11.5%) irrespective of all areas in Dhaka city (Table 1). Islam (2004) reported that the rooftops of the residential buildings were used for drying (88%) and washing (45%) clothes, as a playground for children (97%), for entertaining guests (20%), for cool air during the summer (64%), to sunbathe in the winter (33%). On most of the roofs, some form of pleasure garden exists (78%); sometimes, there are fruit gardens (12%), and, less often, vegetable gardens as well (8%) (Uddin et al., 2016).

Table 1: Estimation of potential space on rooftop and use of open space in the selected household [Dhaka city (n = 97)]

City/ Metropolitan areas	Size of space on rooftop per household (in sq. feet)			Used of open space as % of each respondent		
	Total space	Open space	Potential space for RTG	For gardening	For drying cloths	Others
Mohammadpur	1500	325	1175	79	36	7
Mirpur	1950	338	1612	76	6	24
Gulshan	1806	256	1550	94	11	11
Uttara	2035	460	1575	90	35	10
Kamrangirchar	2131	356	1775	100	25	-
Tejgaon	2075	200	1875	83	42	17
All	1916	323	1593	87.0	25.8	11.5
F-value	1.863^{ns}	1.111^{ns}	1.210^{ns}			

Source: *Uddin et al., 2016 (FAO report)*

This study aims to provide information about the nutritional, recreational and other benefits of rooftop gardening. It will show the critical perspectives of rooftop gardening. At the same time, it will show how it influences urban people's lives in positive ways. This study will show the contribution of rooftop gardening products to the urban people's food consumption. Moreover, it will present the happiness of the rooftop garden owner with their rooftop gardening. It will determine whether rooftop gardening can be considered a supplementary economic activity in urban society. It will let us know the types of people and their socio-economic status in rooftop gardening. Furthermore, it will also help us understand the recreational value of rooftop gardening.

2. Materials and Methods

The pertinent information on the subject was collected from various primary as well as secondary sources. A purposive sampling of representative rooftop garden owners was done in 50 households. The data were collected through face to face interview method with the respondents using a pre-designed and pre-tested interview schedule. A rooftop household was the unit of analysis. Tabular techniques and statistical measures like semi-log regression were used to analyse the data. The data were presented in tabular form for analysing the financial condition, and a cost-benefit analysis was done. Descriptive statistics and the Cobb-Douglas production function model addressed the study's main objectives.

3. Result and Discussion

3.1 Socio-economic profile of the rooftop garden owners

The age distributions of sample rooftop garden owners were divided into four groups. Out of total rooftop garden owners, about 2 per cent of the rooftop garden

owner fell into the 21-30 years of age group, 26 per cent were between 31-40 years, 48 per cent were between 41-50 years, and 24 per cent of the rooftop garden owner belong to above 50 years of age groups.

The education levels of the respondents were categorised into three groups: higher secondary, graduate, and post-graduate. At the highest, 58 per cent of respondents completed their graduation, and at the lowest, 14 per cent completed their higher secondary certification.

Many diversified respondents were involved in various occupations such as services (Govt. and private), business and homemakers. The highest 34 per cent of respondents were homemakers, followed by servicing persons (30 per cent) and businessmen (22 per cent). Moreover, a minimum number of people were found to be a teacher (6 per cent), doctors (4 per cent), engineers (2 per cent) and bankers (2 per cent).

The annual income of rooftop garden owners varies from Tk. 6 to 65 lac. About 42 per cent of rooftop gardening households get 6 to 15 lac per year, followed by 32 per cent of rooftop gardening households. 16 to 25 lac per year. Furthermore, about 8 per cent of rooftop gardening households get Tk. 36 to 45 lac per year.

Considering the overall scenario, most rooftop garden owners were homemakers, and their educational status graduated. They were mostly between 40 to 50 years old, belonging to a small-sized family with various plants in their gardens.

3.2 Cost and return of rooftop gardening

Rooftop garden owners in the study area used purchased and home-supplied inputs valued at the prevailing market rate during the survey period or at the price they paid. The output was also valued at the overall market price. Purchased inputs such as seeds, fertilisers, material, containers, etc., involved direct expenses; therefore, pricing these inputs was straightforward. However, since no cash payment was made for the home-supplied inputs, these inputs' costs were estimated using the opportunity cost principle. The average per household garden calculation is given below:

Table 2: Total Cost and Return of Rooftop gardening

Items	Cost (Tk.)	Percentage
Construction cost per year	475.2	3.63
Container cost per year	577.22	4.41
Soil cost per year	3691	28.22
Material cost per year	86.8	0.66
Seed collection, planting and maintenance cost	497.61	3.80
Irrigation/Watering cost	5306.67	40.58
Fertiliser cost	880	6.73
Insecticide cost	530.20	4.05
Labourer cost per year	1733.333	13.2546
Gross cost per year	13077.22	
Gross return per year	14757.1	
Net return per year	1679.88	

Source: *Author's calculation based on the HHs' data*

It can be concluded that rooftop gardening is not non-profitable; instead, it can be turned into a very profitable business in a place of no land with many considerations.

3.3 Functional analysis of rooftop gardening

Semi-log regression analysis was done considering 50 rooftop garden owners. The model was specified as:

$Y = aX_1^{b1}X_2^{b2}X_3^{b3}X_4^{b4}X_5^{b5}X_6^{b6}e^{ui}$

In the semi-log form, it can be written as follows:

$\ln Y = \ln a + b_1 \ln X + b_2 \ln X + b_3 X + b_4 \ln X + b_5 \ln X + b_6 \ln X + U_i$

Where,

Y = Net Return from rooftop garden (Tk. /Owner)

X_1 = Age of the rooftop garden owner (Year)

X_2 = Educational qualification of the rooftop garden owner (Year)

X_3 = House Type (Categorical value where 1 means 'owned RTG' and 0 mean 'tenant owned RTG')

X_4 = Area of rooftop garden on roof (sq. ft.)

X_5 = Experience of rooftop gardening (Year)

X_6 = Variety of fruits and vegetables (Number)

In = Natural logarithm;

a = Intercept/constant;

bi = Coefficients; and

U = Error term.

Table 3: Estimated values of co-efficient and related statistic of Semi Log Regression Function

Explanatory variables	Coefficients bi	Standard Error	t-value
Intercept	-26.53	5.50	-4.83
Age	1.33 (0.0926)	0.77	1.72
Educational Qualification	-0.19 (0.8677)	1.16	-0.1676
House type	4.15*** (2.26E-14)	0.36	11.23
Rooftop garden area	3.58*** (2.58E-06)	0.58	6.20
Experience of rooftop gardening	0.62*** (0.0068)	0.22	2.84
Variety of fruits and vegetables	-1.13** (0.04)	0.546469	-2.07523
F-value	101.05		
R^2	0.93		
R^2 (adjusted)	0.92		

Source: *Author's calculation based on the HHs' data*

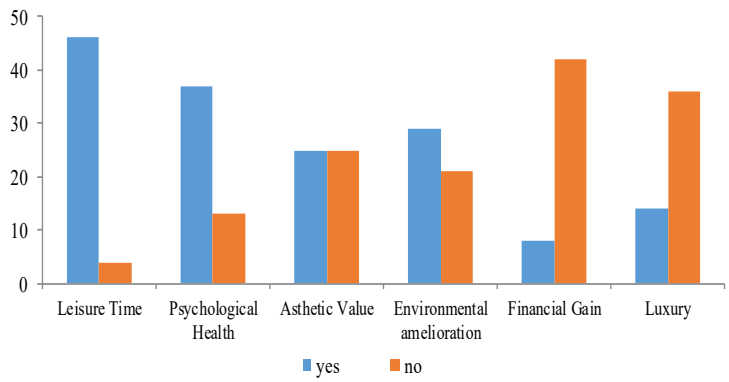
Based on the empirical evidence from the analysis, the findings can be concluded that house type, rooftop garden area, rooftop gardening experience, and variety in rooftop garden significantly impacted the net return from rooftop

gardening. However, variation in plants causes a negative impact on them. i. e. more there is variation in fruits and vegetables, the less is the net return. So, it was anticipated that higher application of the significant variables along with being positive and lowering significant negative variables would increase the net return of rooftop garden owners.

3.4 Analysis of achievement of the purpose for rooftop gardening

Firstly we need to know the purposes of practising rooftop gardening. Thus six purposes were considered. They are, passing leisure time, for psychological health, aesthetic value, environmental amelioration, financial gain, and luxury. The bar diagram for rooftop gardening gives a clearer picture of the considered purposes.

Figure 1: Purpose of rooftop gardening



Source: *Field Survey, 2019*

3.5 Analysis of nutritional proportion from rooftop gardening

One of the significant causes of rooftop gardening is to get fresh and pure fruits and vegetables from own garden. As these products are grown with supervision, they do not generally contain the harmful chemicals that market products carry. The gardeners apply a proportionate amount of pesticides and fertiliser. The fruits and vegetables they were supposed to buy from the market, they get from the garden. The proportion of nutrition they were supposed to get from the market product is obtained from the rooftop garden. The percentages of nutrition they get from fruits are Guava (64.23193), Lemon (54.39252), Mango (59.07376), Jujube (94.56522), Hog Plum (81.10236), Olive (90.47619), Pomegranate (69.33333), Orange (39.66346), Malta (46.19289), Carambola (84.61538), Water apple (98.91304), Sapota (92.64706), Litchi (25.88235), Pummelo (92.24806), Dragon fruit (77.52809), Grape (50), Strawberry (66.66667), Sugar Apple (100), Muskmelon (50), Banana (38.20106), Pineapple (62.5), Papaya (53.04348).

3.6 Rooftop gardening as recreation for rooftop garden owners

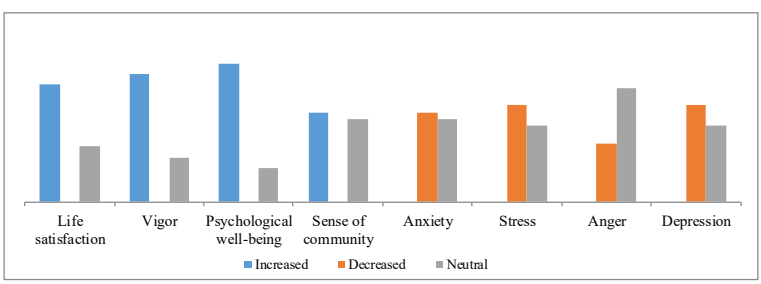
There are different ways to enjoy or relax, or refresh. Sleeping is the best recreation, while others may enjoy reading books and a good story. However, for rooftop garden owners, the view is different. Through analysis, it is seen that 64 per cent of rooftop gardeners considered rooftop gardening as for number one recreational activity.

3.7 Mental health

Recreation is a way to balance or improve mental health. A person needs recreation for peace of its mind. Moreover, some aspects are life satisfaction, vigour, psychological well-being, sense of community, anxiety, stress, anger, and depression. Rooftop gardening directly or directly stimulates life satisfaction, vitality, psychological well-being, sense of community, anxiety, stress, anger and depression. About 68 per cent of rooftop garden owners felt their life satisfaction has increased through rooftop gardening. For 74 per cent of the rooftop garden, their vigour has increased through rooftop gardening. Moreover, 80 per cent of their psychological well-being is being increased with rooftop gardening. Along with positive impacts, negative impacts like anxiety, depression, etc., have decreased or been neutral but did not increase.

The bar diagram of the recreational benefit of a rooftop garden is presented below:

Figure 2: Recreational benefits of the rooftop garden, including mental health



Source: *Field Survey, 2019*

3.8 Problems and constraints associated with rooftop gardening

The rooftop garden owners face several problems. Some rooftop gardeners do not get sufficient quantities of seeds, fertilisers, pesticides and technical support. Again, some complaint about getting insufficient support from governmental agencies. Rooftop garden owners face significant problems, and constraints of rooftop gardening are considered and ranked according to their opinion.

Table 4: Overall ranking of problems relating to rooftop gardening

Problems	Rank
Difficult for a tenant to make a rooftop garden	6
It is laborious	5
Difficult to supply essential plant nutrients	2
Lack of time	1
Lack of rooftop gardening knowledge	3
Seedling damaged	4
Stealing seeding, flowers, fruits etc. by the thief	7
Zero benefits in roof gardening	11
Lack of irrigation facilities	9
Damaging building strength	8
Lack of neatness	10

Source: *Author's calculation based on the HHs' data*

Lack of time is the major problem of all other issues, followed by difficulties in supplying essential nutrients. Moreover, it can be summarised that maximum rooftop gardeners do not consider rooftop gardening a zero-benefit activity. They do it to satisfy family consumption, recreational benefit and health issues.

4. Conclusions and Recommendations

Though rooftop gardening is considered a luxury hobby, it has many other sectors that need to be noticed. Throughout this study, analysing the financial, recreational and nutritional aspects, it seems that primarily middle-aged, graduated homemakers are practising rooftop gardening. Going into the financial factors, mostly rooftop gardeners belong to high to medium-class society. In a busy city like Dhaka, rooftop garden owners find recreation and stress relief through culturing and nurturing plants on the rooftop. Their mental condition, psychological well-being, life satisfaction, etc., are improving through this activity. Enlargement in rooftop garden size positively impacts the profit of rooftop gardening. Experience influences the economic side of rooftop gardening positively. Too much variation in fruits and vegetable plants requires effort and carefulness in rooftop gardening. Negative factors like anxiety, stress, and depression have been lowered by spending quality time in rooftop gardening. Almost half of their respective fruit and vegetables come from rooftop gardening for rooftop garden owners. Lack of time is one of the significant drawbacks of rooftop gardening. Rooftop gardeners find it hard to identify the causes of different incidence in their rooftop gardens and to collect and supply essential nutrients for plants. Protecting seedlings from being damaged is hard for them. Finally, in an economic sense, i.e., from its cost-benefit analysis, rooftop gardening is profitable and has a vast scope for expansion due to its inbuilt characteristics.

Based on the study results, it can be concluded that rooftop gardening is a rising fact in urban areas. A roof garden plays an essential role in the mental well-being of the gardener. The number of participants in this activity is gradually increasing. The study results show that roof gardening also has a promising potential as a small-scale business that can accelerate additional family income. Moreover, its value to the rooftop garden owners is unparalleled in all sorts of measurements. The happiness it provides cannot be measured in monetary value. Nevertheless, it may generate some employment facilities through backward and forward linkages.

The following recommendations are made for sound rooftop gardening in the study areas:

i. The potential use of unused spaces for rooftop gardening and proper drainage facility will be the best option for the dwellers of the building.
ii. Training programs should be spontaneously held on rooftop gardening so that people interested in rooftop gardening have basic knowledge like container preparation for planting, fertiliser application, and irrigation methods.
iii. Training on insect and pest management for the safe and quality production of fruits and vegetables would be helpful for garden owners.
iv. Enable a marketing option for the rooftop garden owners to consider it an economical choice.
v. High yielding variety of BARI should be made available for rooftop garden owners to be happier with the production.
vi. For the longevity of rooftop gardens, the place is to be kept neat and clean.
vii. Tenants should be given more chances to do rooftop gardening with mutual agreement with the building owners.
viii. A technically feasible, socially acceptable, economically viable, and environment-friendly RTG model should be developed and up-scaling gradually in Dhaka city areas.
ix. Need to change the mindset of the RTG owner for adopting improved technologies through motivation or awareness program;

A suitable rooftop gardening model can be developed and implemented by maintaining linkage among BARI, DAE and NGOs.

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Evaluating the Energy (Power) Security in Bangladesh

Mohammad Mohidul Islam*

Abstract

This study uses the most recent past data to evaluate Bangladesh's energy (power) security situation. The discussions based on descriptive features suggest that the country's power sector is not sufficiently secured in line with the ongoing development processes and the inclusive development of a rapidly growing economy. Although the coverage of electricity has been increasing in recent years and it will cover the whole population very soon, the quality of the electricity supply is not at a satisfactory level. The efficient and sound quality electric power installation, generation, and distribution processes should be ensured to supply the uninterrupted electric power. Therefore, the policymakers should find out how to establish sustainable sources of electric power supply that would meet the huge demand for infrastructure development and universal coverage of electricity.

JEL Classification *O13 and Q01.*

Keywords *Energy Security · Inclusive Development · Bangladesh*

1. Introduction

Energy, especially power, is the primary driving force of any country's economy and is the most critical tool in fostering rapid economic development. To ensure the well-being of the nation and sustainable growth of an economy, a secure supply of energy must require. Mainly, after the oil shock in 1973, energy security has always been a significant concern in every country all over the world. According to the International Energy Agency (IEA), energy security refers to an uninterrupted supply of energy with even distribution from available sources at a reasonable price. In a broad sense, the energy security for a country is established when energy is easily accessible, affordable and supplied from a readily available source at a stable tariff without any political and economic disruption.

* Joint Director, Statistics Department, Bangladesh Bank. Email: mminstactcu@gmail.com

Long-term energy security mainly focuses on regular investments to supply energy following economic activities and environmental demands. On the other hand, short-term energy security indicates the energy system's efficiency to support the sudden changes in the supply-demand situation. A secure energy supply mainly relies on diversification in power generation, infrastructure development, and a stable price level. On the contrary, the dependence on concentrated power suppliers, lack of expertise and an unstable political situation (both internal and external) can disrupt energy security.

2. Background

Energy security facilitates the development of a country by fostering production. A 1% increase in GDP growth is associated with a 1.4% growth in demand for electricity in a typical developing country. Hence, a 5-6% annual GDP growth is implied with demands for an around 7-8% growth in electricity supply[1] . Energy security is essential for promoting a country's food security by facilitating agricultural production. Without an uninterrupted supply of power or gas, the optimal level of the country's industrial production is impossible. Investment (local or foreign) in a country readily depends on the available energy infrastructures that ultimately enhance the overall growth activities. Bangladesh's short-term and long-term energy insecurity negatively impacts general economic developments that slow down the GDP growth as a whole.

3. The Literature

Like other developing countries, energy security is a primary concern in Bangladesh. There were several studies, such as Islam et al. (2014), Uddin et al. (2016), and Gunatilake and Holst (2013) are remarkable that have been conducted on the energy security issue in Bangladesh. All of these studies more or less have drawn the same conclusion that energy security has to be ensured for sustainable development. The present study is only a modest attempt to revisit the energy (power) security issue by considering the most recent experiences.

4. The Objective of the Study

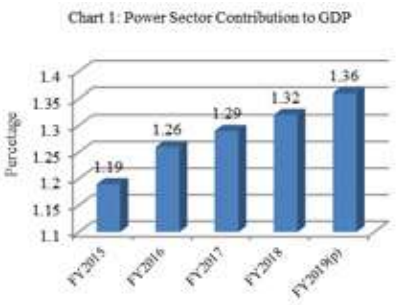
The uninterrupted power supply is essential for inclusive economic development in every country worldwide. Considering the importance of secured power supply coverage in inclusive growth, this study aims to assess the power security in Bangladesh by comparing the power sector's performance in terms of accessibility, affordability and readily available source using the most recent data.

[1] See 6th Five Year Plan, FY2011-FY2015 (Part-2, Page-126).

5. Descriptive Features and Discussions

5.1 Power sector contribution

The low rate of GDP growth (around 7% per annum) in Bangladesh is closely associated with the limited supplies of power and energy. Power and energy contribution to GDP is tremendously low. In fiscal year (FY) 2019, the power[2] sector share of GDP was only 1.36%, and it was only 1.19% in FY2015. Compared to FY2015, the power sector's contribution increased by only a 0.17 percentage point in FY2019. The increment was significantly low, which reflected an unremarkable development in this sector. Although, in FY2019, the growth rate in the power sector increased to 11.57% from 6.09% in FY2015, while in the same period, the GDP growth rate also increased to 8.13% from 6.55%; however, the shortage of power supplies along with poor investment and political unrest situation play a vital role hindering the output growth.



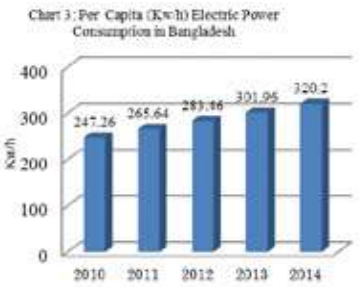
Source: *Bangladesh Bureau of Statistics. Note: P denotes provisional.*

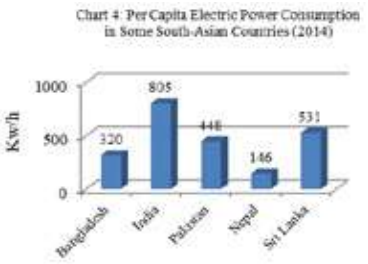
5.2 Electric power consumption

The proper and reliable supply of electricity can positively stimulate the national economy. Nationwide access to electricity is the main ingredient in alleviating poverty and improving socioeconomic conditions. The availability of electricity is necessary to ensure sustainable and inclusive economic development. In general, the availability of electricity is one of the key indicators to measure energy security. The availability of electricity largely relies on high per capita electricity consumption, universal coverage and mitigating the gap between supply and demand. In Bangladesh, per capita electricity consumption is increasing daily, which is a good sign for the economy, but the increasing rate is insufficient according to demand. In 2014, the per capita electricity consumption was 320 Kw/h, which was 302 Kw/h in 2013. Compared to neighbouring countries, the per capita consumption is much lower, whereas, in 2014, the per capita consumption

[2] In this paper, power means electric power or electricity.

of electricity in India, Pakistan and Sri Lanka were 805 Kw/h, 448 Kw/h, and 531 Kw/h, respectively. Bangladesh's low per capita electricity consumption level indicates that the country's power demand is far behind the saturation stage.

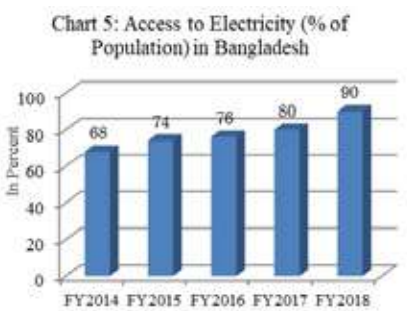


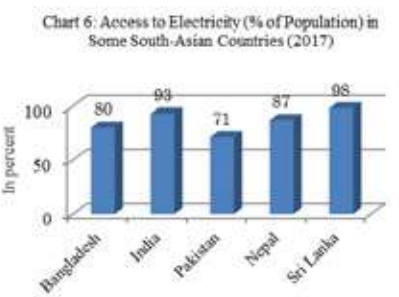


Source: *World Bank Data. Note: Kw/h means kilowatt per hour.*

5.3 Access to electricity

Universal electricity coverage is a prerequisite for expanding the nationwide economic activities, where people can fully participate in the development works. In Bangladesh, people's access to electricity is frequently increasing, but several citizens still do not have access to electricity. In FY2018, 90% of the total population has access to electricity (including renewable energy). The electricity coverage was 80% in FY2017 and 68% in FY2014. Compared to neighbouring countries, the electricity coverage in Bangladesh is much lower. In 2017, the percentage of the total population with access to electricity was 93, 71, 98 and 87 in India, Pakistan, Sri Lanka, and Nepal, respectively. In the same period, the electricity coverage in Bangladesh was 80%. From FY2014 to FY2018, electricity coverage increased by 22%. Within five years, such an increase in electricity coverage shows the hoping improvement. However, the country's access to power coverage is not at a satisfactory level for achieving the status of electricity for all by 2021, as per the government announcement.





Source: *Bangladesh Economic Review and World Bank Data.*

5.4 Installed and generation capacity

Recently, the viability of ongoing development projects in the country has been facing severe challenges that mainly come from the worse performance of the power sector in managing the demand-supply gap. In contrast to the high demand for electricity, the increasing gap between the installed capacity for electricity generation and the maximum generation of electricity has been remarkable year by year. Although both installed capacity and power generation have increased, the rising trend in the gap has offset the possible benefits of increased installed capacity. The following table shows the most recent (last five years) scenarios of electric power installed capacity and maximum generation in Bangladesh.

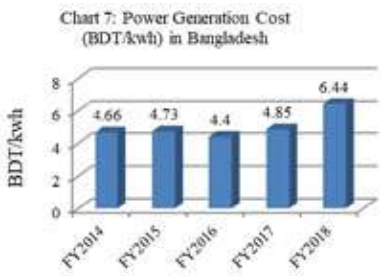
Table 1: Electricity Installed Capacity and Maximum Generation in Bangladesh

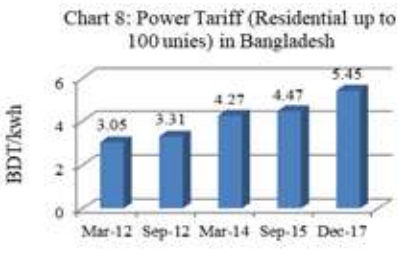
Period	Installed Capacity (Megawatt)	Maximum Generation (Megawatt)	Gap (Installed Capacity- Maximum Generation)	Percentage Change in Gap
FY2014	9821	7356	2465	17.21
FY2015	10939	7817	3122	26.65
FY2016	11770	9036	2734	-12.43
FY2017	12771	9479	3292	20.41
FY2018	15953	10958	4995	51.73

Source: *Bangladesh Economic Review.*

5.5 Generation cost and tariff

The people's affordability to get electricity also measures power security. The price of electricity and the cost of producing electricity are the indicators of affordability in getting electricity. The cost of power generation has increased in the last couple of years because the government has purchased electricity from the oil-based rental power plants to mitigate the increasing electricity demand. Due to a gas shortage, the government relies on imported petroleum-based rental power plants and purchases electricity at a higher cost. As a result, increasing power generation costs frequently hike the power tariff even though the government allocates a considerable subsidy that raises the indirect tax burden on the public. The increased price of electricity adversely impacts the economy, especially as a barrier to the development of the agriculture and industrial sector.

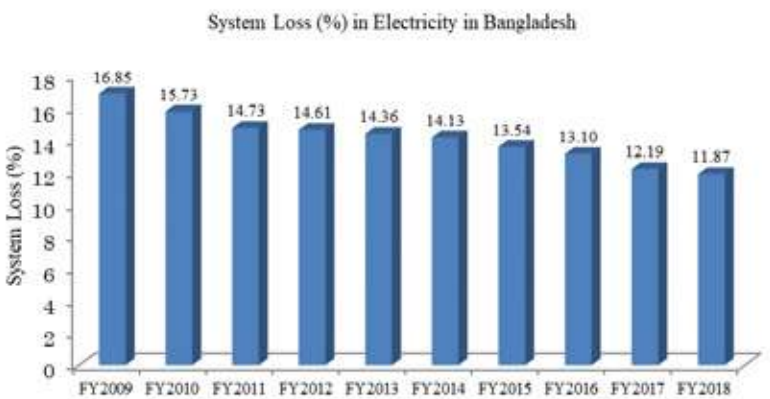




Source: *Bangladesh Power Development Board.*

5.6 Efficiency

The efficiency in the power sector can be measured by observing the system (distribution and transmission) loss situation in electricity management. In Bangladesh, the system loss in electricity is decreasing yearly because of more involvement of private entities in the power sector.



Source: *Bangladesh Economic Review.*

6. Suggestive Measures

Electric power is the most typical form of energy in Bangladesh that mainly depends on gas for production. Due to the limited reserve of gas, it is no longer a reliable source for electricity production. Furthermore, the extensive use of gas in power generation is depleting the reserve of gas day by day. Currently, the economy substantially depends on imported liquid fuel for electricity production, which is the cause of spending a considerable amount of foreign currency. On the other hand, excessive reliance on imported petroleum for power generation frequently hiked the power tariff in the last couple of years. Rising power tariffs increase production costs in both the agriculture and industry sectors. Inadequate

energy supplies, depletion of the gas reserve, and rapid hikes in power tariffs have immensely an adverse effect on agricultural and industrial production, posing a severe threat to energy security. Therefore, the government, including policymakers, should think about sustainable solutions to ensure a universally secured power sector for inclusive economic development.

7. Conclusion

In Bangladesh, the fast-rising population, frequent urbanization and rapidly growing economic activities have been increasing the energy demand, but the insufficient energy supply cannot satisfy this demand. The country has been suffering from a persistent energy shortage for a long time. Such a deficiency of energy has created short-run insecurity in the energy sector. Compared to other neighbouring countries, many people do not have access to energy and the per capita consumption of energy is too low. Inadequate energy sources, insufficient investments and lack of advanced technologies are also hindering the long-run security in the energy sector. Since the supply of energy is not readily available and affordable, and the sources of energy are unreliable, Bangladesh has to improve its energy sector a long way to achieve energy security.

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Economic Development and Bilateral Trade Cooperation: Prospects for a Bangladesh-Malaysia Free Trade Agreement

Foyasal Khan*

Abstract

Free Trade Agreement, FTA, has been considered a critical factor in economic development. Using 'Free trade' prudently, a country can boost its growth and involving trading partners can have absolute gains from it, prominent economists suggest. However, all is not well in free trade because of the nature of free trade, and it may, in some cases, be harmful to a country to grow her domestic infant industries. Looking at the bilateral trade between Bangladesh and Malaysia, it is seen that trade is disproportionately imbalanced and in favour of Malaysia. For years, Bangladesh's trade deficit with Malaysia has been growing. According to recent statistics, Malaysian export to Bangladesh is about $2 billion, while imports are only $140 million. Bangladesh is trying to reduce the persistent trade gap and has taken initiatives. One of the initiatives is to start negotiations with Malaysia to establish FTA. The exponents of the FTA expect that Bangladesh can be benefitted from the proposed FTA by tripling her export to Malaysia and may attract larger doses of investment from Malaysia.

Moreover, Bangladesh can be more competitive in the Malaysian market with the exporters of India and Pakistan, enjoying duty-free access to Malaysia because of the bilateral FTA. This paper examines the recent trends and prospects of trade relations between Bangladesh and Malaysia. It assesses the possibility of FTA bilaterally that can create a win-win situation for both countries.

Keywords *Free Trade Agreement (FTA) · Trade relations. Bangladesh · Malaysia ·*

* Department of Economics, International Islamic University Malaysia.
Email: foyasal.khan@gmail.com

1. Introduction

Economic development, social development and environmental protection are interdependent and mutually reinforcing components of sustainable development, and economic partnership can play an important role in promoting sustainable development. Bilateral trade cooperation is the harmonious development of the economic relations between the parties through the liberalization and facilitation of trade, investment, and cooperation. It gradually eliminates difficulties and restrictions on trade in goods and services, promotes the expansion of reciprocal trade, provides fair conditions of competition in trade, removes trade barriers, creates conditions for further encouragement of investments, and promotes trade and cooperation between the Parties in third-country market. Thus, it can accelerate economic development by raising the living standard of the two countries' populations.

Bilateral trade with Malaysia is of great importance to Bangladesh, as Norlin Binti Othman, High Commissioner of Malaysia, in her National Day Message 2012. She mentioned, "the bilateral relations between Malaysia and Bangladesh in all areas of cooperation have always been warm and close since the establishment of diplomatic relations in 1972" (31 August 2012, The Financial Express). 'Two brotherly countries,' as coined by Norlin, can continue to grow their relationship and friendship with the constant expansion of the bilateral trade and investment, she expects.

Prominent trade experts and economists suggest that the bilateral trade relations between Malaysia and Bangladesh are desirable for mutual benefits. Being an open economy, trade plays a very significant role and is a crucial driver for economic growth in Malaysia. So, being a natural resource-rich country with a diversified production structure, Malaysia can offer enormous opportunities to Bangladesh. Malaysia could become a large market for Bangladesh's exports by expanding the demand for Bangladeshi products. On the other hand, Bangladesh can import from Malaysia at lower transportation costs as both countries share a sea route. Therefore, expanding trade between the two countries is easily understood and hardly needs any renewed emphasis. There are many areas of cooperation. Bangladesh can cooperate with Malaysia in (a) trade and investment promotion; (b) small and medium enterprises; (c) agriculture, forestry and fisheries; (d) tourism; (e) education and human resource development; (f) information and communications technology (ICT); (g) science and technology; (h) environment; and (i) intellectual property.

In recent years, the issue of establishing a bilateral FTA between Bangladesh and Malaysia has become popular and widely discussed and debated among the policymakers and politicians of both countries. This paper aims to study the prospects for a Bangladesh- Malaysia Free Trade Agreement and provides a framework for cooperation to (a) diversify economic relations between the Parties; (b) strengthen the economic competitiveness of the Parties; (c) advance human

resource development in the Parties; (d) promote sustainable development in the Parties, and (e) improve the overall well-being of the peoples of both Parties.

The rest of the paper is as follows; Section 2 outlines the trend and pattern of Bangladesh's trade with Malaysia. Section 3 identifies the causes of the prevailing trade imbalance with Malaysia. Section 4 examines the prospects for a bilateral FTA between the two countries. Finally, Section 5 summarises the paper's significant conclusions and presents some tentative recommendations.

2. Trends in Bangladesh-Malaysia Trade

2.1 Exports, Imports and Trade Balance

Trade between Bangladesh and Malaysia has been highly uneven and disproportionately imbalanced. Trade liberalization carried out by these two countries in recent years produced a one-sided effect on their trade flows. Bangladesh's imports from Malaysia registered a phenomenal increase, as a result of which Malaysia is now at number seven among the top twenty countries based on import payments of Bangladesh, according to Bangladesh Bank statistics. In FY2018-19, about 2.9 per cent of Bangladesh's imports were obtained from Malaysia.

Imports from Malaysia registered constant increase – to $ 1,766.44 million in FY2010-11 from $ 691.59 million in FY2008-09 and then decline to $ 1,399.35 million in FY 2011-12 and increase to $ 1,902.1 million in FY 2012-13. Thus, an average annual compound growth rate of nearly 35 per cent between FY08-FY12 is observed. The imports from Malaysia declined again and reached $ 1,496 million in FY2018-19, and the growth of imports also declined (4.68 per cent) on the average annual compound rate between FY12-FY18.

On the other hand, the picture of exports to Malaysia is mixed. Exports to Malaysia registered a constant increase – to $ 61.98 million in FY2009-10 from $ 11.79 million in FY2005-06 before declining to $ 43.87 million in FY2010-11. However, exports to Malaysia again increased to $101.11 million in FY2012-13 and reached $ 277.22 in FY2018-19. It can be seen in Table 1 that In FY2018-19, exports to Malaysia were just 0.68 per cent of Bangladesh's total exports, whereas Bangladesh obtained 2.37 per cent of its imports from Malaysia in that year. It is also worth noting that Bangladesh's trade deficit with Malaysia in FY2018-19 was 5.45 per cent of its total deficit, one of the highest countries.

Table 1: Bangladesh's Bilateral Trade with Malaysia (Million the US $)

	2008-09	2009-10	2010-11	2011-12	2012-13	Growth Rate*	2018-19	Growth Rate**
Total Exports	16,183.80	17,300.36	18,348.86	24,605.02	25,988.15	12.12	40,535.04	9.29
Total Imports	22,876.96	23,645.00	24,938.34	33,962.72	36,026.50	11.50	62,884.00	11.78
Overall Deficit	6,693.16	6,344.64	6,589.48	9,357.7	10,038.35	10.0	22,348.96	17.36
Exports to Malaysia	31.28	61.98	43.87	56.12	100.11	44.01	277.22	22.59
Imports from Malaysia	691.59	1,232.07	1,766.44	1,399.35	1,902.1	35.01	1,496.0	-4.68
Deficit with Malaysia	660.31	1,170.09	1,722.57	1,343.23	1,801.99	34.58	1,218.78	-7.52
Trade Ratio	1:22.11	1:19.87	1:40.26	1:24.93	1:19		1:5.40	-
Export to Malaysia as % Imports from Malaysia	4.52	5.03	2.48	4.01	5.26		18.53	-
Exports to Malaysia as % of BD's Total Exports	0.19	0.36	0.24	0.23	0.39		0.68	-
Import from Malaysia as % of Total Import	3.02	5.21	7.08	4.12	5.28		2.37	-
Deficit with Malaysia as % of Total Deficit	9.87	18.44	26.14	14.35	17.95		5.45	-

Note: **Average annual compound growth rate between FY08-FY12, based on end-year values.*
*** Average annual compound growth rate between FY12-FY18, based on end-year values.*
Source: Bangladesh Export Promotion Bureau, Export Statistics, various issues; Bangladesh Bank, Annual Import Payments, various issues; Statistical, Economic and Social Research and Training Centre for Islamic Countries (SESRIC), Basic Social and Economic Indicators Database.

2.2 Commodity Pattern of Malaysia-Bangladesh Trade

Table 2 presents the commodity composition of Bangladesh's imports from Malaysia in FY2017-18 and FY2018-19. The five major product categories of imports in FY2018-19 -where nearly 80 per cent of total imports are concentrated- being: 1. Mineral fuels, mineral oils and products of their distillation are bituminous substances; mineral waxes. 2. Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes. 3. Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof. 4. Plastics and articles thereof, and 5. Salt; sulphur; earth and stone; plastering materials, lime and cement. Other minor import items are Electrical machinery and equipment and parts thereof; Organic chemicals; Aluminium and Articles Thereof; Rubber and articles thereof; Miscellaneous chemical products; and Cotton.

Table 2: Commodity Composition of Bangladesh's Imports from Malaysia (Fiscal year 2017-18—2018-19)

(Million US$)

HS Section and Commodity Groups	Fiscal 2018-19		Fiscal 2017-18		Annual Growth Rate
	Values	%	Values	%	%
Grand Total	1496.0	100	1410.1	100	6.09
1. Mineral fuels, mineral oils and products of their distillation bituminous substances; mineral waxes	766.7	51.2	644.4	45.7	18.97
2. Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes	143.5	9.6	212.3	15.1	-32.4
3. Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	100.5	6.7	124.2	8.8	-19
4. Plastics and articles thereof	90.6	6.1	90.6	6.4	0
5. Salt; Sulphur; earth and stone; plastering materials, lime and cement	59.8	4.0	36.2	2.6	65.19
6. Iron and Steel	46.9	3.1	39.2	2.8	19.64
7. Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers and parts and accessories of such articles	34.7	2.3	19.9	1.4	74.37
8. Organic chemicals	33.7	2.2	43.4	3.1	-22.35
9. Aluminium and Articles Thereof	28.25	1.9	24.68	1.8	14.46
10. Rubber and articles thereof	25.3	1.7	25.7	1.8	-1.55
11. Miscellaneous chemical products	21.7	1.5	19.9	1.4	9.04
12. Cotton	16.4	1.1	19.2	1.4	-14.58
13. Others	128.1	8.6	110.6	7.7	15.82

Source: Statistics Department, Bangladesh Bank.

Table 3 shows the commodity composition of Bangladesh's exports to Malaysia, which are highly concentrated in a few items. The top five products accounted for 91.87 and 88.19% of the country's total exports in FY2017-18 and FY2018-19, respectively. These are 61: Articles of apparel and clothing accessories, knitted or crocheted; 62: Articles of apparel and clothing accessories, not knitted or crocheted; 19: Preparations of cereals, flour, starch or milk; pastry cooks' products; 20: Preparation of vegetables, fruit, nuts or other parts of plants; and 07: Edible vegetables and certain root and tubers.

Table 3: Commodity Composition of Bangladesh's Exports to Malaysia, Fiscal year 2017-18 — 2018-19

(Million US$)

HS Section and Commodity Groups		Fiscal 2018-19		Fiscal 2017-18		Annual Growth Rate
		Values	%	Values	%	%
Grand Total		277.22	100	232.42	100	
1	61: Articles of apparel and clothing accessories, knitted or crocheted	113.48	40.93	99.48	42.80	14.07
2	62: Articles of apparel and clothing accessories, not knitted or crocheted	65.32	23.56	61.74	26.56	5.79
3	19: Preparations of cereals, flour, starch or milk; pastry cooks' products	32.08	11.57	28.26	12.15	13.51
4	20: Preparation of vegetables, fruit, nuts or other parts of plants	17.02	6.13	14.54	6.25	17.05
5	07: Edible vegetables and certain root and tubers	16.64	6.00	9.55	4.11	74.24
6	27: Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes	5.14	1.85		-	-
7	22: Beverages, spirits and vinegar	4.07	1.46	3.08	1.32	32.14
8	09: Coffee, tea, mate and spices	2.27	0.82	2.26	0.97	0.44
9	64: Footwear, gaiters and the like; parts of such articles	2.19	0.79	1.70	0.73	28.82
10	Others	18.97	6.85	11.76	5.06	61.30

Source: *Bangladesh Export Promotion Bureau. Export Statistics, relevant issues.*

A few other minor items of export are 27: Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes; 22: Beverages, spirits and vinegar; 09: Coffee, tea, mate and spices; 64: Footwear, gaiters and the like; parts of such articles. Together, these items account for another 10% -12% of the country's exports to Malaysia. The small volume of the country's exports mainly reflects a narrow industrial base and the Bangladesh exporters' inability to enter the Malaysian market because of high tariff and non-tariff barriers. As pointed out by a chamber leader, poor marketing and lack of knowledge of the export potential are reasons for failing to grab the potential Malaysian market. (10 July 2012, the Financial Express).

3. Causes of Bilateral Trade Deficit with Malaysia

Bangladesh's growing trade gap with Malaysia has become a matter of concern among policymakers, and there are many reasons behind it. Discussing in detail all the reasons is out of the scope of this paper, and it requires a separate in-depth study. However, some potent reasons are discussed in the following.

3.1 Tariff Barriers

In 2010, Malaysia agreed to grant Bangladesh's 19 exportable items duty-free access to its market, provided that Bangladesh agreed to begin negotiations on a mutual free trade agreement. Then in 2011, the Malaysian government offered a duty-free export facility for 300 Bangladeshi products, including main export earning apparel. Major products on the list of 300 include apparel, handbags, shoes, shampoos, suits, children's apparel, wallets, hair colourants, golf balls, imitation jewellery, talcum powder, curtains, tablecloths, blankets, bed sheets, shirts, undergarments, lingerie, nightwear, perfumes and mosquito nettings. (14 June 2011, the Daily Star). However, these offers could not significantly reduce the bilateral trade gap that heavily favours Malaysia. Hence, Commerce Minister Tofail Ahmed has recently sought duty-free market access of all Bangladeshi products to the Malaysian market so that the trade ties between the two countries can reach a newer height in the coming days. (15 October 2015, the daily sun).

Because of the country's backward and undiversified industrial base, Bangladesh can offer only simple consumer goods like garments, hosiery products, knitwear, leather shoes, fruit juices, jams and pickles, and fish and fish products for the Malaysian market. These products attract much higher import duty rates in Malaysia than intermediate and capital goods.

In addition to the basic customs duty, several para-tariff measures apply to all products imported into Malaysia.

3.2 Non-Tariff Barriers

Non-tariff barriers (NTBs) significantly impede Bangladesh's exports to Malaysia. It is difficult to make an exhaustive list of NTBs as they vary from consignment to consignment. Most NTBs are non-transparent and hence are difficult to identify. Some are state-mandated impositions or requirements, while others are sheer bureaucratic interference. In his paper entitled "*Bangladesh-India Trade Relations: Prospects of a Bilateral FTA*", one of the prominent trade experts of Bangladesh, Professor Ayubur Rahman Bhuyan (2010), has discussed the most commonly used NTBs, which are: 1. Dispute over Classification of Goods for Customs Purposes; 2. Requirement of Chemical Tests; 3. Customs Valuation; 4. Arbitrary Imposition of Tariff Values; 5. Health and Quality Standards; 6. Permits and Licenses; 7. Condition for obtaining ISI Certificate; 8. The requirement to collect Health Certificate; 9. Technical Standards; and 10. Labelling and Marking Provision. The authors found that most of these NTBs are present as a barrier in the case of Malaysia-Bangladesh relations. Bangladesh exporters have found it challenging to overcome these barriers and export their merchandise to the Malaysian market. The more positive action in the form of withdrawal of tariff and non-tariff barriers by Malaysia from all products across the board would be needed to achieve any meaningful increase in exports to that country.

3.3 Weak Production Structure

The root cause of Bangladesh's trade imbalance with Malaysia is the country's narrow production base in exports and import substitutes. The country's industrial sector being in a rudimentary stage of development, it cannot meet the growing demand of the domestic market. The result is the country's acute dependence on imported supplies. Export production in Bangladesh is also narrowly based and undiversified. Most of the products that Bangladesh can export to Malaysia are the ones Malaysia itself produces and exports.

3.4 Uneven Competition

Bangladeshi exporters are also facing uneven competition with the exporters of India and Pakistan. They enjoy duty-free access to Malaysia due to a bilateral FTA with Malaysia (9 September 2013, the daily Dhaka Tribune).

4. Prospects for a Bilateral Free Trade Agreement with Malaysia

This section has two sub-sections. The former deals with the prospects of FTA and the opinion and initiatives of various stakeholders, while the latter discusses the likely impact of this proposed bilateral FTA on Bangladesh's economy.

4.1 Prospects and Initiatives for FTA

FTAs are legally binding trade agreements between two or more countries. FTAs partner countries provide each other favourable treatment on trade and investment, provision of trade facilitation, and economic and technical cooperation. (MATRADE, 2010). The FTA signing with Malaysia was mooted in 2004 following the growing ties between Kuala Lumpur and Dhaka and expanding trade relations between the two friendly nations, with the trade balance heavily in Malaysia's favour. The FTA's prime objective is to trim the trade imbalance against Bangladesh in the two-way trade between the two countries. A report published in Bernama on 4 June 2012 illustrates that In 2010, the International Trade and Industry Minister of Malaysia, Datuk Seri Mustapa Mohamed and the then Bangladesh Minister of Commerce, Muhammad Faruk Khan, had verbally agreed for the talks to commence. It took nearly two years to work on the proposal. Bangladesh presented it to the Malaysian government in 2012 after a study was conducted by the Bangladesh Tariff Commission (BTC) and the National Board of Revenue (NBR). Many Malaysian companies have shown keen interest in participating in infrastructure projects in Bangladesh in areas like power generation, sea-port development, waste disposal system, construction of roads and highways, and services sectors such as education and healthcare, the source said.

Bangladesh-Malaysia Chamber of Commerce and Industry (BMCCI) was established in 2002 as a non-profit, service-oriented organization and has played a vital role in enhancing bilateral relations. BMCCI has been working with a mission to foster strategic capabilities among the business communities through different

sources like organizing business forums, trade fairs, and exchange of business delegations leading to boosting trade and investment between Bangladesh and Malaysia. (15 September 2015; the Financial Express). In 2004, former prime minister and the architect of modern Malaysia Tun Mahathir bin Mohamad visited Bangladesh being invited by BMCCI, and his visit drew enormous attention among the people of Bangladesh and especially to the business community, said Syed Moazzam Hossain in a television interview (ETV, 7 October 2015). One of the major initiatives to promote close-knit trade relationships between the countries that BMCCI is taking is to organize "Showcase Malaysia" in Dhaka and "Showcase Bangladesh" in Kuala Lumpur. From Brochure 2015 published by BMCCI, it is seen that "Showcase Malaysia" was held in 2008, 2011, 2013 & 2015 in Dhaka, while "Showcase Bangladesh" was held in 2010, 2012 & 2014 in Kuala Lumpur.

Trade experts forecast that trade relations with Malaysia in the form of FTA can benefit both countries. From Bangladesh's point of view, the objective of the agreement should be to obtain duty-free access for its products to the Malaysian market, hoping that it will have a favourable impact on Bangladesh's exports, just as the Malaysia-Sri Lanka FTA has led to a significant expansion of Sri Lanka's exports to Malaysia. A similar result could be expected from an FTA between Malaysia and Bangladesh. A bilateral trade agreement would also be in Malaysia's economic interest. The Malaysian economy will derive dynamic benefits, for example, increased efficiency in economic activities. Malaysia's exports to Bangladesh would also experience a further increase because greater access to the Malaysian market should raise Bangladesh's capacity to import. Consequently, the volume of Bangladesh's essential imports from Malaysia would increase, too.

At the country level, Malaysian Prime Minister Najib Razak paid an official visit to Bangladesh on 17 November 2013, and Bangladesh Prime Minister Sheikh Hasina visited Malaysia on 2 December 2014. In both meetings, the two leaders discuss how to reduce the bilateral trade gap and establish an FTA between Bangladesh and Malaysia.

4.2 Likely Impact of the FTA on Bangladesh economy

The likely impact of this proposed bilateral FTA on Bangladesh's economy is discussed in the following:

4.2.1 Reducing the Trade Deficit by increasing Exports

Maintaining healthy trade relations with Malaysia is incredibly important for Bangladesh to reduce the existing trade deficit as much as possible. The most sensible option for Bangladesh to reduce the bilateral trade deficit should be to raise its exports to Malaysia. For that to happen, it would be necessary on the part of Malaysia to grant entirely free access to substantially all of Bangladesh's exports. Many consumer items and readymade garments have proven in demand in Malaysia and could be exported if restrictions on their import were removed.

In this context, Malaysia, the larger and relatively more developed trading partner, is responsible for initiating moves to meet better trade terms with Bangladesh so that the latter's exports can easily access Malaysia's domestic market. Given the large size of the Malaysian economy in terms of natural resources, geographical area, and the level of industrial development relative to Bangladesh, unilateral concessions offered to Bangladesh would hardly have any adverse effect on the Malaysian economy. On the contrary, this goodwill gesture would improve mutual trade relations and gain both countries.

4.2.2 Effects on Imports from Malaysia

Increased imports would have significant welfare consequences for Bangladesh. One immediate consequence would be the lost government revenue because the protective tariffs would no longer apply to Malaysia's imports. As against the adverse effects of FTA, increased imports from Malaysia will significantly benefit the Bangladesh economy. The bulk of Bangladesh imports from Malaysia is from essential raw materials and intermediate inputs used in industrial production. The FTA will contribute to the expansion of the country's manufacturing industries. Duty-free or low-duty imports will bring down production costs, and the user industries will become competitive in domestic and international markets. Second, while revenue from import duty will decline, increased production in the manufacturing sector will generate more government revenue through VAT and excise duty, which may outweigh the lost revenues from import duty. Third, increased import competition will spur domestic industries' efficiency, which will be forced to raise efficiency and productivity to remain competitive or go out of business. However, to protect critical local industries from severe injury or threat of serious injury, the provision of safeguard measures will need to be incorporated into the FTA treaty.

4.2.3 Effect on Investment

The FTA will likely encourage investment and joint ventures by Malaysian entrepreneurs in Bangladesh. For example, the Malaysia- Pakistan FTA has unleashed a trend of increased Malaysian investment in Pakistan. The Malaysian companies in Pakistan are involved in the oil & gas exploration projects, power plant projects, telecommunications networks, information technology, construction of low-income housing, infrastructure development/road construction, port development, coastal plantation, crop cultivation for export, textile industry, water supply for urban centres, coal mining, pollution control, "Halal" meat industry, and gems & jewellery. (Paracha & Manzoor; undated). Another good example, Malaysia is performing very well in the halal industry. Especially, halal certification endorsement by the Malaysian government has allowed Malaysian companies in the halal food industry to compete well in the Japanese market.

Malaysia is going to establish a halal park in Japan. (2 August 2012, Bernama). To conclude, an FTA may spur Malaysian investment in Bangladesh, as the experience of Pakistan and Japan indicates.

4.2.4 Advantages of FTA with Malaysia

Some of the advantages of FTA with Malaysia are discussed in the following:

1. **Generating Employment**: Major imports of Bangladesh from Malaysia are raw materials or semi-finished goods, most of which go directly into export production. FTA will help create more manufacturing activity in Bangladesh and generate additional employment. Another direct way to generate employment is to export manpower from Bangladesh to Malaysia. So far, more than half-a-million Bangladeshis have been working in Malaysia. In most cases, being unskilled, they work in 3D jobs (Dirty, Dangerous and Difficult), i.e., plantation and construction. The proposed FTA might open the door of opportunities for Bangladesh to export skilled manpower, i.e. doctors and engineers, to Malaysia.
2. **Making Bangladeshi manufacturers truly competitive:** Duty-free import of raw materials and semi-finished goods will bring down production costs, and manufacturing industries will thrive and become globally competitive. In the event of FTA, Bangladeshi manufacturers can import raw materials and semi-finished goods from Malaysia at a price, in most cases, that would be lower than the procurement price of a Malaysian manufacturer. This advantage could make Bangladeshi manufacturers competitive, especially in labour-intensive industries. It is the primary reason Bangladesh's RMG sector could remain competitive vis-à-vis its Malaysian counterpart.
3. **Expanding Bangladesh's export basket:** The FTA will help expand Bangladesh's export basket, which is heavily anchored around apparel and clothing. With the generation of more manufacturing activity, the share of industrial production in GDP will go up and correspondingly, the level of employment will increase.
4. **Cooperation in tourism:** Malaysia is one of the top ten countries in the world and 1st in Southeast Asia for tourist arrivals. In 2013, Malaysia recorded 25,715,000 tourist arrivals (World Bank). On the other hand, despite many attractive tourist destinations, Bangladesh's arrivals were 1,48,000. This picture shows many lessons from Malaysia to attract tourists to Bangladesh. Hence, the proposed FTA may be a path of cooperation in tourism.

5. Concluding Remarks and Policy Recommendations

Because of low and stagnant exports and fast-growing imports, Bangladesh's trade deficit with Malaysia has steadily increased over the past decade. While Bangladesh has been able to obtain a significant part of its essential

development imports from Malaysia at a lower cost, which has contributed to the country's industrial growth and exports to other parts of the world, the persistent increase in the country's trade deficit has raised demands for taking appropriate action to reduce the deficit. Inadequate market access opportunity for Bangladesh's exports to Malaysia is blamed as a significant cause of the deficit. However, the more important reasons are the country's narrow export base and inability to produce many of the goods in demand in Malaysia. This paper recommends the conclusion of signing a bilateral FTA with Malaysia to reduce the trade gap. Other specific policy recommendations are as follows:

1. **Providing for Negative List.** The Agreement may also provide for Negative Lists of products, which the two countries may consider most sensitive. However, these lists should be kept as short as possible, and products of export interest to Bangladesh should not appear in Malaysia's Negative List.
2. **Dismantling of NTBs and Para-Tariffs.** All non-tariff and para-tariff barriers mentioned in this paper should be removed along with phasing out tariffs.
3. **Safeguarding Provisions.** The FTA should include a provision offering Bangladesh the right to impose non-tariff restrictions on Malaysia's exports if that would appear necessary to protect its nascent infant industries.
4. **Expanding Production Base and Building Export Capacity.** To harness the potential arising out of the FTA, there is a tremendous need to build the country's export capacity for various products. For Bangladesh to increase its bilateral exports, this proposed FTA can have the provision that Malaysia shall extend non-reciprocal duty-free access to Bangladesh's exports on an across-the-board basis. The objective should be to enhance Bangladesh's exports to Malaysia.
5. **Attracting large investors of Malaysia to invest more in Bangladesh infrastructure.** Bangladesh's primary target should be attracting large investors from Malaysia to invest more in Bangladesh's infrastructure rather than industries. We do not have proper roads, power and ports, so these are opportunities for foreign investors. Local entrepreneurs now can invest in several million-dollar industries but cannot afford to invest in a multi-billion-dollar infrastructure project.

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Responses of Fishermen to Climate Change in the South-Western Coastal Regions of Bangladesh

Md. Enamul Haque*

Abstract

Environment and sustainable development can go hand in hand and are often analysed through the sustainable livelihood framework. This literature shows that shrimp production is not the only source of livelihood for south-western coastal people in Bangladesh. Diversifying into non-farm activities is increasingly adopted as a viable livelihood strategy and its importance is profoundly growing daily. Recently, climate change and the recognition of its adverse socio-economic impacts on livelihoods remains a cornerstone in the developing world. Shrimp producers see a devastating fall in shrimp production due to natural disasters like floods and drought that leave thousands of people in this region unfed and malnutrition. Diversification seems like one of the main strategies by which coastal people can respond to the challenges of climate change. Fishers who rely on nature for food and income have minimal livelihood alternatives. Yet, natural resource-based tactics appear to be prevailing in the existing degree of diversification, which may not be sufficient to deal with the effects of current climate extremes and forecasted changes. This paper aims to document local ways of responding to the impacts of climate change. Given this, the thesis aims to provide a theoretical and empirical analysis of non-farm diversification in climate change adaptation in south-western coastal regions in Bangladesh. The study also examines the impact of non-farm income diversification on income distribution. These analyses reveal that incomes from other than fishing have a positive impact on coastal households" welfare and income distribution. This result strengthens the argument that non-fishing income diversification can be an excellent strategy to reduce risks in shrimp production and paves the way to sustainable development.

Keywords *Climate Change · Adaptation · Livelihood diversification · South-Western Coastal Region · Bangladesh ·*

* Assistant Professor, Department of Economics, Pabna University of Science and Technology, Pabna, Bangladesh. Email: enaml875@yahoo.com

1. Introduction

One of the most significant difficulties facing our society today is dealing with the socio-economic effects of climate change. Increased global temperature and accompanying severe events such as sea-level rise, droughts, flooding, and cyclones are already revealing the reality of its destructive effects on people and nations. Developing countries must adapt quickly because of their heightened vulnerability (Agrawala & Van Aalst, 2008).

Responding to the socio-economic impacts of climate change is one of the significant challenges facing our world today. The reality of its devastating effects on people and nations is already unfolding through increasing global temperature and associated extreme events such as sea-level rise, droughts, flooding, and cyclones. Adaptation is crucial for developing countries because of their increased sensitivity to the effects of climate change (Agrawala& Van Aalst, 2008). As a result, Erikson and O'Brien (2007) argue that reducing climate change risk through adaptation measures is becoming increasingly crucial for long-term development. Diversification entails the continual maintenance and variation of a wide range of activities and occupations to reduce household income variability, mitigate the adverse effects of seasonality, and give employment / supplementary income (Ellis, 2000; Barrett et al., 2001; Lanjouw & Lanjouw, 2001; Davis & Bezemer, 2004; Haggblade et al., 2010). Bangladesh is a developing country vulnerable to natural calamities such as floods and cyclones. Several natural disasters have impacted Bangladesh at various times. A natural tragedy known as ILA struck the south-western coastal region in 2009, causing massive devastation and leaving many people dead and malnourished.

Furthermore, the ILA had other negative socio-economic consequences that hampered the country's ability to achieve long-term development goals (SDGs). People are still suffering from the adverse effects of ILA. Some fundamental issues can be asked, such as what has happened to poverty, inequality, and unemployment. The study's goal is to discover those answers.

2. Impacts of Climate Change in Bangladesh: Some Sectors

Fisheries: Increasing year-to-year variability, as well as an increase in both droughts and high precipitation events, reduces agricultural production and has a negative impact on food security.

Water: The availability of safe drinking water is projected to diminish because of increased evaporation and variability in rainfall events.

Health: Malaria cases surged quickly in parts of the highlands where the disease had previously been absent. Increases in cardio-respiratory and viral disorders are also projected due to the warming.

Ecosystems: Forest ecosystems are threatened by climate change and human activity such as forest fires and logging.

Furthermore, many plant and animal species are on the verge of extinction as climate conditions change too quickly for them to adapt.

Infrastructure: Floods and heavy rainfall caused damage to roads, highways, and structures.

3. Aims and Objectives

This study aims to look into ways to adapt to climate change, mainly through livelihood diversification, and to make recommendations for shrimp producers to improve their performance by leveraging economies of scale.
The following are the precise goals:

i. To determine the dangers and risks of cyclones and other natural disasters.
ii. To investigate the local people's coping mechanisms for dealing with cyclones.
iii. To identify ways for fishers to diversify their livelihoods in the face of climate change.
iv. Make some suggestions for resolving the associated problem.
v. To prepare the road for Bangladesh's coastal regions to achieve the SDGs.

4. Review of Literature

An attempt has been made in this study to present a review of research on shrimp production and the socio-economic consequences of climate change on Bangladesh's fisheries sector. A disaster is an unexpected, catastrophic event that causes significant damage, loss, destruction, and devastation to people and property.

Disaster damage is immeasurable and varies depending on geographical location, temperature, and the type of earth surface/degree of vulnerability. It impacts the impacted area's mental, socio-economic, political, and cultural state (Assam Govt. Disaster Management Institute, 2003).
Cyclones, earthquakes, floods, and other natural disasters are examples.

Bangladesh is one of the world's least developed and disaster-prone countries. Bangladesh is vulnerable to natural disasters, particularly cyclones, due to its conical form and location on the point of the Bay of Bengal (Tareq, 2010). A cyclone is an atmospheric system characterised by low barometric pressure (depression) and strong winds that rotate counterclockwise in the northern and southern hemispheres (Assam Govt. Disaster Management Institute, 2003).

The cyclone formed over the ocean, where the water was warm.

Cyclones have impacted the country throughout the last 30 years, resulting in the loss of precious lives and property.

The Bay of Bengal (Murty and El-Sabh 1992; Haque 1997), which is believed to be one of the perfect grounds for cyclone formation because it has 6–10 per cent of tropical cyclones, has the physical and climatic characteristics necessary for developing tropical cyclones. Each year, on average, 12–13 depressions emerge, and at least one intense hurricane strikes Bangladesh (Mooley 1980; Haque 1997; Paul 2009a, b).

Bangladesh has been hit by several devastating cyclones, including those in 1822, 1876, 1961, 1965, 1970, and 1991. (Wisner et al. 2004; Dube et al. 2004; GoB 2008).

According to previous studies, Bangladesh accounts for 80–90 per cent of global damages and 53 per cent of overall cyclone-related deaths (Ali 1999; GoB 2008; Paul 2009a, b).

In the last two centuries, cyclone-related deaths have accounted for almost 42% of all deaths in Bangladesh (Nicholls et al. 1995).

For example, in 1971, the total death toll from cyclones was predicted to be between 300,000 and 500,000, with 100,00 people dying. For example, the total death toll from a storm in 1971 was between 300,000 and 500,000, with 100,000 persons missing; the estimated damage was USD 450 million.

The official death toll from the 1991 storm was 140,161, with a total population of 10,721,707 people impacted; damage estimates ranged from USD 1.8 billion to 4.3 billion. The poor socio-economic situations of coastal residents, in addition to the geophysical characteristics of the Bangladesh coast, contribute to residents' increased vulnerability to cyclones (Paul, 2009).

Coastal inhabitants' livelihoods rely strongly on ecosystems linked to agriculture, fisheries, forestry, and salt farming, among other things.

As a result, the rising frequency of cyclones would undoubtedly impact the livelihoods of vulnerable people living in low-lying coastal Bangladesh (Mian 2005, Islam 2008).

As a result, cyclones are a common occurrence in Bangladesh and a colossal calamity. While cyclones can produce dangerous winds, many people are unaware that they pose several other risks, both directly and indirectly.

Hazards are described as -Phenomena that pose a risk to persons, structures, or economic assets that may result in a disaster.

They could be created by humans or occur naturally in our surroundings (Assam Govt. Disaster Management Institute, 2003). Salinity, water logging, and embankment erosion are just a few examples. Cyclones have a wide-ranging impact, bringing powerful winds and heavy rainfall to a large area.

However, secondary occurrences like storm surges, water logging, tidal surge, and salinity cause the most harm to life and property. Multi-hazard occurs when more than one danger occurrence occurs in the same place. These many hazard events may occur at the same time or at separate times.

For example, a cyclone can cause salinity, water logging, embankment erosion, tidal surge, and storm surge in the same place.

5. Methodology

5.1 Conceptualisation

Cyclone in Bangladesh is a disaster that has wreaked havoc on property, agriculture, infrastructure, and life.

Simultaneously, Indigenous coping mechanisms are one of the strategies being investigated to deal with cyclones.

If the Participatory Rural Appraisal (PRA) is used, indigenous knowledge and practices can be effectively identified.

Local knowledge combined with policy measures effectively mitigate the cyclone's detrimental effects.

This viewpoint informs the study's central notion.

5.2 Selection of the study area

Santa Village in Garaikhali Union, Paikgacha Upazila, Khulna District, was chosen as the study area based on the goals.

Cyclones frequently impact people who live in this remote coastal location.

In Bangladesh, this region is highly vulnerable to climate change. The primary source of income is fishing.

Approximately 75% of the working population is employed in this sector. The majority of fishing is done for both subsistence and commercial purposes. They use traditional knowledge and practices (such as housing, agriculture, and warning techniques) to reduce damage and costs before and during cyclones.

5.3 Draft questionnaire preparation

For the study, a draft questionnaire is being produced. Personal information, cyclone information, and three phases are all included in this questionnaire (hazard phase, impact phase and recommendation phase).

5.4 Sample size selection

The overall population is mainly determined by its geographical location and size. Data collection by population requires more time and is not practical.

Identifying the right sample size to achieve the desired study outcomes is critical. A stratified sampling strategy was used to identify the 100 people who made up the sample. The sampling size plays a critical role in providing the actual scenario that the study seeks. A household can be considered a sampling unit for the household survey.

Because of several constraints such as time, money, and helping hands, a large sampling size with many households is advantageous.

5.5 Sources of data collection

Data was gathered from direct and secondary sources to examine fishers' coping capacity.

Primary data collection refers to information gathered from the field through first-hand observation. Secondary data collection is when information is gathered from a variety of sources such as organisations, websites, journals, and so on.

The primary data collection procedure is divided into two steps: The PRA is responsible for questionnaire and survey preparation.

Questionnaire preparation: To gather the essential data, a questionnaire is created.

The following are the contents of the questionnaire: Cyclone information (history, trend, frequency, length, intensity); Demographic information (population, income, occupation); Identifying risks and their consequences (water logging, salinity, river erosion, tidal surge, structural, agricultural, fisheries, pollution, diseases etc.); Coping strategy (agricultural pattern, structural pattern, awareness, signal, service etc.); Recommendations from locals.

Participatory Rural Appraisal: The surveying is mainly conducted by Upazila administration members such as the Upazila disaster management officer, the UP Chairman, and the general public.

The Participatory Rural Appraisal (PRA) survey is a type of survey that relies on the participation of rural residents.

It is carried out in two significant steps.

Semi-structure Interview: First, the Paikgacha Upazila map and general information such as total population and village names are gathered. The Upazila disaster management office is then contacted for cyclone-related information.

Focused Group Discussion (FGD): It's a simple approach to bringing people together to discuss a given issue. The inhabitants of a selected hamlet, primarily 6-8 residents, are convened here for a focus group discussion (FGD). They give cyclone spatial and nominal information.

The opinions of the public were gathered on- 1. Cyclone history and trends, 2. Cyclone Hazard Venn Diagram, 3. A map of potential hazards (i.e., Salinity map, water logging map, vulnerability map etc.), 4. Calendar of Hazardous Seasons, 5. Seasonal calendar for livelihood.

Secondary data is gathered from the Department of Public Health and Engineering (DPHE), the Agricultural Office, the Local Government and Engineering Department (LGED), and pertinent journal articles. The secondary information includes a physical map, a land-use map, a hazard map, an annual fisheries report, and relief information (DPHE).

Climate change and fisherman's livelihood diversification: Fishermen adapt to climate change by diversifying their livelihoods, including fishing, boating, rickshaw/van pulling, housekeeping, small business street vending, and farm labour. Although natural disasters have badly harmed the fishing industry, most

fishers still find work in the coastal region.

Table 1: Livelihood diversification

Diversified livelihood	Frequency
Sheep rearing	20
Small business	30
Street vendor	25
Boat man	48
Housekeeping	29
Fishing	82
Rickshaw/van pulling	35

6. Constructing the Coping Capacity Index of Coastal Fishers (FCCI)

Formula 1: Calculating the indicator score I= (cumulative response score/maximum response score) X5

Formula 2: Computation of capacity score for factor d1= (sum of Id1/maximum sum of Id1) X ranking score for d1

Formula 3: FCCI= (percentage sum of d/100) X5

Table 2: Coping capacity factors

Determinants of coping capacity	Factors	Factor assumptions
Economic resources	Diversity of income source (b) Remittance	More diverse sources of income have a higher coping capacity.
	Access to credit	Remittances play an essential role in facing climate change.
		Fishers with credit access are more economically able to cope with climate change.
Social capital	Access to family/household labour	More access to family/household increases the social capital of fishermen
Awareness and training	Level of literacy	Literacy contributes to coping capacity
	Access to climatic information	
Technology	Knowledge of fish varieties	Fishers with Knowledge about fish varieties are better able to adapt to climate change
	Mobile phone use	Fishers who use a mobile phone are better off the climate change

Determinants of coping capacity	Factors	Factor assumptions
Infrastructure	Access to roads	Access to roads made them capable of marketing input and output
	(b) Waterways	Waterways play an essential role in marketing input and output
Institutions	Government subsidy	Fishers with government subsidies for fishing are more resilient to climate change
	Disaster relief assistance	Climatic disaster is easily adapted with disaster relief assistance

Among the six factors of coping capacity, institutions, infrastructure, and technological knowledge seem most relevant for fishers' coping ability. While economic resources, social capital, awareness, and training were ranked least important. The research shows the aggregate coping capacity of respondents is low.

Table 3: Calculating response score

Factors	Frequency	%	Cumulative	Rank	Maximum
Diversity of income source	35	.35	.35	7	
Remittance	10	.10	.45	12	35
Access to credit	30	.30	.75	9	
Access to family/household labour	40	.40	.40	6	40
Level of literacy	32	.32	.30	8	32
Access to climatic information	27	.27	.59	10	
Knowledge of fish varieties	63	.63	.63	3	74
Mobile phone use	74	.74	1.37	2	
Access to roads	25	.25	.25	11	57
waterways	57	.57	.82	4	
Government subsidy	54	.54	.54	5	82
Disaster relief assistance	82	.82	1.36	1	

Table 4: Calculation of I

Calculation of I	Calculation of d	Rank score
I1=.05	d1=.02	D1=3
I2=.06	d2=.06	D2=6
I3=.11	d3=.11	D3=4
I4=.05	d4=.03	D4=1
I5=.05	d5=.09	D5=5
I6=.10	d6=.05	D6=2
I7=.04	Sum of (d)=0.36	
I8=.09		
I9=.02		
I10=.07		
I11=.03		
I12=.08		

FCCI= (percentage sum of d/100) x5
= (.36/100) x5
=1.8

Table 5: The levels of coping capacity based on the ranges of index scores (source: modified from Egyir et al.2015)

Level of CC	FCCI score range
Very high CC	4.01-5.00
High CC	3.01-4.00
Moderate CC	2.50-3.00
Low CC	1.51-2.49
Very low CC	0.00-1.50

The factors normalised capacity score involves the normalisation of the capacity score of an aspect of coping capacity about the maximum score of the factor using a Likert scale of 0 to 5 (where 5 is the total score). The survey result shows low aggregate coping capacity (FCCI=1.8).

7. Conclusion

We will be able to provide some policy implications on the elements that contribute to reducing climate change vulnerability in Bangladesh's south-western coastal regions. As the residents of this region become powerless owing to a lack of economic possibilities outside of shrimp farming, sheep rearing would be a viable alternative.

Sheep farming has numerous advantages. It could be a protein source and substitute for shrimp production. Sheep farming will benefit a large number of individuals. Sheep farming requires a low initial investment, allowing anyone to participate**.** It appears to be the polar opposite of poverty's vicious circle—more jobs, more income, savings, sheep—rearing investment, and employment. On the other hand, shrimp farmers require agricultural finance from the government or non-governmental organisations (NGOs) at first. This study offers recommendations on how agricultural finance might be used cost-effectively.

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Predetermined History of War Economy

Md. Bayazid Sarker*

Abstract

War is an important event in turning human history and economic theories. Two world wars have changed human history and economic theories significantly. However, some evidence created an inquisition about whether all human history was written after the event or in advance? To find the answer, the study surveyed relevant literature and reliable information. The study found evidence of war and war financing where the events were predetermined in the broad head, and after the incident, history detailed it. In line with the findings, the global community may have an obscure about World War III, which can be planned already.

JEL Classification *F02 · N00 · N43 · N44*

Keywords *Predetermined history · War economy*

1. Introduction

It is widespread to write a history of an event after it has occurred. Herodotus, the father of history (Wiki, 2020a), along with other historians such as Collingwood (2010) and Richard Marius & Melvin E. Page (2018), has also defined aligned with the standard definition. However, is there any exception to human history, written in advance? If the exceptions are several or remain for extended periods, how will human history appetite the big exception?

The objective of this study is to search and research whether such events were predetermined and if anything is next to be determined. This work is in progress when we, the global human community, are under Covid-19 lockdown. Thus, is the supplement inquisition on the Corona pandemic also pre-settled?

The first confrontation was 'The Berlin Conference 1884-1885', which may have been much more prior. The German Chancellor Otto Von Bismarck hosted the conference among 14 European states to work out an effective occupation across the African continent. The conference passed a rule titled "The Principle of Effective Occupation" to control conflict among the European states in the occupation

* Economist and freelance writer. Email: bayazidsarker@gmail.com.
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process (Berlin Conference, 1885). It resulted in 90 per cent of Africa coming under European control by 1902, and it was just 10 per cent before the conference. Each European state conquered their respective land of Africa, underlying the plan and policy of the Berlin Conference in 1885. Africa faced many wars, bloodsheds, and defeats, finally losing their land and fate to European states. During post-war periods, the world might have gotten many stories, movies, and literature based on those sufferings and sorrows. It has resulted in a series of conflicts, hatreds, riots, wars, civil wars and genocides among the Africans, including facing trial in Europe. As a final consequence, history has been written.

Therefore, can we say that the history was written in the broad head long before the event and had been just made detailing after the events? It could be concluded with a positive answer if The Berlin Conference was true. Even we can say it was a long-acted drama for Africa. Ultimate reality is a paradox of pre-settled human history.

2. War financing, Global Domination: Opportunities for Some Families

The previous paragraphs discussed Europeans' lengthy implementation process of a predetermined effective occupation plan over Africa. However, there had been many wars within Europe since the seventeenth century. Although European states had earned huge colonial capital depleting Asia, Africa and America; however, they faced a series of budget deficits due to fighting each other regularly throughout the centuries.

2.1 The Rothschild Family and their influences

Most states took war finance from a single financier named 'The Rothschild House' owned by an extended reputed business family, the Rothschild. Niall Ferguson rightly quoted, "Once, Rothschild used the states to become a Rothschild. Now, Rothschild no longer needs the State, but the State still has want of Rothschild" (Ferguson, N., 1998.v-1, p21). One needs to know the family's political, financial, business, and international media influences to realise the Rothschild family's absolute power and importance. Before that, it is good to know that the scientific name of about 153 species or sub-species of insect, 58 species of bird, 18 species of mammal (including the Baringo Giraffe- *Giraffa camelopardalis rothschildi*), 14 species of plant (including a flame lily-*Gloriosa rothschildiana*), three species of fish, three species of spider and three species of reptile bear the name "Rothschild" (Ferguson, N., 1998.v-1, p6).

Mayer Amschel Rothschild, born in 1744 in Frankfurt, Germany, had five sons. Each of them looked after the respective business houses: Amschel Mayer Rothschild- Rothschild House-Frankfurt, Germany, Salomon Mayer Rothschild-Rothschild House, Vienna, Austria, Nathan Mayer Rothschild- Rothschild House, London, England, Calmann Mayer Rothschild- Rothschild House, Naples, Italy and Jakob Mayer Rothschild- Rothschild House, Paris, France. In almost every

war in Europe, each side was ultimately financed by the Rothschild houses of the respective countries. (Garrett.G.L., 2019.p182). Since the seventeenth century, most of the wars in Europe were financed in that process, with a few exceptions like Hesse-Kassel, a small state under the German federation that was well disciplined in war financing (Ferguson, N., 1998. v-1, p8).

Accordingly, the British government was also heavily financed by the Rothschild House-London before establishing the Bank of England (BOE) in 1694. Even BOE was established as a private bank to bear the war expenditure favouring the British government, where the Rothschild family had a sponsored role on it. Rothschild Houses earned the lion's share of their income from return against budget deficit financing to the European states. In case of war financing, the winner side paid back and was grateful to the respective Rothschild house. On the other hand, the defeated side could not pay back the borrowed money, so the state was obliged to follow the instructions from the respective Rothschild house (Garrett. GL, 2019.p182). It was a win-win game for the Rothschild houses to exercise their power and influence among the European states. For instance, World Bank and IMF impose some unrealistic conditions for the borrower country in the current scenario. There is a presumption that multinational and multilateralism concepts have been introduced from the Rothschild houses' financing activities (Ferguson, N., 1998.v-2, pp279-282). Rothschild had many houses across Europe and America and that of 5 houses. Among the houses, Rothschild House-London took the leading in managing and financing. This house also carefully developed a network of salaried agents in other key financial markets, i.e., the stock market. Agents' job was to trade in the market, and they were also supplied with the latest financial and political news. (Ferguson, N., 1998.v-1, p9; Wiki, 2020b).

Besides the state financing, Rothschild Houses earned profit by investing in bonds and the stock market. They collected market, political and economic information through their network and used it when necessary. In 1815, Rothschild House also informed the probable war defeat of Napoleon through the agent on the battlefield. In addition, the London house confirmed the British victory in the Waterloo Battle one/two days ahead of the news received by the British government (Coleman, J., 2013.pp42-43). The house sold some British bonds in the market early in the day. The market received the wrong signal of British fall in war, and almost all bondholders sold their bonds at very low prices. Rothschild's agents bought all bonds at a very minimal price. The market went up when actual news was disseminated (Ferguson, N., 1998. v-1, p8; Wiki, 2020b). In this process, Houses earned huge profits and gradually increased their assets. Graf Prokesch, Pückler-Muskau and Toussenel referred to Rothschild's quotation in 1828 as "Rothschild . . . without whom no power in Europe today seems able to make war."

According to Niall Ferguson (1998) and John Coleman (2013), most of the wars in Europe since the seventeenth century came onto the battlefield if and only if the Rothschild family desired. If they did not, war could not be started. For instance, The Belgium Revolution, 1830, could not run after ten days, as Rothschild houses did not deserve that (Ferguson, N., 1998 v-1. p22). It is not the last. Rothschild family and their associate, the Rockefeller family, even funded the Bolshevik Revolution and commented on its leadership as Jewish Bolshevists (Tolf, R. W., 1976; Sutton, A.C., 2001, p-127). Such comments might influence the family as both theoretical and revolutionary leaders were Jews by birth. Wall Street group had a crucial role in financing to Bolshevists. However, when the Rothschild family could not see any change in Bolshevists against capitalism, the family tried to find an alternative. The family thought Adolf Hitler could be a good alternate against Bolshevists. Accordingly, on behalf of the Rothschild family, Harriman financially supported Hitler in 1932 for next year's German election (Reformation.com, 2020). These facts and figures proved that the Rothschild family financed different wars across Europe.

2.2 The Rockefeller Family and their influences

American Rockefeller family may have been treated as the second most influential family based on their business and political influences. In the late nineteenth century, the family did control about 90 per cent of the petroleum business in the USA. Both families have been working on conspiracy theories to ensure New World Order (NWO) through their secret associations with Freemasons and Illuminati Agenda (Big Think, 2019; Coleman, J., 2013.p39). It isn't easy to assess their total asset as the houses were somehow exempted from audit. However, analyses from different sources show that their real asset can be estimated within the brace of USD 7 to 10 trillion or the amount equivalent to the finance world budget deficit for two consecutive years without interim repayment. In the banking industry, they have direct or indirect control over JP Morgan Chase Bank, Citi Group Inc., and Vanguard Group. They have also influenced Federal Reserve Bank, New York (Flaherty, E., 2020). Flaherty E stated, "Foreigners (*Rothschild, London one of them*) use their command of the New York Fed to manipulate US monetary policy for their own and further their global political goals, namely the establishment of the sinister New World Order". Bank for International Settlement (BIS), known as the central bank's central bank, has been influenced by these two families since its formation. Similarly, they have influenced the World Bank and IMF boards, which are central to the NWO agenda (Flaherty, E., 2020; Henderson, D., 2020). Besides, Goldman Sachs, Deutsche Bank, and BNP Paribas are also linked and in line with the two family's ideology NWO (Henderson, D., 2020).

On the other spectrum, the US Rockefeller family has a long record of providing financial assistance, scholarship, and other forms to 75 institutions in the USA, including Harvard University, Princeton University, Stanford University, Yale

University and Massachusetts Institute of Technology (MIT) (Wiki, 2020c). These two families also have direct/indirect control over international and social media such as CNN, Fox News, New York Times, Wall Street Journal, Economist and Facebook.

3. Influences Over International Media and the Third Family

3.1 Three families' domination over media

International media plays a vital role in international trade, commerce and politics. The recent US-China trade war was started by the conflict grounded in the 5G technology domination battle. It resulted bringing sluggishness in global economic activities. Then the Covid-19 pandemic accelerated this slowness and turned into a worldwide recession. It is widely discussed that World War III will be grounded by domination over sweet water and data. It is supported by the big powers' recent preparation to take control over data. According to World Economic Forum, the everyday world creates 500 billion tweets, 294 billion emails, 4 petabytes of Facebook data, four terabytes car connected data, 65 billion WhatsApp messages and 5 billion searches. The entire digital world is expected to reach 44 zettabytes or 44×10^{10} bytes by 2020. By 2025, it is estimated that 463 exabytes or 463×10^{9} bytes of data equivalent to 213 million DVDs will be created each day globally.

In the electronic communication system, a large portion of the entire world uses email, Facebook, WhatsApp, and similar platforms free of cost. However, it should be reminded that there is no free lunch. The user device can be located if anyone posts or downloads from a social media site. In other words, free users are compromising their privacy consciously or unconsciously. In 2016, an online media named Business Insider posted information about 'In-Q-Tel', a company that works in favour of three USA intelligence agencies: Central Intelligence Agency (CIA), Defense Intelligence Agency (DIA) and National Geospatial-Intelligence Agency (NGA). Intelligence agencies provide financial and policy support to 14 US-based international social media and IT companies through In-Q-Tel. The companies include Alphabet (*Google search engine, Gmail, Android OS, YouTube*), Microsoft (*Windows Operating System, MS Office, Skype*), Facebook (*Instagram, WhatsApp*), database software company: Oracle Inc., and microprocessor companies: Intel, AMD, Sun Microsystem and Dell. Through these company's intelligence groups can perform data mining (Eldemire, S., 2019; Spadarfora, A., 2019; BBC, 2018) for primary information collection in a better way with a minimum cost of time and money (Chudley, J., 2018; Levine, Y., 2018; Wiki, 2020e). Previously the agency had to perform this job manually with higher cost and extended time. Even each IT company individually can preserve detailed information about software/application users by using Machine Learning (MI) and Artificial Intelligent (AI) technology. Later, the company can use the user's detailed information for their required purposes. A recent example is the '*Cambridge Analytica data scandal*'

(Wiki, 2020f). Based on global influences, Three US intelligence agencies can be the third family in this analysis, and this family effectively and more actively backs NWO plotting (Emery, D, 2018)

3.2 The fourth family

Another media giant, the Murdoch family, can be considered the fourth most influential family globally. The family controls the News Corporation and the Fox Corporation. They also have control over a couple of other news media. The family's ideology somewhat aligns with the Rothschild and the Rockefeller family (Politico, 2012). However, the last two families are not as crucial as the Rothschild and the Rockefeller families. They have several centuries-long histories of influence over money and media.

4. What Would be the Next?

Rothschild and Rockefeller had long efforts, multiple initiatives, and remarkable success in creating a state based on religion. In his book- The Rothschild Dynasty (pp 131-139)- Coleman discussed how the family made propaganda, used Balfour Declaration in its way, and created a Jews state in the land of Palestine that had 7 thousand years long ethnicity. Post World War-I, the Rothschild family continued their propaganda for another war (World War II) till 1939, aiming to form NWO, as stated in Congressional Record, Apr. 25, 1939, pages 6597-6604 (Coleman, J., 2013. p137). They planned to establish the NWO and a world government either by a resolution in the League of Nations or by force (Coleman, J., 2013, p134). In a part of propaganda, they avoid meeting with the Pope as doubt or opposition. Secondly, they vanished the League Nations' survey report on Palestinians' opinion regarding the proposed Jews state. After World War II, even they did not try to hide their propaganda activities.

Two families, Rothschild and Rockefeller, are still working on conspiracy theories for NWO. However, the NWO's planning and design are known only to them. Like Freemasons and Illuminati Agenda (Big Think, 2019; Coleman, J., 2013, p39), their secret society is devoted to making their secret plan of NWO and One World successful. These propositions get obscure to us, the ordinary people. In his book, The Eyes of Darkness, Dean Koontz, p 312, stated research on biological weapons in Wuhan, China and named the 'Wuhan-400' virus (Koontz, D., 1996; V101.9.com, 2020). In addition, the latest documentary on The Origin of the Covid-19 by The Epoch Times indicated that the Covid-19 virus developed in the P4 Laboratory of Wuhan Institute of Virology (Epoch Times, 2020). The situation gets worse when the former Facebook vice president, Jeff. Rothschild supposedly advocated solving global problems by exterminating 90 per cent of the human population (Emery, D, 2018). Jeff. Rothschild made this statement at the Chinese and American Entrepreneurs and Investors Conference in 2013. Thus, the possibility of the Covid-19 global pandemic linked with those comments or predictions or even with conspiracy theories may get more complex.

5. Conclusion

From the above analyses, the entire study can be concluded fourfold. First, there is an indication that significant changes in the global political system by the wars during the Berlin Conference were preplanned by any one of the four families. Second, powerful central banks, multilateral development institutions and major international banks controlling families are now preparing and planning to finance the world government following the conspiracy theory underlying NWO. Third, as they (the families) have control over the global banking industry and international news & social media, it can be assumed that if any incident happened in future, it would be treated as preplanned under conspiracy theory and the global community, except them, will know after the incident. Fourth, as USA and China are engaged in a trade & technology war underlying the 5G domination and ongoing Covid-19 pandemic, the inquisition arises on whether these are the starting of World War III? Again, the global community, excluding conspiracy theorists, will know later.

Based on periodic discussions and analyses supported by relevant literature and reliable information, the history of major wars and significant changes in the global political and financial system had been written in the broad head well before the incident. The international community, excluding a few elite groups, will know and be safe in our world later.

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Valuing non-market goods, services & leisure time analysis of tourists of Coxsbazar beach, Bangladesh: Hybrid Travel Cost method

Jasia Tahzeeda*

Abstract

The main attractions of sea beaches include their scenic beauty, entertainment, security, and nature. An appropriate pricing policy can be used to preserve and maintain sea beaches. The current study uses the Hybrid travel cost method (HTCM) as a non-market valuation technique to value the Coxsbazar beach in Bangladesh. In this developing country, few or no previous works of this kind have been conducted. The paper's main objective was to understand the willingness to pay (WTP) and analyse the socio-demographics and the characteristics of visits. Another primary aim of this paper is to analyse time spent on the site concerning income.

Using the HTCM excluding shopping costs, the study revealed that the amount respondents were willing to pay was 3129.15 Bangladeshi Taka (bdt), and the yearly consumer surplus was 13477182683 bdt. Using the HTCM, including shopping costs, the study showed that respondents were willing to pay 3519.975 bdt and the annual consumer surplus was 15160533122 bdt. Furthermore, from the Leisure time analysis, it was found that Leisure time spent on the site was strongly positively related to family and personal income. The consumer increased the demand for spending more leisure time on the site (luxury items) more than proportionately as his family money income rises. Additionally, it revealed that the consumer increased the total leisure time spent for the total yearly trip to Coxsbazar less than proportionately as his money income rises (normal good).

Keywords *Consumer Surplus · Travel Cost Method (TCM) · Willingness to Pay (WTP) · Hybrid Travel Cost Method*

* Environmental Economist. PhD Candidate, Deportment of Economics, Natural Resource Department, Phillips University, Marburg, Germany. Email: trishasia@gmail.com

1. Introduction

Bangladesh has introduced and revitalised its nature-based tourism in its protected areas in cooperation with local people to conserve biodiversity. Coxsbazar is the most popular tourist destination in Bangladesh. **Cox's Bazar** is a seaside town, a fishing port and district headquarters in Bangladesh with the longest unbroken sea beach in the world (Bangladesh Parjatan Corporation). Due to its free accessibility and associated attractions like sunrises/sunsets, sea-food restaurants and street-side Burmese markets, many people visit the area. The beach of Coxsbazar performs ecological functions and provides recreational facilities to those who visit this area. Millions of foreigners and Bangladeshi natives visit this city every year. Tourism of Coxsbazar is contributing significantly to the economy of Bangladesh. Besides, many non-market goods and services are associated with it. The current study applies the hybrid travel cost method as a non-market valuation technique to value the Coxsbazar beach in Bangladesh as it is necessary to measure the consumer surplus (CS) of the tourism in Coxsbazar and the willingness to pay (WTP) of the tourist to visit this beach.

Although there is no entry fee for Coxsbazar beach, tourists spend a significant amount of money visiting and staying there. Thus the economy of Bangladesh primarily benefitted through the tourism of Coxsbazar. The local people of Coxsbazar immensely benefit from tourism in many ways. Such as, they benefit through growing economic and educational opportunities in that area and cultural exchange, which would not be otherwise possible (Siddique & Jamil, 2013). Researchers have also stated that developing countries can earn significant revenue from recreational activities used for their development purpose. In a paper by Dikgang et al. (2017), it is reflected that sharing conservation revenue with communities surrounding parks could demonstrate the link between ecotourism and local communities' economic development and promote a positive view of land restitution involving national parks.

Furthermore, it was found that improved facilities and infrastructure are likely to lead to both increased visitation and higher revenues in recreational places (Guha & Ghosh, 2009). The natural beauty of Coxsbazar can produce enormous income through tourism if improved facilities are provided to the tourists along with safety and other necessities (Siddique & Jamil, 2013). However, in a developing country like Bangladesh, it is crucial to preserve ecologically critical areas and beaches to preserve the area by maintaining biodiversity, regulating recreational activities and controlling unregulated tourism. Unregulated tourism creates problems for environmental resource preservation in developing countries (Bharali & Mazumder, 2012). Researchers have found that the water of the Bay of Bengal and the beaches are getting polluted by the debris the tourists throw away. The tendency of Bangladeshis to use plastic materials and the single-use or throw-away culture worsens the problem of pollution (Amin, 2019; Islam, 2019).

Bangladesh is a country of heterogeneous socioeconomic conditions; this research presents significant results by reflecting the relationship between leisure time spent on the site and the population's income. Bangladesh is graduating from Least Developed Countries (LDCs) to Least Middle-Income Countries (LMICs) by 2024. Furthermore, as the socioeconomic condition of the people of Bangladesh improves significantly and Bangladesh becomes a more prosperous country, the demand for leisure and visiting Coxsbazar will likely increase in future. This study will indicate the nature of future travel demand to this site.

This research will analyse leisure time by considering leisure as non-market goods and services. Leisure is considered a good, and most goods can be purchased with income, but they cannot be purchased in the case of non-market goods and services. Leisure is also a non-market good. Goods are a source of consumer satisfaction, whether purchased on the market or produced and consumed at home. Leisure time is also an essential component of life quality and influences life satisfaction (Walega & Walega, 2017). Many research determined the relationship between leisure and income (Walega & Walega, 2017; Saksirituthai, 2012). Thus in this research, leisure time analysis is done concerning income.

The need for policy intervention to restore the environment is growing substantially as people in developing countries exploit the environmental resources for different purposes. Thus the need for internalisation of externalities valuation research and conservation-based management policy frameworks arises as the lack of these has caused the degradation of several of the world's natural resource-rich sites, such as marine beaches of developing nations (Dixon et al., 1994). Policies to address environmental problems rely on non-market valuations (Karen et al., 2007). In this research, non-market valuation techniques were used to determine Consumer surplus, consumers' willingness to pay, and leisure time analysis. The study will explain people's perception of the leisure time spent and travelling to Coxsbazar: whether it is a normal, inferior or luxury good. The specific objectives of this study were: 1) to identify the socio-demography of visitors, 2) to identify the characteristics of the visits made by visitors, and 3) to calculate consumer surplus (CS) from the perspective of the travel cost method (TCM), 4) to identify the willingness to pay (WTP) from TCM, 5) To analyse Leisure time for income; 6) To understand the perspective of tourist in terms of the condition of the beach.

2. Study Area

Cox's Bazar is a city, fishing port, tourism centre and district headquarters in south-eastern Bangladesh. The beach in Cox's Bazar is sandy and has a gentle slope; with an unbroken length of 120 km, it is the longest natural sea beach in the world. It is located 150 km south of the divisional headquarter of Chittagong. Cox's Bazar is one of Bangladesh's most visited tourist destinations, although not a major international tourist destination. In 2013, the Bangladesh Government formed the Tourist Police unit to protect local and foreign tourists better and look after the

nature and wildlife in the tourist spots of Cox's Bazar. As one of Bangladesh's most beautiful and famous tourist spots, the primary source of economy in Cox's Bazar is tourism. For this research, the sample was randomly collected from three major beaches in Coxsbazar city: Laboni, Kolatoli and Shugondha. The rationale behind selecting these three areas as the study area is that these are the most popular beaches for tourists of Coxsbazar. In Figure 1, the study area is depicted.

Figure 1: Study Area and location, Coxsbazar, Bangladesh

3. Literature Review

This article contains an overview of the few primary methods/tools, namely the Hybrid Travel cost method, willingness to pay, the relationship between income and expenditure through the Engel Curve and leisure time analysis and the validation of their use for this research to reach a non-market value for Coxsbazar beach. There are some rationales behind why leisure time analysis is taken into account, which is mentioned in this section.

3.1 Hybrid Travel Cost Method

This study is based on a hybrid approach where the zonal approach of the travel cost method was combined with individual information. TCM was used to capture the economic value of natural resources as an integral part of designing financial incentives and a proper allocation for better management (Islam & Majumder, 2015). There is much research concerning the valuation of recreational sites (forest parks, national parks, beaches etc.) using TCM such: Chen et al., 2004; Herath & Kennedy, 2004; Dwyer et al., 1983; Knapman & Stanley,1991; Rolfe & Gregg, 2012; Stevens & Allen, 1980.

Furthermore, only a few researches were found regarding the valuation of recreational sites in Bangladesh (forest parks, national parks, beaches etc.) where TCM was used (see, Kawser et al., 2015; Shammim, 1999, Tahzeeda et al., 2018). On the other hand, the valuation of beaches in Bangladesh is scanty and only very few researches are found addressing the valuation of beaches, such as Nde (2011), Komahan & Gunaratne (2017). The paper of Islam & Majumder (2015) provided a brief overview of natural resources' economic valuation, including the travel cost method with a case study from Foy's Lake, Chittagong, Bangladesh. Thus there is a need for research related to the beach of Bangladesh. Shammin'S (1999) paper used the TCM to determine willingness to pay for the services of the Dhaka Zoological Garden. Kawser et al. (2015) focused on Lawachara National Park for quantifying the recreational value and the functional relationship between travel costs and visiting a national park. The work of Tahzeeda et al. (2017) had targeted the National Botanical Garden of Bangladesh for determining revenue by maximising entrance fees by quantifying the consumer surplus.

In the hybrid method, a combination of the individual and per capita approaches is used where the number of trips by each user in a sample is scaled up to represent the total zonal use and then divided by the zonal population adjusted to user "shares" that is the population of the zones divided by the number of users (Ward & Beal, 2000). The hybrid travel cost model considers the individual visitor as a unit of observation and allows for maintaining the personal travel cost, travel time, and demographic variables. Additionally, the dependent variable is calculated by dividing that individual's visits by their share of the zones' population to calculate trips per capita. The share of the population depends on how many visitors came from that zone of origin (Loomis et al., 2008).

3.2 Welfare Calculations

The utmost important objective of the recreation-demand analysis is to compute welfare measures that can be fed into policy analysis (Yen & Adamowicz, 1993). Both willingness to pay and the consumer surplus are crucial to measuring welfare. Willingness to pay (WTP) has been applied extensively to measure non-marketed goods and services in many research (Markantonis et al., 2013, Ghanbarpouret et al.,2014, Islam et al., 2016).

TCM is based on calculating the Marshallian consumer surplus (Bateman, 1995). Consumer surplus (CS) is the difference between the total travel costs or expenses incurred by a visitor to a recreational site and the maximum amount they were (or would be) willing to spend to make the visit or trip (Timah, 2011). The consumer surplus is brought out based on the assumption that the benefits of the same public goods or services are equivalent for every visitor. The further they travel, the more they pay. When travel costs exceed the benefit, the travel behaviour will not happen (Tang, 2009).

3.3 Engle Curve

The Engel curve describes how the expenditure on a commodity varies with household income. Engel curves are crucial in estimating the impact of demographic changes on demand. Ina growing economy, these estimates assist in forecasting the demand for some necessary items like food and energy. The formulation of government policy heavily relies on the Engel curve. Assessment of events' welfare impacts depends on the Engel curve's shape. The welfare impact on individuals or households with low income is underestimated if the shape of the Engel curve is quadratic but assumed linear (Hasan, 2012).

The shape and structure of the Engle curve are used for identifying and making an assumption and identifying the nature of the goods, such as whether it is standard, inferior or luxury goods, in a few research (Babu et al., 2014; Chiappori & Meghir, 2015). For luxury items, the Engel curve is upward sloping and convex downwards, showing that the consumer increases the demand for that good more than proportionately as income rises. For a normal good, the Engle curve is upward sloping and convex upwards, and the consumer increases the demand for the good less than proportionately as his money income rises. For inferior goods, the Engel curve has a negative gradient. That means that as the consumer has more income, they will buy less of the inferior good because they can purchase better goods. There are some items for which the expenditure would increase proportionately with rises in money income; in this case, the Engle curve would be a straight line.

3.4 Leisure Time Analysis

Leisure can provide satisfaction like other goods and services. As leisure cannot be brought into the market, it falls under non-market goods and services. People spend considerable time on leisure activities, whereas they spend only eight (8) hours, one-third (1/3) of their daily time working. Thus, the utility maximising function must focus on non-marketed goods and services, including leisure. In the study of Saksiriruthai (2012), it was mentioned that according to the utility maximisation theory, individuals maximise utility by consuming goods, services, and leisure time. The study also emphasises the importance of leisure by stating that people spend about 16 hours daily on non-market activities, including leisure.

Leisure gives people satisfaction. The satisfaction derived from leisure time is another component of the usability function. The consumption of leisure time is one of the elements of household choice theory. It is acknowledged that consumers derive satisfaction from consuming goods and services and from leisure time at their disposal. Sharing time for work and relaxation is an economic choice like any other. Households devote their time to market work, housework and leisure time (Walega & Walega, 2017).

Leisure time analysis is done to understand the vital relationship between leisure and demographic information. Demographic information of respondents is used to determine the relationship between leisure time and different groups of

people. Saksiriruthai's (2012) research mentions that comparing leisure time use across other groups is possible if combined with demographic information.

As there is a strong relationship between leisure time and money, it is crucial to find the relationship between these. A strong relationship is found between time budget and cash budget. Along with cash budget management, time budget management is an important aspect of human behaviour (Walega & Walega, 2017). There is a need to understand the crucial relationship between leisure time and income. Moreover, there are researches where the authors attempt to assess the diversification of time devoted to leisure depending on the level of income among working people (Walega & Walega, 2017; Saksirituthai, 2012). In this research, the relationship between leisure time and income group is done to analyse how people perceive leisure time and how they will behave if their income increases.

3.5 The Need for Environmental Valuation at Coxsbazar

Although many non-market valuation studies have been widely carried out in the developed world, including studies related to sea beaches, very few non-market valuation studies have been conducted in the developing world. In contrast, the studies on sea beaches are very scanty (Timah, 2011). Additionally, there is a dire need to conduct research focusing on developing countries (Henrich et al., 2010).

There is no previous research on the valuation of Coxsbazar beach, particularly on tourism, where the tourists' perspective was taken into account. Coxsbazar is considered one of the most popular tourist destinations in Bangladesh. Scanty documents are found related to the area of tourism and tourist except for travel brochures, Bangladesh Parjatan Corporation, Centre for Injury Prevention and Research (CIPRB), and hotel communication. Thus there is a need for further research in this area. Very few studies are found related to the tourist's perception of Coxsbazar. Therefore, observing the nonexistence of the available data and predicting the tourist place's future demand, there was a clear need to carry out an environmental valuation method to protect the environmental public good.

4. Methods and Methodology

4.1 Questionnaire Design

A semi-structured interview questionnaire was designed to gain information on WTP in this study. The survey questionnaire was chosen because it encourages a high response rate and is suitable for complex questions. The questionnaire was divided into three sections: Socio-demographic characteristics, characteristics of the visit, amount of leisure time spent travelling and on the site.

The first section of the questionnaire gathered information on visitors' demography, such as nationality, age, and education. This section included the visitors' geographical area, such as the city and district they came from. This section focuses on the family and personal income in detail. The second section was designed to obtain information on characteristics associated with the Coxsbazar

visit, such as mode of transport and cost associated with that, the total cost of visiting the place, travel cost, shopping cost on-site, out-of-pocket expenses such as food consumption and other utilities used in the area, cost related to sports in the area, visiting rate (number of visits per year) and reasons for visiting. In this section, the focus is also given to the nature or the purpose of the visit. The final section focused on time spent travelling and the total time spent on the site.

4.2 Sampling and Data collection

The first step was to undertake the field work and collect data from visitors. During the first fieldwork phase, a systematic random sampling method was applied where every fifth visitor who entered the beach area was chosen as a sample. Seventy-four samples were collected in four days (from 22 March to 25 Marc^{h} 2019). This method was selected for its simplicity, and the results derived from this method were likely to be representative. All respondents were above 18 years of age. However, all the tourists were Bangladeshi nationals. The sample was randomly collected from three major beaches in Coxsbazar city: Laboni, Kolatoli and Shugondha. In the second data collection phase, 31 respondents were chosen for in-depth interviews (18 August- 22 August 2019) to deeply understand their perception of Coxsbazar beach. A purposive sampling method was used where sixteen (16) foreigners and fifteen (15) Bangladeshis were selected for in-depth interviews. However, in the second data collection stage, only qualitative tools are used, including in-depth interviews and observation methods. Thus a total of 105 in-depth interviews were taken, whereas 74 samples were taken for quantitative analysis.

For data collection in the first phase, the survey consisted of a mixture of closed and open-ended questions followed by a semi-structured in-depth interview. The observation method was also used for this purpose. Then the actual number of visitors was determined. It is pretty popular to use the on-site survey to estimate recreation-demand models. Mukanjari's (2018) paper estimated recreation-demand models for KNP using on-site survey data derived from consumer surplus estimates. Next, a regression analysis was carried out on the zones with the actual number of visitors as dependent variables. We assumed that the number of visitors would be inversely related to the travel cost. Data related to gender, age group, monthly family income, monthly personal income, academic education, characteristics of the Coxsbazar, reasons for visiting, transportation mode and travelling cost and time, and leisure time spent on the site were analysed. SPSS and Microsoft Excel were used to analyse the data. Consumer surplus and aggregate consumer surplus were calculated. For measuring the Travel Cost method, information related to all transport-related costs, including local transportation cost, transport cost from the origin of the visitor to the location, accommodation cost, and food cost on both the site and during travel, were included. Additionally, all out-of-pocket expenses such as sports and food costs, including snacks on the site, were included. However, three separate analyses are done using the shopping cost on the site, one-third of the shopping cost on the site and no shopping cost on the site.

4.3 Hybrid TCM Analysis

This research applied a hybrid travel cost method where both zonal and individual travel cost methods were used. The zonal model of the TCM is applied, whereas geographic divisions were used by calculating the distance from the site. Thus, a total of 12 zones were identified based on the distance from the site, Coxsbazar. First, districts are arranged based on the traveller's home or location. The difference of distance of 50 km was used to distinguish each zone. Then the number of visits is determined, basically the number of people who have visited the area from the location.

The observed number of visits, the actual number of visits (Vr), visits per population (Vrp) for (1 million), travel cost, and travel cost adjusting for multiple site visits were mentioned during the analysis. Vrp is calculated by considering an actual number of visits divided by the total population of that particular area. The actual number of visits was calculated by multiplying an observed number of visits and 157. The total number of visitors to the site over the four days was 46400 (as per CIPRB communication). Therefore, the sample can be converted to actual data by multiplying the number of visitors by (46400/4)/74=156.8 ~ 157. Travel cost was calculated as the average travel cost from that zone which was adjusted by considering the multipurpose visit. The individual travel cost method is used where travel cost is determined by adding the observed number of visitors and their number of visits in the last year.

4.4 Consumer Surplus and Willingness to Pay

The area finds daily Consumer surplus under the demand curve. Yearly consumer surplus is found by using Riemann Sum for the area of the trapezoid. Yearly Consumer surplus is derived by multiplying the daily consumer surplus by 365 (Tahzeeda et al., 2018). Willingness to Pay (WTP) is calculated by dividing the Yearly Consumer surplus by the number of visitors in a year.

5. Result Analysis

5.1 Demographic Information

In the first data collection phase, 74 samples are chosen through random sampling. Among them, thirty-two (32) were female, and forty-two (42) were male. However, one (1) of the male participant was physically challenged. Among the male, five (5) of them are students. Among the 32 females, 12 are homemakers, and 2 are students.

The majority of the respondents, twenty-five (25), have a maximum master's or equivalent educational level. Sixteen (16) have a maximum bachelors or equivalent education. Six (6) of them have maximum education of diploma. Sixteen (16) have maximum education up to high school completion. Seven (7) of them have completed secondary school exams. One (1) of them have studied until primary school, and three (3) respondents have very little or no institutional education.

By analysing the age group, it was found that almost 80 % of the respondents (59 respondents) are young, and their age range is between 18 to 35 years. Twenty-eight (28) of the respondents are between 18 to 25 years. Thirty-one (31) respondents are aged between 26 to 35 years. Twelve (12) of them are aged between 36 to 45 years. Two (2) of them are aged between 46 to 55 years old. Only one (1) of the respondent is over 55 years old. It is not surprising that most of the respondents are young, as the travel time is very long (around 12 hours) and the distance is very long from most major cities. Thus it is physically exhausting to travel to the site.

One of the most critical elements of this analysis is the family income per month. Thus it was analysed in the paper. Only two (2) have less than 5000 Bangladeshi Taka (bdt) family income. Nine (9) have family income between 5000 to 20000 bdt. Twenty-four (24) of them have a family income between 20001 to 50000 bdt. Eighteen (18) have family income above 50001 to 100000 bdt. Twenty-one (21) have a family income above 100000 bdt per month. Additionally, monthly personal income was analysed, and the result was striking compared to the monthly family income analysis. It was found that almost 34 % of the respondents belong to the lower or lower-middle-class group, as twenty-five (25) have income less than 5000 bdt. Twelve (12) have personal income between 5000 to 20000 bdt. Twenty-four (24) have personal income between 20001 to 50000 bdt. Twelve (12) have personal income above 50001 to 100000 bdt. One (1) respondent has a personal income of over 100,000 bdt.

Furthermore, the purpose of the visit was analysed. Most respondents visited the place for entertainment, either with their family or friends, as thirty-seven (37) of them visited the site for a family visit and entertainment. Twenty-six (26) of them visited the place with their friends. Next, six (6) of them visited the place for their official purpose, and five (5) visited it for work and other reasons.

The purposive sampling method was used in the second data collection phase, where sixteen (16) foreigners were interviewed. Four (4) of them are Srilankans, seven (7) of them are Indians, one (1) and four (4) of them are Nepalese, and one (1) of them are Afghanistani by Nationalities. Ten (10) of them are working and are job holders, whereas 6 (six) of them are postgraduate students. All these foreigners are there for job purposes or training. Ten (10) of them are between the age range of 18- 35 years, and five (5) are between the age range of 36-45 years. On the other hand, among all Bangladeshi nationalities, six ranged between age 18 to 35, 7 ranged between 36 and 45; and two (2) were over 65 years old. All of them have at least a master's. Their income and other related variables are not used for the quantitative analysis as purposive sampling was used. These people were targeted to understand their perception of the beach, and their suggestions were considered.

5.2 Hybrid Travel Cost Method

Travel cost is measured in three states. In the first case, only travel costs were calculated by ignoring shopping costs. In the second case, only one-third of the

shopping cost was included in measuring consumer surplus. In the last case, shopping cost adjacent to the beach area was included apart from travel costs. The rationale behind adding shopping costs was that most people who travel long distances tend to buy souvenirs from Coxsbazaar beach, dried fish, etc., from the beach or shops adjacent to beaches, contributing to the overall economy.

First, all 12 zones were arranged based on lowest to highest Vrp. Next, the relationship between the travel cost and Vrp was computed.

For determining travel costs apart from all relevant travelling costs, on-site, food and accommodation, and shopping costs were also considered. However, three states were identified for measuring travel costs related to shopping costs. The first state showed the relationship between Travel costs without considering shopping costs; the second state depicted the relationship between Travel costs without considering one-third of the shopping cost. The final state incorporated total shopping cost into the travel cost and showed the association with Vrp.

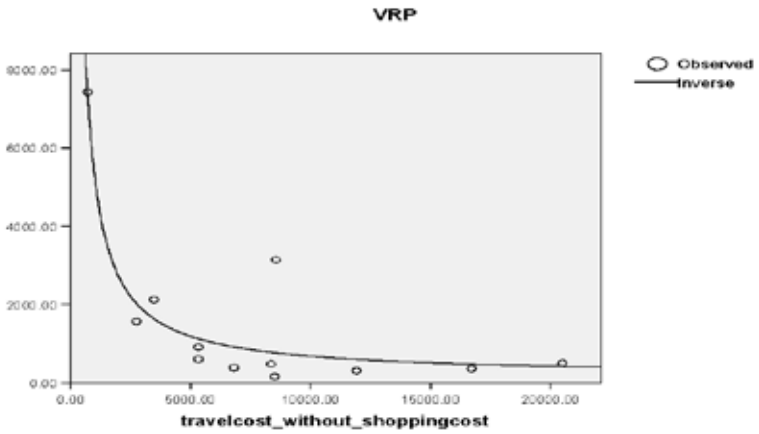
State 1: In-state 1, Travel cost without considering shopping cost was derived. Table 1below the relationship between travel cost without shopping cost and Visitation rate per 1 million population.

Table 1: Zonal model of the Hybrid travel cost method analysis

Zone	Vrp/.000001	Travel Cost without shopping (BDT)
I	160.48	8500
L	313.73	11910
K	367.55	16697.50
E	388.96	6800
H	481	8347
N	502.50	20495
J	603.85	5327.50
C	912.92	5314.31
B	1573.62	2740
F	2126.05	3465.83
M	3146.67	8550
A	7439.28	708.56

The relationship between travel costs without shopping costs and the Visitation rate per population is depicted in Figure 2. It was found that the R square is 0.846. Adjusted R Square is 0.831. It was calculated that the Yearly consumer surplus is 13477182683 bdt. Willingness to pay is 3129.15 bdt.

Figure 2: Travel cost without shopping cost and VRP



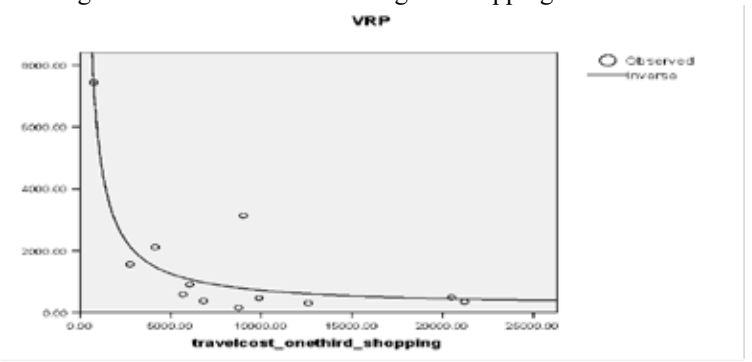
State 2: In-state 2, Travel costs considering one-third of the shopping cost, were shown. Table 2 below the relationship between travel cost considering one-third of shopping cost and the Visitation rate per 1 million population.

Table 2: Travel cost considering one-third of the shopping cost

Zone	VRP/.000001	Travel Cost with 1/3 shopping cost in BDT
I	160.48	8750.65
L	313.73	12576.67
K	367.55	21214.16
E	388.96	6800
H	481	9861.33
N	502.50	20495
J	603.85	5661
C	912.92	6043.87
B	1573.62	2740
F	2126.05	4131.89
M	3146.67	9000
A	7439.28	753.40

The relationship between travel cost considering 1/3 of the shopping cost and Visitation rate per 1 million population is depicted in Figure 3. It was found that the R square is 0.84, and the adjusted R square is 0.83. Here, it is calculated that the Yearly Consumer Surplus is 14419566992 bdt. Willingness to pay is 3347.94 bdt.

Figure 3: Travel cost considering 1/3 shopping cost and VRP



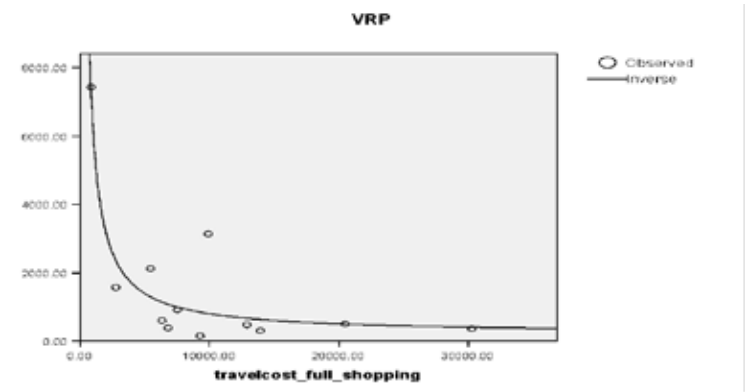
State 3: Travel cost with considering full shopping cost is explained in the state 3. Table 3 below the relationship between travel costs considering total shopping costs and the Visitation rate per 1 million population.

Table 3: Travel cost considering full shopping cost

Zone	Vrp/.000001	Travel cost with shopping cost
I	160.4818	9250
L	313.7292	13910
K	367.5457	30247.5
E	388.9595	6800
H	481	12890
N	502.4987	20495
J	603.8462	6328
C	912.9232	7503
B	1573.616	2740
F	2126.054	5464
M	3146.667	9900
A	7439.28	841.5455

The relationship between travel cost considering full shopping cost and Visitation rate per 1 million population is depicted in Figure 4. It was found that the R square is 0.83, and the adjusted R square is 0.81. Here, the Yearly Consumer surplus is 15160533122 bdt. Willingness to pay is 3519.975 bdt.

Figure 4: Travel cost considering full shopping cost and VRP



5.3 Leisure Time Analysis Concerning Income

For the study, both personal and family income were identified. Four (4) Groups were decided based on income. Group 1, or the first Group, consists of people whose income is less than 5000 bdt, including homemakers and students. Group 2, or the second group, consists of people whose income ranges between 5000 to 20000 bdt. Group3 or the Third group of people are those whose income range is 20001 to 50000 bdt. Group 4: Fourth range of people are those whose income is 50001 to 1 lac Bdt. The fifth group of people are those whose income range is over 100000 or 1 lac bdt.

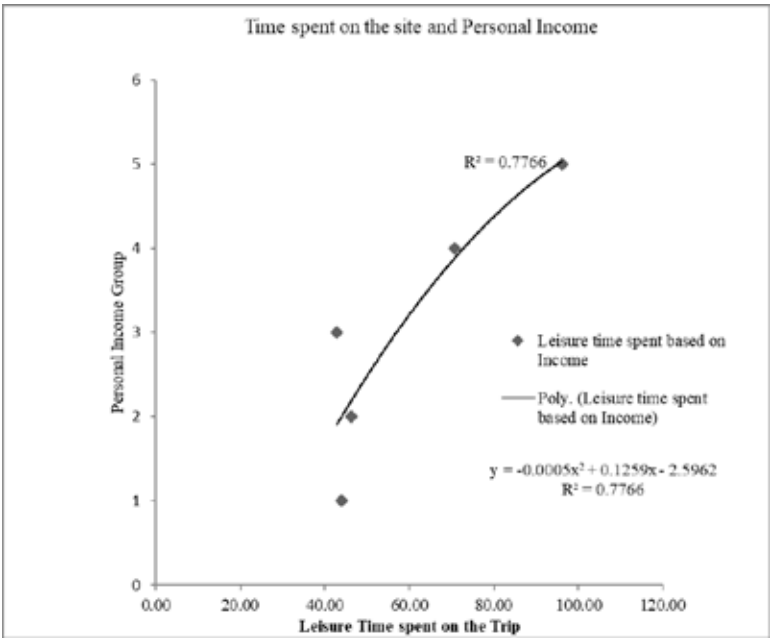
By analysing each income group with average time spent on the site, it was found that there is a strong correlation between income and time spent on the site. Higher the income range, the higher the time spent on the site. So, more time is spent on the site when the income is high. So time here was also related to income.

5.3.1 Analysis of Personal Income and Leisure on that Particular Trip

From analysing personal income with leisure time spent on that trip, it was found that more time is spent on the site when the income was higher on a single trip to the site. Polynomial regression was used for analysing the data. It was probably due to the affordability of staying at sight, as expected accommodation and food expenses were another explanation people can afford more leisure with given income or the demand for leisure is higher as income is higher. Thus leisure is an average good here.

Leisure time spent on the site in that single trip and personal income was represented in Figure 5 below where R Sqr is. 776. As shown in the R^2, about 77 per cent of the variation in the visitation rate could be explained by the polynomial regression model. Leisure time spent on the site was strongly positively related to personal income.

Figure 5: Leisure time spent on the site and Personal Income

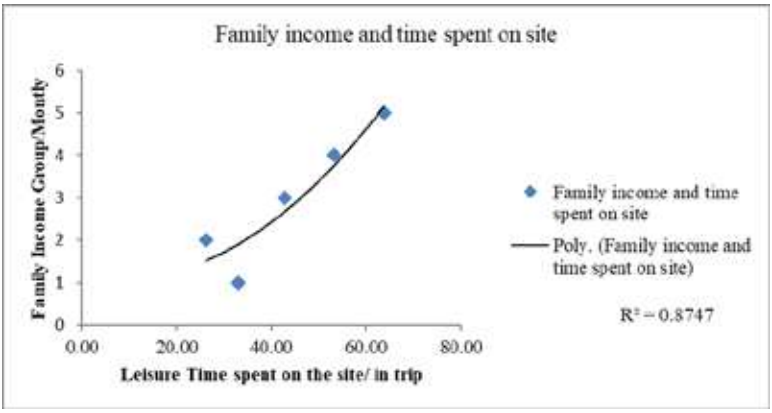


5.3.2 Leisure time Analysis for Family Income

It was found that among the visitors, many women were house-makers. Additionally, many students have a high family income, whereas their income is low. Thus family income was used to determine the only time spent on the site for the trip.

Family Income and Time spent on the site:
First, regression was done between family income and time spent on site. Below Figure 6 is represented where it was found that the R square is higher, which is 0.874. It is found from the Engel Curve of the graph that the consumer increases the demand for spending more leisure time on the site than proportionately as his family money income rises. The Engel curve for this good is upward sloping and convex downwards like the curve given, indicating it is a luxury good.

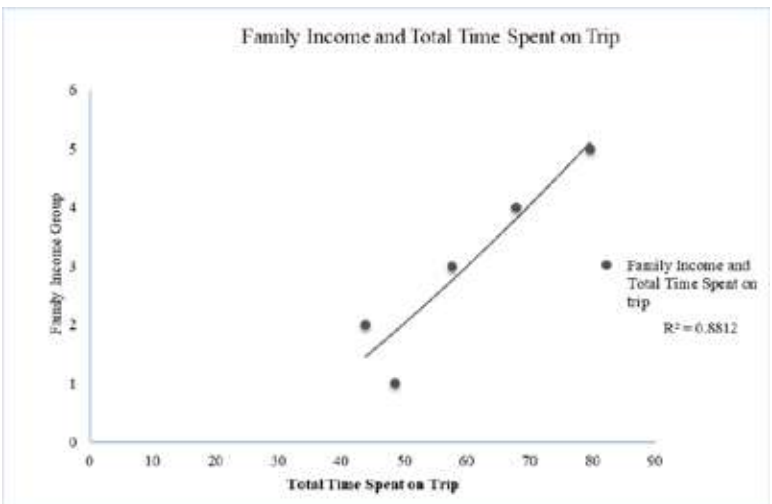
Figure 6: Leisure time spent on the site and Family Income



Family Income and Total Time spent on the trip:

Regression was done between family income and total time spent on the site. Total time spent on the visitation is calculated by considering total travelling time and time spent on the trip. Figure 7 shows the relationship between total time spent on the site and family income. It was found that with polynomial regression, the R square is 0.8812. So, there is a strong relationship between these two variables. The graph also found that as the Engle curve was almost linear, the total time spent on the site increased proportionately as family income increased.

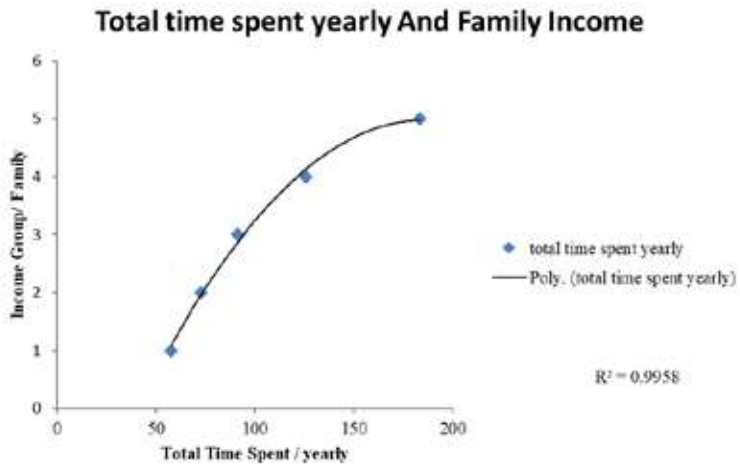
Figure 7: Total time spent on the site and Family Income



Next, in this stage, the total yearly visit of the visitors is also incorporated. Figure 8 shows the relationship between the annual total time spent on the site and family income.

It was found that the R square becomes higher with polynomial regression, which is .995. So this relationship was strongly positive. The Engle curve found that the consumer increased the total leisure time spent for the total yearly trip to Coxsbazar less than proportionately as his money income increased. Thus it can be considered a normal good.

Figure 8: Yearly total time spent on the site and Family Income



5.3.3 Analysis of Time

As income increases, the leisure time investment for the yearly trip to Coxsbazar would increase at a decreasing rate. Thus it is a normal good. However, as income increases, people tend to stay longer on the trip to Coxsbazar more than proportionately. It indicates that it is a luxury good in terms of time spent on the site. As people's income increases, they tend to increase the duration of the trip more than making frequent trips to the site. It reflects that travel time does not increase significantly with income increase.

5.4 Relationship Between Income and Total Cost

There is a positive relationship between personal and family income groups and the total cost of the trip. In this analysis, the time value of money was ignored as it might overestimate the cost of the trip. Thus, travel time was not considered a monetary cost but was calculated separately. It was found from the regression of the Family Income group, and the total cost that Adjusted R Square was 0.807 and R Square was 0.856. So a strong relationship was seen between increasing income and total cost.

5.5 Observation and Perception of the Tourist: Result of In-depth interview about the perception of the tourist and Observation

To delve into the tourists' perception regarding the beach, a total of 105 in-depth interviews were taken. It was found that most people complained about the beach's cleanliness and lack of facilities, including the shortage of clean public toilets in the area. Many tourists also complain about the security issue of the area, particularly during nighttime. Some expressed their concern related to mugging at night and eve-teasing. However, locals and outsiders are apprehensive about that area's growing drug usage, which threatens the security of the tourists. Thus there is an increasing security concern, and authorities should be more alert about these issues.

The observation method realised that the beach's cleanliness had improved significantly as many dustbins and small buckets for throwing dirt were implemented. It is also observed that the small shopkeepers on the beach are also highly concerned about the pollution of the beach, and thus while selling food (like coconut or nuts), they request the customers to throw the dirt on the bins. However, there is still much non-organic dirt, and such plastic materials are thrown in that area. Most of the international respondents stated that although the beach was beautiful, many noticeable plastic bottles were found on the beach. There was also opinion from international tourists related to that area, stating that the roads or intercity communication in Coxsbazar is not satisfactory. Tourists from Srilanka also mentioned that the goods price is higher in Coxsbazar compared to that of neighbouring countries.

It was also observed that within the last two years, CIPRB had implemented lifeguards on the main three beaches of Coxsbazar, Kolatoli, Laboni and Shugandha. In contrast, they do not maintain other significant beaches, such as Enani beach of Coxsbazar. Another international respondent raised that issue and stated that more lifeguards must be available to ensure the tourists' safety in that area.

5.6 Limitation

For this research, travel time was not considered as a monetary cost. In the modern world, most people shifted to full-time work than wage-based work. Thus, most people who visit the area have full-time work instead of wage-based work. Additionally, some people are students, and some women are housemakers with no wage or monetary income. On the other hand, travel time is also reflected in travel cost itself. Thus, a separate analysis was done to overcome this limitation where leisure time spent travelling and on the site was considered an independent variable.

6. Conclusion

This paper sets out to conduct an economic valuation to accompany a holistic analysis of the prospects of understanding the current demand of visiting the place for tourism and then projecting the future demand of tourism in Coxsbazar as

income will eventually rise in Bangladesh. People with various age ranges and incomes visit the place from the demographic profile.

By analysing the Hybrid Travel cost method, WTP and Consumer surplus were determined. By excluding shopping costs, the study found that respondents were willing to pay 3129.15 Bangladeshi Taka (bdt) and the yearly consumer surplus was 13477182683 bdt. Including full shopping costs, the study found that the amount respondents were willing to pay was 3519.975 bdt, and the annual consumer surplus was 15160533122 bdt. Finally, by including only one-third of shopping costs, the study found that willingness to pay was 3347.938 bdt, and the yearly consumer surplus was 14419566992 bdt.

The time analysis found that Leisure time spent on the site was strongly positively related to family and personal income. The consumer increased the demand for spending more leisure time on the site (luxury items) more than proportionately as his family money income rises. Thus, leisure time spent on the site is considered a luxury item. On the other hand, total leisure time spent yearly on the site can be regarded as normal. It can be rephrased that as people's income increases, they tend to prolong their duration on the trip more instead of making frequent trips to the site. Finally, it can be suggested that as many respondents have shown their concern about their insecurity and cleanliness of the beach, it is essential to take these into account for meeting the demand of increasing tourism in the area, mainly through removing the plastic pollutants from that area. As the demand for tourism in Coxsbazar will increase significantly and it will contribute to the economy of the country, thus there is a dire need to ensure sustainable tourism in Coxsbazar.

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The Significance of Sadri Language in the Socio-Cultural Context of the Oraons in Bangladesh

Shahedul Halim Kazi[*]
Mohammad Sharif Ul Islam[**]

Abstract

Ethnic languages are in danger throughout the world, which causes various effects on the socio-economic aspects of the concerned people and communities. The current article focuses on issues related to the Oraons ethnic community living in Bangladesh. To get insights into the problem, this paper takes the participants' subjective opinions to comprehend the present situation of their mother tongue in the socio-economic context they live in. The present study indicates that the use of Sadri, the native language of the Oraons, has significantly decreased over time in every sphere of their life, including schooling, social interactions, workplace communications, etc. Even in the family environment, its downward trend is also noticeable. The dominance of the mainstream language, the absence of the written scripts and linguistics practices, and the reluctant attitude of the young generation towards their mother tongue are some of the visible facets of such language decay. Besides, the lack of an ethic-language-based education policy hinders the transmission of the Sadri language from the present generation to the next.

Keywords *Oraons · Sadri · Mother tongue · Indigenous language · Bangladesh*

1. Introduction

In the 21st century, rhetoric, language diversity or the language ecology has been and is one of the most burning issues in the academic sphere and the policy dialogue (Chrosniak, 2010). The world authorities, at one end of the spectrum, are very empathetic concerning the revitalisation of the extinct languages

[*] [Corresponding author], Associate Professor, Department of Anthropology, University of Dhaka, Email: kazi.shahedul@du.ac.bd
[**] Assistant Professor, Dept. of Information Science and Library Management, University of Dhaka, Email: sharif.islam@du.ac.bd

(Penfield & Tucker, 2011) as well as the preservation of the endangered tongues (Tulloch, 2006). On the other end, the expansion of neoliberalism as the main force of globalisation imposes severe challenges for the socio-cultural diversities in the world, hence, for the language ecology too (Sharma & Phyak, 2017). As a consequence of the corporate intervention, the role of the nation-states as the main endeavour for securing socio-cultural diversities has been weakened visibly (Hodos, 2002). Unfortunately, the small ethnic communities worldwide are becoming the severe victim of the worldwide trend of monolithic cultural aggression (Precious, 2010). Consequently, the romanticism of language diversity or language ecology has become a utopia for different indigenous groups and their languages; as the extinction and erosion of minority languages continues. Previous studies reveal that in the case of indigenous languages, their assimilation into a predominant language is one of the primary reasons for the extinction of many such languages, thus the erosion of language ecology in the world (Chrosniak, 2010).

The estimated number of languages found in the world is 7,000, which most linguists would agree with (Bhuiyan, 2016; Pereltsvaig, 2012). Currently, many languages have lost their speakers as only 4% of existing languages are spoken and used by 96% of people worldwide (Crystal, 2003). However, earlier, Crystal (2003) speculated that a quarter of the world's language would be extinct within a century. Currently, around 3000 languages are labelled as endangered due to the lack of speakers, whilst about 230 languages have been completely extinct since 1950 (UNESCO, 2010). Existing studies show that globalisation, population displacement, and cross-cultural marriages are the visible reasons for this phenomenon (Faridy & Syaodih, 2017). However, many speakers of the minority languages often shift to the dominant languages, which is often regarded as a more viable option socially and economically (Isern & Fort, 2014; McMahon, 1994). Irrespective of the language's extinction, indigenous languages are probably the first to perish. Currently, the indigenous people correspond to only 6 per cent of the world's population, with over 4000 languages. One such language dies every two weeks (United Nations & Assembly, 2019). The extinction of indigenous languages undoubtedly brings irreparable loss to human society. These languages are not only the mode of communication but a preserver of knowledge, culture, and heritage that took thousands of years to flourish (United Nations & Assembly, 2019). In such a notion, this study tried to focus on the Oraon indigenous people living in Bangladesh and particularly on their language to understand the current situation of their mother tongue in the socio-economic context they inhabited.

2. Background of the Study

The indigenous languages across the world are at stake. On the one hand, different agencies and actors are influenced by the constant compulsion to ingest minority languages. On the other hand, substantial academic and policy endeavours are in place to resurgence dead languages and prevent endangered tongues' decay. These

endeavours, first and foremost, search for the relevant factors or forces that cause survival adversity for the indigenous languages. Considering that, the current study aims to investigate the use and significance of the 'Sadri', one of the indigenous endangered languages spoken by the Oraons. They live in the Mukdadpur Village of Bangladesh. Hence, the study's key research question is: What factors *influence the declining use of Sadri? An additional question is: How do they sense the enduring importance of their mother tongue in their life?*

As the current study stresses the Oraons and their native language (s), a brief presentation on them is essential to comprehend their ethnic origin. The debate lies on the racial and linguistic origin of the Oraons. Some anthropological studies have claimed them Austric is a race, and linguistically they are Dravidians (Taru, 2007). The Oraons first originated in the Indus Valley, dated back to 3500 BCE, and over time they have moved into different parts of the Indian subcontinent (Taru, 2007). The present habitat of the Oraons includes; Bangladesh, Nepal, Bhutan, Pakistan, Sri Lanka, Bihar, Jharkhand, Chattisgarh, Assam, Andaman and Nicobar, Tripura and Orissa, Paschim Bangla (Wes Bengal) in India (Giménez, 2017; Taru, 2007). However, there is no concrete data regarding the arrival of the Oraons in Bangladesh. Still, during the 1765-1947 period, there had been an Oraon influx from India to Bangladesh that most scholars in the field agree with (Barakat et al., 2009). The present population of Oraons in Bangladesh believes to be around 85,041. They live mainly in the Varendra Region of Bangladesh, whilst the highest number of Oraons reside in the Naogaon district (Taru, 2007); the researchers choose Mukdadpur Village as the field of the study. As to the senior Oraons in Mukdadpur, their ancestors migrated to the current location from India but could not tell exactly when the movement occurred. Although, few speculated that it might have happened before the end of the British period.

Distinctively, the Oraons call themselves Kurkhar (Tirkey, 2015), and their native languages are known as 'Kurukh' and 'Sadri' (Islam, 2014). Kurukh is categorised as the Dravidian language (Tirkey, 2015), while Sadri is classified as the descendent of Indo-Iranian languages, a blend of Kurukh, 'Farsi,' Urdu, and Bengali. Sadri is conceptually considered a mixed language by linguists (Islam, 2014). However, most Oraons live in the Varendra region, and the research set up for this study only speaks Sadri, though the influence of Bengali on them is enormous.

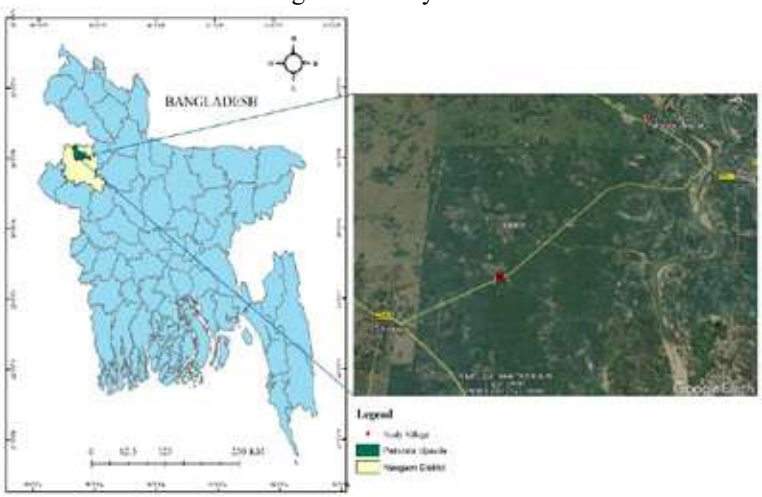
Various factors affect the sustainability of a language in general. Similarly, there are several domains by which a language and its general practices can be maintained for a language to survive. These domains include; family, school, neighbourhood, friend circle, workplace, and religion (Mirvahedi & Jafari, 2021). Once a language loses its use within these domains, it falls into a peril to survive. The practitioners of many minority languages nowadays need to compromise with the use of native tongues, as its use in many respects cannot cope with the existing socio-economic context of the surroundings. The current study has an explicit

submission to this fact. In line with some other studies, for instances; (McMahon, 1994; Isern & Fort, 2014; Setiawan, 2020; Mirvahedi & Jafari, 2021), the current research reveals that the overwhelming domination of the mainstream language threatens the coexistence of Sadri; the mother tongue of the Oraons in Mukdadpur.

3. Methodology and Fieldwork

From a methodological point of view, this is a qualitative study based on observation and in-depth interviews. The data for this empirical study was collected from Mukdadpur Village, situated in the Patnitala Upazila of Naogaon District, one of the Varendra districts in Bangladesh (*Figure 1*). Observation and interviews have been used for this study as they are the major components of qualitative research and are widely used in different field-based studies (Miles & Huberman, 1994). Observation is usually a cover-all for much of what is sensed in the field. In the current study, observation helped to witness the demographic composition of the studied village on the one hand and its economic structure. It has been observed that most of the inhabitants in Mukdadpur are Oraons, followed by a few Bengali Muslim families who own most of the assets, power, and prestige. Besides, observation interviews also played a crucial role in this current study as interviews are the primary research tools that channel the opportunity to know things that the researchers could not know otherwise (Holy & Stuchlik, 1983). More distinctively, an interview allows the interviewer to immerse themselves intimately in the life of the people who are the subject of an inquiry. Everyday experiences and their expressions concerning the question are the goal of a researcher to attain through interviewing people (Skinner, 2012). As the present study aimed at investigating the current status of the Oraons' language and its daily uses in the socio-economic structure of Mukdadpur, interviewing them has been found as an effective tool to comprehend the subject matter precisely, thus come up with the relevant findings. A total of 30 males and females were interviewed using semi-structured questions and were selected purposively. The data's nature is in-depth and relies on the conversational style rather than the face-to-face encounters manner (Skinner, 2012). The average duration of each interview was roughly an hour and fifteen minutes, and the data gathered through interviews were written on the paper. The interview data have been analysed, interpreted, and evaluated narratively, taking the respondents' subjective viewpoints. Relevant verbatim taken from field notes were quoted while deemed appropriate in the data analysis process. Recall error was minimised by using the culturally appropriate local language.

Figure 1: Study Area



The fieldwork of the study was held in two periods. The first phase, which lasted from 26 October to 3 November 2020, was devoted to selecting the study village, followed by seven pretests. And the second part, which lasted from 1 to 17 January 2021, stressed observation and interview. In this study, the name of the participants and the case village has been kept anonymous. The interlocutors were told about the purpose of the study before the beginning of the interview, and those who wanted to participate willingly were incorporated into the study. Considering the ongoing pandemic, necessary safety measures were maintained to avoid health risks.

The researchers had to use a connection to conduct the fieldwork, limiting the chance of an open inquiry. Nevertheless, this form the guaranty of not being hassled as a stranger in an unknown place. If the study could include more villages rather than one, whether that would have influenced the findings of the study or not, but previous research suggests that commonness in the rural villages of Bangladesh exists in all aspects (Toufique & Turton, 2002), incorporating more villages, per se, probably would not have affected the study. Taking the interviews other than the participants' mother tongue would have seemed questionable. However, the connection who accompanied the researchers to the field was an Oraon and fluent in both languages (i.e., Bengali and Sadri). If needed, he could play the role of an interpreter. However, none of the interviewees had a problem communicating in Bengali.

4. Findings of the Study

4.1 Socio-demographic Information of the Studied People

As shown in table-1, a total of 30 Oraons were selected for this study; 21 males and nine females. Most respondents were married and lived in joint families consisting of 5 or more members. Hinduism currently dominates their religious beliefs, whilst

an increasing number of the villagers are converted to Christianity. More than a half (53.3%) of the respondents are literate. In contrast, a moderate number (16.7%) remain illiterate; the rest can only sign their names. The male interviewees mainly earn their livelihood through peasantry and agricultural labour. The female primarily works in household chores, but working as agricultural labourers is also common. The monthly income of most respondents' (46.7%) and their families range from 5000-10000 BDT, while a considerable number of interlocutors' (36.7%) family incomes are less than 5000 BDT.

Table 1: Socio-demographic data of the respondents

Variables	Categories	Number
Sex	Male	21
	Female	9
Age	≤ 18 years	4
	19-49 years	16
	50 and above	10
Marital status	Married	24
	Unmarried	6
Number of Family Members	3	6
	4	11
	≥5	13
Religion	Hindu	25
	Christian	5
Education	Literate	16
	Can sign only	9
	Illiterate	5
Monthly income of the family	<5000	11
	5000-10000	14
	11000-20000	4
	Do not Know	1
Profession	Peasant + Agri labor	16
	Housewife + Agri labor	6
	Public representative (UP member)/Politics	1
	Student	6
	Missing	1

4.2 Language (s) of the Oraons in Mukdadpur

The Oraons living in Mukdadpur are mostly bilingual. All the interlocutors of this study found equally commendable with both in their mother tongue (Sadri) and Bengali. Sadri is widely used to interact with the same ethnic people daily. Although Sadri is the native language for the Oraons living in the village; however, many failed to mention its name when they were asked about their mother tongue. Some called it 'Oraon language' while others said it 'Adivasi Bhasha' and 'Banua'. It is worth mentioning that out of the 30 interviewees, the majority (10 interlocutors) mentioned it as Oraon language' followed by Adivasi Bhasha (6 interlocutors) and 'Banua (2 interlocutors).

In contrast, only eight interviewees rightly mentioned the name of their mother tongue as 'Sadri', and the remaining (4 interlocutors) did not know its name. Unlike the name, most of the respondents agreed about the absence of any specific alphabets for their language, whilst several interviewees did not know whether they had any particular alphabets. It was found that the Oraons use Bengali alphabets for their written communications.

4.3 The use of Sadri in Different Social Domains

The findings revealed that the daily use of the Sadri among the Oraons in Mukdadpur is confined only to the family and own community. In contrast, the use of their mother tongue is unattainable or quite limited at school, within the friend circle, among neighbours, at workplaces, and in religious practices. As to the interview data, none of the educated participants was fortunate to practice their languages at schools as Bengali was the only medium of education which has been illustrated by a 17-year-old respondent, who said:

> *"Although there were several Oraon children at school, in my class, I was the only student from my community while attending the primary and high school. At the school, I had to keep speaking in Bengali the whole day to interact with the cohort. Once I returned home, I got puzzled about whether to speak in Bengali or Sadri. Sometimes, I felt the urge to use Bengali in the home environment to develop my Bengali language skills, as I believed knowing Bengali well would help me a great deal to cope with the school environment. Now, I am a college student, and my Bengali language skills have improved over time compared to my school days. Consequently, the space for practising Sadri has become even narrower, and nowadays, I am more habituated to communicating in Bengali than in the earlier days. However, people can still make the difference between the native speakers of Bengali and me, as my accent is rather different from theirs."*

The villagers having school-going kids mentioned that their offspring have become reluctant to speak Sadri even in their home environment. They perceived Sadri as an inferior language when compared to Bengali. A 30-year-old Oraon man from Mukdadpur takes this issue forward, who claimed:

> *"My son is in primary school, and he spends a long hour there every day. Once returned home, he completely avoids using Sadri and gets angry if we try to speak with him in it. His attitudes often compelled the others in the family to keep speaking Bengali with him."*

Most studied Oraons in Mukdadpur village are small peasants and agricultural labourers. They mainly work in their own village or the neighbouring villages to earn ends meet. Few graduates also seek a job in the government or private sectors and are willing to stay outside their village. In extreme cases, such as during the lean seasons, these people are forced to manage their livelihood through 'rickshaw-van pulling'. However, the Oraons must work under or with the Bengali-speaking people in all cases. The situations compelled them to avoid speaking their mother

tongue for a considerable time at work. Two respondents give hints about it. For instance, a 40-year-old respondent explained:

> *"Most of the year, I work as an agriculture labourer. The employers (Girosto) I work for are mostly Muslims and speak Bengali. Being illiterate, I did not go to school and have learned to speak Bengali through working for employers. Since childhood, I have realised that I must learn to speak Bengali to manage my living."*

While conducting the fieldwork, a 27-year-old female university graduate from Mukdadpur added:

> *"I am a university graduate living in an extended family that includes my husband, an underaged son, parents-in-law and a mentally challenged sister-in-law. After graduation, I tried to find a respectable job in the government and non-government sectors. Still, all my endeavours were unsuccessful due to my lack of proper knowledge and skills in Bengali. Currently, I work as agricultural labour to support my family. All through my life, I have regretted not learning Bengali well. To avoid this mistake, I have kept my eyes on my son to learn Bengali like a native. Thus, I always talk with him in Bengali and encourage all the family members to do the same. I wish my son would not have to face the same fate as me and live a better life."*

Bengali neighbours mainly inhabit the Oraons in Mukdadpur. Nevertheless, the neighbouring villages also have Santal, Rajbangsi and Pahan communities. People belonging to all these ethnic groups including the Oraons need to interact with each other for their daily life and leisure. During social interactions, they use Bengali as a common language to communicate and hardly use Sadri. An expression of a 52-year-old interviewee can be cited here as an instance:

> *"For leisure, I often go to the nearby bazaar, where I meet friends from different ethnic communities besides Oraons. If I keep speaking my mother tongue, then only the other Oraons would understand, not those from other language communities. Therefore, I have no option other than speaking Bengali."*

Although the women in Mukdadpur seldom go out of their village for leisure, having friends and neighbours from other ethnic groups is not rare. These interethnic friendships give them the pleasure of amity against a stereotyped social life. In such situations, the most convenient way of communicating in Bengali, as illustrated by a 35-year-old woman who mentioned:

> **"***I have several friends and neighbors from other ethnic communities who resided both in our village and the neighbouring villages, whom I mostly met during my school and college days. We still keep in touch and often meet each other during our leisure time. We generally chat in Bengali while having such interactions."*

Religion is one of the most important social institutions that is often viewed as a significant source of social solidarity. The most common traditional religious activities of the Oraons are; 'Karam Puja', 'Sharul fest', 'Goyal Puja' etc. Traditionally, these celebrations, specifically the recitation of such religious

verses, were conducted in the Sadri language. However, these celebrations are constantly reducing their distinctions over time and to the glory of the Sadri language. In addition, most participants of this study currently believe and practice Hinduism. They mainly use 'Sanskrit' and 'Bengali' in their religious practices. A few remaining participants practice Christianity and use Bengali along with English for their spiritual engagement. Two cases can be heard concerning this. For instance, a 16-year-old boy illustrated:

> *"Although most of the inhabitants in our village are the believers of Hinduism; however, many traditional religious practices still exist. For instance, Karam Puja has been and is observed by everyone, while some also practice Sharul fest and Goyal Puja. Nonetheless, these trends are declining gradually due to the influence of Hinduism and Christianity. As the practitioners of Hinduism, during the religious happenings, most of us sit and attend the priest's recitation (a Brahmin). A priest usually uses Sanskrit and partly Bengali while conducting the religious events."*

Another Oraon of 20-year-old from Mukdadpur said:

> *"The Oraons who practice Christianity in the village, including me, are the converted Christian. All the religious rituals and happenings here are maintained and administered by a 'father' who is not an Oraon. Besides, in most cases, the father speaks in English or Bengali for all the recitations. Sadri is never used in any sequence of such religious happenings."*

4.4 The Significance of Sadri among the Oraons

The data from the studied village shows that Sadri is more used by the individuals who spend most of their time within the community than the outgoing individuals. Hence, the Oraon women and the elderly Oraons have a greater chance to use their mother tongue than the others. A 47-year-old Oraon woman in the study village illustrates it, who mentioned:

> *"Nowadays, I spend most of my time in the village as my husband and sons can manage our livelihoods without my participation in the economy. I manage household activities and mostly interact with other women in the village. However, earlier I used to work in day labour and had to interact with Bengali communities as all my employers were Bengali. Therefore, the chance to practice language was limited to the family environment only."*

The finding explicitly indicates that all interviewed Oraons felt more comfortable speaking in their mother tongue than Bengali. They find it difficult to express their emotions and feelings in Bengali and also struggle to learn its suitable accent. Two individuals mentioned below illustrate their internal conflict of language use. For an example, a 23-year-old Oraon said:

> *"I have always struggled to learn Bengali as a second language. I knew I had to learn Bengali to sustain and get a respectable life; thus, I started learning it during my school days. Still, sometimes I lose control over Bengali and start mumbling when expressing my feelings. If I had the opportunity to speak Sadri in all the social spheres, that would make my life much easier."*

The expression of a 50-year-old Oraon woman can be added here as another instance:

> *"I am always concerned about the correctness of the language. In earlier days, when speaking Bengali, I always remained conscious of whether I was speaking it correctly. Hence, I spend more time constructing the sentences. Usually, I think in our language first and then give the verbal expression in Bengali. Fortunately, I do not have to stress too much about the Bengali language as I am getting older and spending most of my time within my community. Nowadays, I feel more relaxed and comfortable not speaking any language other than my own."*

It was found that any prominent literary publications did not use Sadri. The Oraons do not have any particular literature or books that can be presented as artefacts of their language and ethnicity. Few Oraons mentioned a couple of pamphlets regarding their ancient religion and Sadri words that they claim as the only written materials. The oral version of Sadri mythologies and stories are practised by the older men and women in the community through performing poems, rhymes, and songs occasionally. However, these practices are also getting less and less important among the new generations, as hinted by the number of interviewees. Expressions of two Oraon villagers from Mukdadpur are given here for clarifications. For example, a 19-year-old girl mentioned:

> *"I go to school and can read and write Bengali fluently. In school, I read many novels, poems, etc., written in Bengali. However, I do not get any literary works written in Sadri. I think we must produce written volumes of our mythologies and folklores in our own language."*

Reversibly, a 57-year-old man gave his opinion from a different angle, who illustrated:

> *"The young generation of Oraons nowadays spends a lot of time outside of their own community and pursue various alternative sources of recreation. Many spend a significant duration with mobile and digital technologies. They have little interest in Oraons' mythologies or other sorts of folklore that has been passed from generation to generation through oral communication. However, the written form of the Sadri language could have helped the young generation practice their culture and heritage. Still, the youths should not ignore taking care of the Oral form completely, as it is aligned with our identity."*

5. Discussion

The Oraons living in different parts of the country speak 'Sadri' and 'Kurukh' as their native languages (Taru, 2007). Nevertheless, the studied Oraons only speak 'Sadri' as their mother tongue and cannot talk or communicate in 'Kurukh'. In the quest to understand the general linguistic use of Sadri in the Oraons' life, this study invests a significant amount of time with the studied participants to explore different phenomena of langue use. For instance, the use of 'Sadri' in education,

the workplace, religious events, and socialisation was under careful examination. Moreover, specific importance has been given to exploring the use of native language in their home and family environment. The significance of 'Sadri' among the Oraons and the literary practices based on the language were also under the scope of this study.

Although school is an effective place for children to learn and practice their mother tongue (Panda, 2012); however, the studied Oraons children are deprived of such privilege. For instance, the Oraons' children were compelled to receive education in the mainstream language other than their native language, i.e., Bengali. Not only among the studied population but globally same scenario exists as around 40 per cent of ethnic children do not get an education in their native languages (UNESCO, 2016). In different Oraons inhabited localities in India, such as the central and eastern part of that country, the minority children are compelled to get their education in 'Hindi', 'English' or other state languages rather than their own language (Froerer, 2011; Xalxo, 2018). It is evident from the current study that the Oraons children must undergo bilingualism to get a proper education. Bilingualism is a process that involves two language acquisitions in children by the parents or the environment (Iriani, 2018). Bilingual education is quite common but debatable. Some speculate it will hamper the child's first language, the school dropout rate will increase, and the school failure and so on (Madarova, 2020).

In contrast, a recent systematic review paper on the domain reports favours bilingualism when considering cognitive control. According to the article, more than 50 per cent argued in favour of bilingualism on cognitive control task issues; over a quarter showed mixed intention toward such a claim and little over 17 per cent denied this (van den Noort *et al.*, 2019). A study in Spain illustrates the higher the level of bilingualism, the greater the creativity is and vice versa (Sampedro & Peña, 2019). However, many researchers believe that bilingual instructions alone are not enough to foster better classroom performance, creativity, or cognitive control; instead require a holistic approach, where parents, teachers, and the environment has to play their part (Djahimo & Indahri, 2018; Hopp et al., 2019). In such a scenario, the Oraons school-going kids in Mukdadpur spend a significant amount of time in a monolingual environment without practising their own language, along with the anxiety of the mainstream language. The quality of the education and support in the school they get is also not out of the question. They are also conscious of using the Bengali language properly, explicitly emphasising the accent. Thus, they spend more time practicing this language, sometimes even in their home environment. Therefore, it could be speculated that these kids are slowly isolated from their language ecosystems and could become more conscious of adopting the state language per se, 'Bengali'.

The study finding indicates that the Oraons use Sadri in their home environment with some demographic variations. For instance, the younger generation is less engaged in using Sadri in their home than the older generation.

A study conducted in Indonesia also identified a similar trend as the younger generation is more towards adapting state language and somewhat reluctant to their ethnic language. However, the older generation still possesses much respects their heritage language (Setiawan, 2020). In the context of our study, the older generation is also more respectful concerning the use of the mother tongue than the younger counterpart. However, some parents these days encourage their offspring to speak Bengali more, even in their home environment. The most visible reason for such practice is the belief that mainstream language learning will improve their socio-economic condition and open more windows of opportunities in every sphere of life, including education, job, finance and social life. Such a belief is not unique among the Oraon indigenous people in Bangladesh. As a recent study based on the city of Zanjan in Iran highlights, the Azerbaijani-speaking population has a deep attachment to their ethnic language. However, they still promote the state language, 'Farsi', in their home to get various institutional and social support (Mirvahedi & Jafari, 2021).

Most of the males who studied Oraons in this study earn their livelihood through peasantry and agricultural labour. Besides homemaking, the Oraon women also work as day labourers in the farm field. The findings reveal that the Oraons work under the Bengali households and require maintaining commination exclusively in Bengali during work. It is unknown from this study regarding workplace discrimination among the indigenous Oraons in terms of wages, employability, etc. However, a broad spectrum of research suggests worldwide ethnic inequality exists in the labour market (Van Laer and Janssens, 2011; Quillian *et al.*, 2019). Although previous studies did not find any association between ethnic language and workplace discrimination (Thijssen, Coenders & Lancee, 2021), this particular study found some association between ethnic language and workplace discrimination. For instance, one of the educated female interviewees claimed that despite having a master's degree, she could not get any respectable jobs due to her lack of proper skills in the mainstream language, Bengali.

In the case of socialisation, Oraons encounter their communities and other adjacent small minorities and Bengali people. In such situations, they speak Bengali as most people in that area can understand and speak it. The evidence from the current studies indicates the Oraons accent of Bengali language varies in different degrees when compared with the local Bengali origins. It sometimes could make them inferior to compare with the native speakers. These variations in language skills, along with the distinctive culture of the Oraons, could play a role in the general socialisation practices. However, in socialisation, whether the small minorities, including the Oraons, possess an asymmetrical power relationship with the mainstream Bengali-speaking people or not is a question of further research.

Besides work and education, Sadri is not widely used even during religious practices. Most of the Oraons are believers of Hinduism, followed by Christianity. It is evident that during different religious ceremonies, 'Sadri' as a language is

entirely disregarded. A similar trend can be traced in various studies. For instance, one of the minority groups in Iraq uses the mainstream language rather than their ethnic language during worship (Dweik, Nofal & Al-Obaidi, 2019).

Most interviewees show deep respect and love for their language and culture and want to preserve and practice their language. However, the absence of literary forms of Sadri language makes things complicated and their urge to preserve it more difficult. Besides, literature is a powerful tool that preserves culture and traditions. A scarcity of literary works in specific ethnic languages might threaten the associated groups to lose their inherent values, culture and traditions, precisely the case of many African languages (Sunday Bagu, 2021) and the case of Mukdadpur, where they merely have any written literary works.

6. Conclusion

The indigenous Oraons discussed in the current study have lived in Mukdadpur for generations with distinctive cultural values, livelihood patterns, and linguistic identities. Over time, their integration into the broader society has given birth to various challenges for their survival as a self-determining ethnic group. There is no doubt. However, in many respects, that particularly their economic survival compelled them to compromise with their distinct cultural values. In this study, such a 'tradeoff' has become a reality for the Oraons in Mukdadpur. Consequently, using their mother tongue has observed a paradigm shift, and Bengali has become an integral part of their linguistic practice.

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Dynamics of Dichotomy and Conflict in Religion and Education: Historical and Current Context of Bangladesh

Kazi Sameeo Sheesh*

Abstract

Along with the Indian subcontinent, Bangla can be called home to a diverse practice of religion. The people of the ancient Bangla had different beliefs and offered worship in various ways. This study aims to overview the spread of the major religions and their political and educational dynamics in this region. This paper covers five sections: Religious Demography in Bangladesh, Dynamics of Dichotomy and Conflict in Religion: Historical and Current Context, Islamic Discourses in Bangladesh, Education System and Religion in Bangladesh, Religious Education and Conflict in Bangladesh. Historically religious texts and customs, the sense of purity, and priests played a role in shaping the power structure for livelihoods. During the pre-Aryan period, social divisions were drawn along professional lines in this territory. After the Aryan infiltrated Bangla in the first millennium BCE, the caste system was introduced. There remains historical evidence of the dichotomy between language-based Bangali nationalism and religious practice in this territory from Pre-Aryan (before 1500 BCE) to the Pre-British Period (1757CE), in which conflicts remain elusive. It reflected the existence of class division and strategies to justify the oppression of people in Bangla. This paper stresses the issue of (non-) access to education for an oppressed class of population and its potential for conflict. Describing the conditions between religious identity and education, conflicting factors, manipulation of texts, denial of education, segregated education to ensure inequality and lowered esteem prevailed here.

Keywords *Conflict sensitivity · Nationalism · Untouchability · Caste system*

1. Introduction

To understand the dynamic of Islam, education and religious conflict sensitivity in the Bangladeshi context, one needs to comprehend the long-inherited customs,

* Senior Research Fellow, Center for Advanced Research in Arts and Social Sciences (CARASS), University of Dhaka, Email: sameeo@gmail.com

traditions, rituals and nature of religious belief and practice in this territory from ancient Bangla[1] to the present day. The Indian religions, Hinduism and Buddhism, originated here and evolved in the ancient Indian subcontinent of which Bangla was a part. Two Semitic religions, Islam and Christianity, entered Bangla with the intervention of foreign powers and saints. Because of centuries of contact and cultural and socio-political interaction, the social and religious life of the Muslims profoundly influenced the life of the indigenous or Sanatan religion, which, in many cases, is identified as Hinduism. In that same manner, some Hindu practices seeped into the lives of the Muslims (Karim 2012, Mukherjee 2012). Again, in the name of religion or religious identity, this land has experienced events like riots, partition and other forms of hatred-fuelled conflict.

This paper discusses religion and education concerning conflict sensitivity in the Bangladeshi context. This paper covers five sections: Religious Demography in Bangladesh, Dynamics of Dichotomy and Conflict in Religion: Historical and Current Context, Islamic Discourses in Bangladesh, Education System and Religion in Bangladesh, Religious Education and Conflict in Bangladesh.

2. Dynamics of Dichotomy and Conflict in Religion: Historical and Current Context

Here, I will not illustrate a detailed or chronological history of Bangladesh. I am highlighting the relevant incidence of the history for the arguments on the political dynamics of religious conflict.

2.1 Pre-Aryan (before 1500 BCE) to Pre-British Period (1757 CE)

The ancient religious system in Bangla gravely presented the idea and image of ghosts, witches, gods, goddesses and demons. Such religious beliefs and practices reflected the livelihoods in a plain land with the deep forests, numerous rivers, and water bodies and their influence on daily life (Haque 2003, 23). During the period when Aryans spread in the west part of this territory, Narayan (Bishnu) and, in the eastern part (current Bangladesh), Shib were the main gods to be worshipped (Haque, 2003, 28). Here, it is noticeable that since the pre-Aryan and Aryan periods, there was a form of east-versus-west division in religious practice in this region (Khan 2012, Hossain 1992, Sharif 2010). Moreover, historical evidence remains on the dichotomy between language-based Bangali nationalism and religious practice in this territory. Surprisingly, these conflicts remain elusive.

[1] In this paper, I adapt the nouns/names as par the phonetics in Bangla language. For example, I use the words like Bangla, Bangali, Ballal Sen, Chattagram, Shib, Bedic, Dharmo, Bishnu, Rudro, Mahadeb instead of Bengal, Bengali, Vallal Sena, Chittagang, Shiva, Vedic, Dharma, Vishnu, Rudra, Mahadeva (as I think these sound reflect more Euro-hegemonic), unless I quote or refer from other's writing.

2.2 Aryan and Caste System in Bangla: Religion Texts and Hierarchy

Haque (2003) asserts that during the pre-Aryan period, in this territory, social divisions were drawn along professional lines, while, after the infiltration of the Aryans into Bangla from the first millennium BCE, the caste system was introduced. The early Vedic Aryans perceived this land as an unholy place where people were 'sinful barbarians' (Islam 2011). There remained a restriction to entering this territory, although, later, by the 500 BCE, Aryans took the then kings of Bangla seriously from the military point of view (Islam 2012). The Aryanisation of the subcontinent, including then-Bangla, led to a conversion of the division of labour-based *barna* system into a hierarchical *jati* order (Haque 2003, Basu 2012). So, the infiltration of the Aryan religion started an institutional process to form division based on religious identity from birth.

However, the caste system in Bangla was not a stereotypical practice; they have different dynamics on them. The *Purus Sukto* hymn of the Rig Beda grounded the religio-cultural justification of the hierarchical caste divisions based on the four-fold *barna* system (Basu 2012). The Aryans grouped themselves into Brahman, Ksatriya and Baishya. They assumed the responsibilities of performing different 'important work' types, whereas the non-Aryans and natives were made Shudra and allotted physical labour for the services of the higher castes (Bala 2012). At the top of the hierarchy, the Brahmans were considered the purest, believed to embody sacredness, and regarded as gods on earth. The Kshatriyas (military men) and the Baishyas (business class) enjoyed lesser purity. The Shudras mainly occupied the lowest rung of the social order. Generally, the Shudras were extremely poor and treated as untouchables. They have little access to sanitation, housing, healthcare, and education facilities (Bala 2012, Basu 2012).

2.3 Politics of (un-)touchability

Even within the Shudras, there was division. Shudras were divided into two broad categories: one, *Sat Shudras* (higher caste could accept food and drinks from them) and *Asat Shudrasa* (they were untouchables, and their touch was considered pollution) (Basu, 2012). Here, the critical question is, what are the reasons for this distinction?

History provides evidence of the politicisation and exploitation of the 'title' of the caste by the ruling class to gain their vested interests. During Ballal Sen's (1159-1179AD) period, different transformations in the caste system, both for the lower and higher order, did occur for political, economic and social reasons. Ballal Sen introduced *kulinism* in Bangla (Basu 2012, Misra 2012, Bhattacharyya and Ray 2012, Haque 2003), though some historians might differ on this (Misra, 2012, Bhattacharyya and Ray 2012). The Brahmans who did not show obedience to his rule were 'de-castified' (*Obonoyon*), and those who did support him got the *kulin* class. For example, the Brahman sect *Subarnbanik* was 'degraded' to Shudra's level, and *kaibart, Nalakar, Kumbhakar,* and *Karmakar* were 'upgraded'

as *Sat Shurada* by the King Ballalsen (Basu 2012, Misra 2012, Talukdar 2011). The underlying story is that during the ruling period of Ballal Sen, Ballavando was a rich businessman or *banik*. The treasury of Ballal Sen faced a crisis due to maintaining the cost of a long-term war against the king of Udantapur. Ballal Sen sought loan to Ballavando. Ballavando agreed with one condition; he demanded the right to collect the tariff of the 'Harikal' state. Ballal Sen became angry and captured Ballavando's property and tortured him. Moreover, his caste status was degraded from Brahman to Shudra, and he forbade the priests to participate in any rituals offered by the *Subarnabanik*. Conversely, Baniks also started to provide a higher salary for employers to work for them to avenge this. Thus, the higher caste Hindus faced a crisis getting people to serve them. Thus, Ballal Sen was forced to upgrade *Kaibarta, Malakar, Kumvakar* and *Karmakar* to upper caste as Sat Shudra (Talukdar 2011).

Again, subalterns (here, the lower caste population) were not a homogenous group. The politics of exploitation of the subalterns remained in the Vedic age (likewise today) by the people of higher social and political order (today, we may call them power-hungry 'politicians') to serve their vested interests. One of the powerful instruments to do this is using the 'religious custom' and its application to weaken their antagonist or 'other' party. Here, a common phenomenon is identifying or defining them as antagonists and their activities as 'antireligious' (for instance, so-called 'Nastik', 'Murtad' etc.) and legitimising the oppression and exploitation against them. It indicates how the development and use of the caste system and marginalisation process occurred in Bangla using religion-based power politics.

Historically, religious texts and customs, the sense of purity, and priests shaped the power structure for livelihoods. It reflected the existence of class division and strategies to justify the oppression of people in Bangla. Moreover, I stress the issue of (non-) access to education for lower caste people. Therefore, the conditions between conflict and education, such as manipulation of texts, denial of education, segregated education to ensure inequality and lowered esteem prevailed here (Bush and Saltarelii 2000). Even today, Islamic discourse, whose power dominates the production of the texts, remains relevant to analyse the role of texts and interpretations by readers to construct sensitivity towards religious conflict.

2.4 Conversion of Religious (Muslim) Identity and Class Position

Why is the number of Muslims in the eastern part of greater Bangla, currently Bangladesh, higher vis-a-vis most of the territory of the Indian subcontinent-even the western part of Bangla? Is there any link between marginalisation and conversion to Islam? These are the relevant questions for this section.

The Muslim people in Bangla inherited class differences. Historically, Muslim people in this territory can be differentiated into two major social classes, Nobles (Ashraf) and commoners (*Atraf*). The so-called nobles (*Ashraf*) are migrants from

northern India (mainly from nearby Bihar), and their tongue is Urdu, which is one different factor in setting themselves apart. The commoners (*Atraf*) are the indigenous Bengali population. Before Islam came into this territory, like in other parts of India, Bangali people were identified as Hindus (Eaton, 2001). A caste system prevailed there at that time. The upper class of Hindus was oppressing the scheduled caste people. History shows that when Islam entered, a group of the Hindus affiliated with the scheduled castes, formerly called untouchables or *Harijans* (Gandhi called them children of God), were converted to Islam (Eaton 2001). It must be noted that conversion of the Bangali populations to Islam did not only occur by the sword, as has been alleged sometime (Khan 2012, Hossain, 1992, Karim 2012). Historian Richard Eaton (2001) identified that several economic factors played an important role in widespread Islam in Bangla in the 17th century. The Ganges River's gradual eastward shift opened up forest lands to the outside world, supporting agricultural development. The Sufi saints built mosques and shrines that formed the nuclei of hundreds of new agricultural communities. This helps spread a liberal version of Islam to the inhabitants. At the same time, economic prosperity under Muslim rule was brought by the region's integration into the world economy through the export of textiles. These socio-economic forces influenced the indigenous people to convert to Islam (Eaton 2001).

Hence, several things need to be noted here. The elite Muslims (the *Asraf*) kept a social and cultural distance from the indigenous people. The immigrant Muslims from middle Asia, Afghanistan, Iran, Arab and north India identified themselves as Ashraf (Sharif or 'gentleman'). Mostly there were four elite groups: Syed, Sheikh, Mughal and Pathan. Sharif (2010) noted a tendency that when Brahmans converted to Islam, they received the title Syed and the converted Kayasthay received the Sheikh title. So, in addition to immigrant Muslims, there remain 'elite' groups within the converted Muslims.

Another significant factor is that the indigenous people accepted Hindu gods and scriptures entirely. Instead, they adapted with Islamic understandings of God, its prophets and holy books. At the same time, Sufi Islamic doctrines and practices were recast with the traditional Hindu forms of culture. For example, the divine name Allah has interchangeably been used in Bangla Islamic literature with the Sanskrit terms for Hindu gods, like Great Person (*Pradhanpurush*) and the One without Colour (*Niranjan*) and God (*Iswar*). The prophet Muhammad (PBUH) was called 'Avatar' as a different manifestation of Sanskrit designation for the Hindu god Bishnu (Bangladesh 2009,86-88). It is evident that the Bangla literature syncretises Islam with Hindu beliefs and practices, overcame the communal boundaries and introduced new devotional movements of *Satya Pir* or *Satya Narayan* (Bangladesh 2009, 86-88, Stewart 1995, 578-597). As argued by Barkat, Islam in Bengal is considerably different from the 'orthodox' or Sharia law based on Islam originated in Arabs (Barkat, 2019, 31-34).

Thus, the occurrences of oppression due to the social caste system and scope of economic opportunities and interests were vital causes for the conversion of Bangali Muslim (lower caste Hindus to Muslims) people. However, this conversion does not mean that people rejected all the rituals of their Hindu forefathers (Eaton 2001, 25-51, Bangladesh, 2009, 86-88). So, I believe that the conversion of Hindus to Islam did not create a tremendous theological conflict. Still, it reflects that class difference remained a prominent cause behind this conflict during the pre-colonial period. At the same time, we have found that the liberal attitudes and tolerance existed in a society where the state provided the scope of freedom to express and practice in a culture of harmony, allowing different names for Allah or the Prophet (PBUH). This made for subjective and syncretistic interpretations of Islam. It gave Bangali Islam a distinct stamp.

2.5 Islam in Bangladesh (British Period- Now)

In the continuum of this history, this class difference was politically converted to communalism during the colonial period (1757-1947) and its aftermath. From 1203 CE to 1757 CE, most rulers were Muslims in this territory. During this period, the rulers in Bangla generally were quite respectful towards the people of other faiths. Several examples of religious pluralism remain in culture and literature (Roy1983, Islam 2011). However, after the British had conquered Bangla, they adopted the 'divide and rule' policy and on many occasions, inter-religious (Hindu- Muslim-Shikh) and intra-religious (within Islam) conflict appeared in this land (Islam 2011). This policy, in turn, gave birth to two states, India and Pakistan.

The Muslims might have a feeling of deprivation of losing power. The last and most potent of the Muslim conquerors were the Mughal dynasty (1526–1857), which eventually spread its authority over virtually the entire subcontinent. British superiority coincided with Mughal decline, and, following a period of European successes and Mughal failures on the battlefield, the British ended Mughal power. The last Mughal emperor was exiled following the failed Indian Mutiny of 1857–58 (Burki 2014). So, the shifting power of Muslim rulers to the British Raj created tension among the Muslim elite or previous ruler class.

Moreover, Khan (2012) explained that British rule in Bangla accentuated the fundamentalist and extra-territorial loyalties among the Muslims (both *Ashraf* and *Atraf*) in three ways. First, the disappearance of Muslim rulers in Bangla pitted the Muslim peasants against Hindu (the Zamindar) and Christians (in this case, the British) exploiters and thereby catalysed communalism. Secondly, due to the revolutionary development of transportation systems, the Muslims of Bangla got closer to the broader world of Islam. Thus, different fundamentalist elements entered the fray of Islam in Bangla. Finally, revivalist and fundamentalist Islam benefited from an upsurge during the nineteenth century. During this period, Islamic revivalist movements like Tariqa-i-Mauyahidun (popularly known as the Wahabi movement) arose. These fundamentalist creeds of Islam more easily

entered Bangla through Hajj's institution (pilgrimage to Mecca). As a result, the Farayeji movement led by Haji Shariatulklah and his son Dudu Mian, the Tariqa-i-Muhammadiya led by Mir Nisar Ali Titumir, the Ahli Hadith movement led by Maulana Bilayat Ali, the Tayuni movement led by Maulana Keramat Ali disseminated fundamentalist versions of Islam in the nineteenth century. These movements were organised as a political resistance against the exploitation of Hindu Zamindar and the British rulers. All these movements boost fundamentalist Islam and communalism in the politics of Bangla.

Consequently, during the colonial era, different dynamics of Islam entered politics, continuing. Alam (2008) mentions four overlapping traditions that emerged more rigorously from the colonial period:

a. Sufi-centric: This tradition is tolerant and accommodative to different faiths that influence one another on a religio-cultural basis.
b. Scripturally literalist: This tradition advocates for a socially active Islam. It was derived from the influence of the revivalist movements (e.g. Khelafat, Farayeji) in the nineteenth and twentieth centuries against the British rulers. Here, Islam must strictly follow the scripture and provide little or no room for critical or different thoughts.
c. Radical and militant: This tradition derives mainly from radical and militant Islamist political (e.g., Maududi, Jamaat-e-Islami) parties. They seek political power and support Sharia laws to rule the state.
d. Secular: A secularised and modernist tradition of Islam by a group of Muslims in the Indian subcontinent and Bangla (e.g. Shikhagoshthhi) emerged during the British period. This tradition is influenced by the Euro-centric enlightenment education system introduced by the British. They are, to some extent, tolerant of critical thoughts and different views about religion.

Thus, since the British period, in the Indian subcontinent and Bangladesh, tolerance, harmony, and the contradictory intolerant and discriminatory traditions of Islam have remained. Indeed, the dominance of traditions influences the construction of views and attitudes towards 'other beliefs'.

2.6 Islam in Bangladesh (Pakistan Period- Now)

In the Indian subcontinent, the British rulers transformed their power with the birth of two states: India and Pakistan. The Hindu-Muslim conflict might prompt some to come forward with the 'Two-Nation Theory', which holds that though Hindus and Muslims live in the same land, they are different nations – their religion is different. Their cultural heritage is diverse (Islam 2011). To make a long story short, the British started their colony in this region in 1757. In 1947 the colonial rule was over, but this region was divided into two states, a Hindu majority in India and a Muslim majority in Pakistan. Within Pakistan, there were two parts, West and East (now Bangladesh).

The independence day for Pakistan is 14 August 1947. The initial instances might show that Pakistan was born in the name of Islam. Mr Jinnah is called Pakistan's "Father of the Nation" and initially wanted to establish a state without much influence from Islamic laws and customs. For example, the 14 August 1947 was the 26th Ramajan 1366 Hijri, a day in the Muslim lunar calendar, and according to Islamic principle, Muslims must fast from dawn to dusk. However, the birthday of Pakistan was celebrated, and Mr Jinnah, along with the last viceroy of the Indian subcontinent, Lord Mountbatten, celebrated that occasion with a grand lunch in Islamabad (Zaman 2012, 10). Hossain (1992, 12) asserts that though Mr Jinnah left Congress for its communal tendency and became the leader of the Muslim League, he did not want Pakistan to be a fanatic Islamic state after its establishment. For not establishing an Islamic state, Jinnah was severely criticised by the Islamists in Pakistan, especially by the Jamaat-e-Islami under the leadership of Maududi (Hossain 1992). Here, I stress that in 1964 Pakistan was declared an Islamic state under the autocratic rule of Ayub Khan (Hossain 1992). This was the beginning of establishing the linkages between military rules and the use of Islam in politics in Pakistan and later in Bangladesh.

Another noticeable thing is that there remained a difference in the views on Islam between West and East Pakistan. The Islam in Bangladesh (then East Pakistan) was influenced by a Sufi-humanistic spirit, whereas in West Pakistan, Islam was more orthodox and Sharia law based (Hossain 1992). Islam had entered the regions of West Pakistan with the sword, and the political victories achieved there started the establishment of Islam. Still, in the Bangla territories, Islam was first spread by the Sufis, followed by politics. This difference is reflected in the literature and culture of these two territories. In Bangla, we have evidence of the liberal interpretations of Islam, but in Urdu, we find less evidence of liberal and critical literature about religion (Hossain 1992).

In short, based on this 'Two-Nation Theory', Jinnah claimed that the Muslims in India deserved a separate homeland. Hence, it should be mentioned here that this same Jinnah was an advocate of the unity of these two communities. He was called the 'Ambassador of Hindu-Muslim Unity' by some prominent Hindu leaders of that time (Hossain 1992). However, the British rulers did not sincerely want the unity of the Hindus and the Muslims, and their policy created certain situations in which Jinnah, a believer in the secular philosophy of life, was virtually compelled to demand a separate state for the Muslims of India (Islam 2011). Here, the historical narration tells that the West and then East Pakistan (now Bangladesh) became one state based on religion (in this case, Islam) despite geographical and cultural differences. Even Islam in West Pakistan and Bangla territory was not the same. In addition, a dangerous precedent was set, that of military rulers exploiting religion to legitimise their power. It started during the Pakistan period and has repeated itself in independent Bangladesh.

2.7 Islam in Bangladesh (Since Independence)

History shows that the conceptual basis that Muslims would be vulnerable in undivided Bangla or the Indian sub-continent and therefore be liberated through the partition of India in 1947 has proved to be an absolute fallacy. Instead, the population of Bangladesh did experience that Bangali Muslims and other religious communities were far more vulnerable and oppressed in Muslim-majority Pakistan than they ever had been (Khan 2014). During the liberation war, the people of Bangladesh experienced how cultural, political and brutal military oppression occurred in the name of Islam. Again, the question is, what is happening in Bangladesh after independence regarding the use of religion, particularly Islam, in the dominant political structure?

3. Immediately after Independence

After independence, Bangladesh adopted secularism as one of the four fundamental principles of the constitution on 4 November 1972. The objective of this constitution was to abolish communalism and the use of religion in politics. Since Islam-based political parties, such as Maududi's political philosophy, led Jamaat-e-Islami, Muslim leagues, Nizam-e-Islam played an anti-liberation stance and were a defeated force, was easier at that time to prohibit the use of religion (mainly, Islam) in politics. However, right after release from Pakistan prison, Bangabandhu Sheikh Mujibur Rahman, the first President of the Bangladesh government, articulated that Bangladesh was a new addition to the Islamic world. Later on, Bangabandhu joined the OIC (Organization for Islamic Countries) conference in February 1974 (Hossain 1992, 13). He attempted to clarify this stance on several different occasions, stating that secularism does not necessarily mean the denial of religion. Nevertheless, it does not mean that Bangabandhu talked about a future Islamic state. Instead, considering the importance of recognition from the Islamic world (and notably the demand for fuel energy from the Oil-rich middle countries), it was an essential political and economic strategy (Hossain 1992).

Military Regimes

After 1975 the regime was changed with the bloody killing of Bangabandhu and his family (15 August 1975), and four foremost national leaders (3 November 1975) started military rule in Bangladesh. Alam (2008) and Hossain (1992) assert that both military regimes Zia (1975-81, Lt. General Ziaur Rahman became President on 21 April 1977) and Ershad (1982-90, Lt. General Hussain Muhammad Ershad became President on 11 December 1983) tried to overcome their legitimacy crises by manipulating the political issue of Islamic identity. During the regime of Zia, the principle of 'secularism' was replaced by 'Faith in Almighty Allah' (Hossain, 1992; Alam, 2008). This initiative was supported by the Muslim League, Jamaat-e-Islami, Islamic Democratic League, Nezam-e-Islam and Khelafat-e-Rabbani (Hossain, 1992, 14). The reader should note that these parties were banned

in the immediate aftermath of independence because of their anti-liberation activities (Hossain, 1992,14). However, during the Zia regime, these parties were rehabilitated into politics. The use of Islam in politics was extended during the Ershad regime. In 1988, Islam was declared the state religion by amending the constitution (Alam 2008). The underlying cause behind this is to create an aura of political legitimacy and win support from the oil-rich Middle Eastern Muslim countries, especially Saudi Arabia and the Gulf countries, to get aid and export labour (Alam, 2008, Hossain 1992).

Thus, in the history of Bangladesh, we have observed a phenomenal practice between the capture of power by the military and the use of Islam in politics.

Democratic Regimes

In the 1990s, the so-called democratic era started in Bangladesh. There remains a regular five-year election process to change the government in power. From the 1990s to now, the subsequent democratic government could not overcome the tactical use of Islam in politics. Still, instead of two major political parties: The Bangladesh Awami League (AL) and the Bangladesh Nationalist Party (BNP), to attract voters and maintain a strategic relationship with Islamist political organisations, they compete to show "Who is more Islamic?" (Alam 2008, 10). This so-called tactical relationships and coalitions have its effect on vote banks, public policy and in the daily lives of the average citizen (Alam 2008, 10-11). In the general election of 1991, the Bangladesh Nationalist Party (BNP), Awami League (AL), the fundamentalist Islamic party Jamaat-e-Islami (JI) and Jatiya Party (JP) won 140, 88, 18 and 35 seats, respectively. Since no party secured enough of an absolute majority to form a government (at least 151 out of 300 seats), Jamaat-e-Islami (JI) played a kingmaker's role by extending support to the BNP and forming a coalition. So, JI got the chance to demonstrate its strength for voting politics and create a support base for militant fundamentalists and anti-liberation forces in politics (Alam 2008). In the general election of 1996, the seats for AL, BNP, JI and JP were 146, 116, 3 and 32, respectively, and AL formed the government with the support of JP. Later on, JP withdrew its support and BNP, JP, JI and Islami Oikya Jote (IOJ, an umbrella front of different smaller Islamic organisations) and formed a four-party alliance. This alliance won a landslide victory in the subsequent election in 2001, in which AL won only 62 seats, whereas the BNP-led four-party coalition won 230 seats, out of which BNP, JI and a fragment of JP won 193, 17 and 18 seats, respectively. During this period (2001-06), the two leaders (both of them would later be convicted for a crime against humanity and patronising religious fanaticism) of Jamaat-e-Islami became full ministers in the cabinet. During this period, Bangladesh experienced a prolific rise of militant fundamentalist Islamic organisations (e.g. Harkatul Jihad al- Islami Bangladesh (HUJI), Jamaatul Mujahideen Bangladesh (JMB), Ahle Hadith Andolon Bangladesh (AHAB) and so on) (Alam 2008, Barkat 2018). Moreover, the transnational Islamic organisation

Hizb-ut-Tahrir Bangladesh (HTB) has become more visible (Khan 2011, 192-215).

Here, I want to note several points about the rise of Islamic fundamentalism during the so-called democratic regimes of the last two decades.

1. Islamic organisations came to the public sphere more prominently after the 9/11 incidents
2. The transnational Islamic political culture has become evident
3. Incidences of political violence in the name of Islam have become a serious concern with the manifesto of less tolerance towards differing beliefs and critical views- especially towards Sufi shrines and the Ahmadiyya sect of Islam
4. For the vote banks: Islamic parties are now considered essential players by the major political parties.

4. Islamic Discourses in Bangladesh

In the history of the Indian subcontinent and Bangladesh, tolerance, harmony, and the contradictory intolerant and discriminatory traditions of Islam (Haque 2003, Chakraborty 2009, Eaton 2001, Hossain 1992, Karim 2012, Khan 2012). There is evidence of religious tolerance, pluralism and co-existence, and proof of conflict. To explain the cause and remedy of religious conflict in Bangla, I have found mainly three types of interpretations. The contemporary post-modernist thinkers like Mazhar (2008) and Sharif (2012) glorify the tradition of Sufism and Baishnavism and define them as Bhavandolon, 'a liberal religious discourse' of and for Bangla. There remains a long tradition of Sufi-centric Islam. This tradition is tolerant and accommodative to different faiths that influence one another on a religio-cultural basis. Mazhar (2008) and Arif (2012) espouse this discourse as an example of communal harmony in pre-colonial Bangla. They also discard 'secular' and 'enlightenment' discourses and criticise them as a weapon of oppression and hegemony. This discourse had also been used as a tool to fight against oppression during the colonial period (Mazhar 2008, Khan 2012). Again, a secularised and modernist tradition of Islam by a group of Muslims in the Indian subcontinent and Bangla (e.g. Shikhagoshthhi) emerged during the British period. The 'secular discourse' emerged due to the influence of the European enlightenment and modernisation philosophy (Alam 2008). Umar (2000), Zaman (1999), Momen (1998) and other modernist scholars (from the Muslim community) assert that religion should be considered a personal matter. They strongly support the separation of religion from state affairs and allege that state patronisation of religious education is the cause of religious conflict in Bangla.

On the contrary, 'fundamentalist discourse' claims superiority of Islam and maintains that the exclusion of Islam is the root of all conflict in Bangla. They adamantly believe Islam is the only complete code of life, and there is no alternative to this. According to them, Islam must be strictly followed by the scripture. They allow little or no room for any critical or different thoughts. In the nineteenth and twentieth centuries, the revivalist movements (e.g. Khelafat, Farayeji) strengthen

this script or literalist sect of Islam (Alam 2008). This school of thought provide a strong premise for the radical and militant Islamist political (e.g., Maududi, Jamaat-e-Islami in Bangladesh) parties. They seek political power and support Sharia laws to rule the state. They express less tolerance towards liberal, secular, or other discourses about Islam (Chowdhury 1995). Thus, the Sufi-based liberal, secular and militant discourses of Islam remain to analyse the cause and remedy for religious conflict in Bangladesh. These three schools of thought philosophically and politically advocate substantially different world views.

Islam in Bangla was not a monolithic tradition. Over time and especially during the colonial period, several overlapping traditions of Islam emerged. As I have mentioned, each tradition embeds a particular school of thoughts or discourse, and each carries different world-views about the purpose of human life, God or higher power and evil. This led them to show tolerance and respect towards other beliefs.

Hence, Islam in Bangla, to some extent, has a distinct stamp. In some cases, it shows a unique synchronisation of indigenous (Sanatan, Hindu, Buddha) tradition with Islamic thoughts and practice (Roy 1983, Eaton 2001, Khan 2012). Again, a more orthodox and rigorous version of Islam emerged and, in many cases, was imported into this territory (Khan 2012). Thus, the history of Bangladesh shows a paradoxical existence of a more tolerant syncretistic (both liberal and secular) and bigoted fundamentalist tradition of Islam. Therefore, in a broader sense, Islam in Bangla can be divided into three discourses: syncretistic, secular and fundamentalist (Khan 2012, Alam 2008, Roy 1983, Eaton 2001, Sharif 2012, Haque 2003, Hossain 1992, Islam 2011, Karim 2012, Mazhar 2008). Within each discourse, there remains a different school of Islamic thoughts. I briefly present them in table 1.

Table 1: The taxonomy on conflict sensitivity in the Islamic discourses in Bangladesh

Discourse	Islamic philosophical underpinnings	Sensitivity towards other religions, including other Islamic thoughts	Political participation
Syncretistic	Sufism Bahai (it is also considered a separate religion)	Beliefs in love for all. Liberal and respectful.	Mainuddin Chishti, Shah Jalal, and Dudu Mia actively participated in politics Do not participate.
Fundamentalist	Maududism Salafism Wahabism	The three branches are reluctant toward other branches of Islam, let alone other faiths.	Maududi-based JI is very active in power politics.
Secular	Enlightenment and modernist development paradigm	Consider religion as a personal subject.	Do not support the use of religion in politics.

(Adopted and adapted from Roy 1983, Eaton 2001, Khan 2012, Roy 1983, Eaton 2001, Arif 2012, Haque 2003, Hossain 1992, Islam 2011, Karim 2012, Mazhar 2008).

However, I have briefly shown how religion and politics- from pre-Aryan to contemporary history- have evolved as potential factors for conflict in this region. The following section discusses how religion, particularly Islam, plays a vital role in education.

5. Education System and Religion in Bangladesh

Historically, in Bangla, religion has been considered an important subject to be taught in schools. Here, religious identity has played a deterministic role (meaning that religious identity determines who can get the right or opportunity to education and who cannot) regarding access to education. The institutionalisation of education can be traced back to the composition of the 'Rig Beda', one of the four earliest Bedas. This was central to the Brahminical tradition of religious texts in Hinduism for about 3000 years (Chowdhury, 2012; Rig Veda, 2007; Khatun, 2012; Biswas and Rubaiya, 2012). During the early days, i.e. 2000-1000 BC and the later Vedic period (1000 to 500 BC), the primary objective of education was spiritual development. However, other subjects such as grammar, logic, ethics, and astronomy were taught along with vocational trades. Access to education, particularly religious education, was restricted according to the caste identity. Only Brahmans and, to some extent, Ksatriya pupils (at the elementary level) were allowed to learn about religion. Later in this cycle, only the Brahmans could learn about the Bedas and other higher subjects. These subjects were related to the vocation of the priesthood (Chowdhury, 2012, Biswas and Rubaiya, 2012). During the 6th to 7th century AD, Buddhist education flourished in Bangla. This Buddhist education was Biharis or temple centric, and unlike the Brahmanic tradition, it educated children irrespective of their caste identity and social class. They were allowed to learn about Buddhism's religion, grammar, philology, dialectic, medicine, astronomy and the arts (Biswas and Rubaiya, 2012). Through the Muslim saints, the Sufi sects of Islam entered Bangla during the eighth century, and Khankah and Maktab-based education were established. This Khanka was a spiritual institution based on human understanding and feeling. People of all religions and races visited the Khanka to learn about the Sufi spirit of Islam, in which love, peace, liberal thoughts and communal harmony were taught (Biswas and Rubaiya 2012, Waiz 2012). So, Bangla has the example of practising the syncretistic tradition of Islamic education.

The Muslim rulers established their reign in Bangla during the thirteenth century. The Arabs, Turks, Afghans and Mughals ruled over the Bangla. Throughout the Mughal period, various reformation initiatives were taken concerning Madrasa education. As different political regimes ascended the throne, these varied in terms of verse and scope. These reformations, to some extent, were believed to contribute to sectarian rifts among people. During the Akbar (1556-1605) regime, the state attempted to design Madrasa education to establish a tolerant and co-existent atmosphere between Hindus and Muslims. The courses comprised medicine, agriculture, geography, and understanding texts from other languages and religions

(Riaz 2010; Bangladesh Enterprise Institute 2011). This reform also shifted the focus from rote memorisation to learning by practice (Riaz 2010).

In contrast with his predecessors, Aurangzeb (1658-1707) showed less tolerance and seemed more conservative. Riaz (2010) remarked that Aurangzeb showed little care about Hindu education and tried to foster the education of Muslim youth and extended state patronage for Madrasa education. So, during the Mughal period, Madrasa education was transformed from a liberal to a more intolerant approach, and the relaxed maqul (rational) school was substituted by the manqul (revealed) education (Bangladesh Enterprise Institute 2011). Thus, a fundamentalist Islamic education began in Bangla.

The Christian Missionaries spearheaded by European imperial powers- the Portuguese, French, Dutch and British- entered the region and expanded their education program from the 16th century onwards (Haque 2003; Laird 2012). Although the Catholics had started to preach initially, the Protestant groups began to dominate, and their Catholic counterparts subsided in influence over time (Chaudhuri 2012). Having encountered Muslims in the subcontinent, the Missionaries had become more cautious about preaching to the followers of Islam and focused on spreading their education among Hindus and some other indigenous communities such as the Santal (Chaudhuri 2012, Laird 2012). Along with preaching Christianity, the education system developed by the British colonial power also brought the notion of modern science and rational thinking. This helped create a new intellectual class in Bangla, influenced by the idea of enlightenment and secularism. It brought to the fore new perceptions about religion (Chaudhuri 2012). As time progressed, some young Muslims joined their ranks and rationally thinking groups were developed among the Muslims who expressed liberal and secular views on politics, economy, education, fine arts and religion, literature, culture and humanism (Huq 2012a and 2012b). Conversely, as a reaction to the colonial power and 'modern education', different Madrasas grew up and preached a Wahabi- or extremist form of Islam- and inculcated a more orthodox, radical and ultimately militant form of Islam (Siddiqi 2012, Alam 2008).

So, Bangladesh has inherited different dynamics of education from the pre-colonial and colonial eras, in which, in many cases, religion plays a deterministic role in accessing the education system or constructing the mindset. Now, as an independent country, Bangladesh has its own education system. How friendly is this system in promoting tolerance for liberal thinking or respecting 'other beliefs'?

6. Religious Education and Conflict in Bangladesh

There are three distinct education streams in Bangladesh: general medium, Madrasa and International (popularly known as English medium). Again, since the 1990s, the study of one's respective religion as a subject has been compulsory (before that, it was optional) according to the national curriculum under the general stream for the secondary school certificate examination. However, religious studies have

the potential to impart a lesson in sensitivity to conflict. Here, a significant concern is that in the general stream of schools in Bangladesh, each student studies one's religion and is not getting access to learn about other religions. As a result, during the session on the religious study, students are divided according to their 'religious identity. They study different textbooks. Here the inevitable question appears- can this division (physical, spiritual and content-wise differences of the texts) pave the way to generate conflict among different religious groups? Can this system provide any room for critical thinking, especially regarding the issues of religion?

In Bangla, religion, particularly Islam, has evolved and synchronised over time, and this has also been reflected in the education system. Historically, we found evidence that the approaches of religious education toward religious sensitivity to others have been varied at various times; sometimes, liberal and non-divisive strategies triumph over conservative ones and vice versa. The Bihar religious education system, which allows everyone, regardless of their religious identity, emerged due to the restrictive and divisive Brahmanic education system during the Pala dynasty between the 6th to 8th centuries (Chakma 2012, Biswas and Rubaiya 2012). Again, the influence of this liberal and non-discriminatory Bihar education system declined gradually, and the Brahmanic divisive education system again started to dominate during the era of the Sena dynasty (c.1097- 1225) (Biswas and Rubaiya 2012). The pluralist Akbari Madrasa education system (rational) was changed by the rise of the orthodox and aggressive Aurangazeebi Madrasa education system (revealed) (Bangladesh Enterprise Institute 2011). The Khanka system of education provided space to people of all religious beliefs and castes to enshrine healing, satisfaction and spiritual support (Waiz 2012). Though the Khankah system of Sufi education ensured access to all, irrespective of any religious creed, its land was confiscated through colonial rule. Later, colonial powers introduced missionaries and the secular system of education (Chaudhuri 2012, Waiz 2012).

Nonetheless, the liberal and tolerant, inclusive and non-divisive approaches to religious education that emerged in Bangla were discontinued. In many instances, the attempt for liberal and inclusive approaches to religious education has been thwarted or stepped down by conservative and discriminative policies. It is still a valid reality at the secondary level of education in Bangladesh as the teachers and students of one religious identity are not getting the opportunity to learn about other religious beliefs and textbooks of other religions- unless, of course, one was to read it out of their interest. Therefore, I desire to study more about the potential implications of such a system regarding religious conflict sensitivity.

For the last decades, the incidents of 'religious violence' have increased alarmingly in volume and nature (Mohan 2013, Barkat 2018). 'Religious studies' on respective religions have been introduced as compulsory secondary education subjects since 1990. I admit that there is no apparent correlation between religious education and religious violence in Bangladesh. Religious conflict is a global

concern, which is also a concern for Bangladesh. So, critical research should be pursued on religious education in school towards resolving or contributing to religious conflict.

Critical analyses of the relationship between Bangladesh's religious education and religious conflict are missing in academic literature. Hoque (2012) did a survey-based report on the current education policy of Bangladesh and religious tolerance. However, this report did not reflect any more profound understanding of the issue. Though Rahman (2012) attempted to analyse the state of peace education in secondary education, the paper did not critically address the issue of religious textbooks or education. Notwithstanding Rahman and Rahman (2013) discussed the issue of Islam, the language and the content of the paper show a defensive tone favouring Islam, and this did not address any critical issue per se. So, in Bangladesh, I have not yet found any critical academic literature regarding this issue, particularly the school's potential and consequences of teaching and learning from an Islamic lens to endorse religious harmony or conflict.

Again, within the same school, students are divided because of their respective 'religious identities during religious studies sessions. There is a chance that the consequence is the prevalent conflict we see and experience. In Bangladesh, more than 90% of students take Islamic studies as a compulsory subject in their secondary schools (BANBEIS 2012). Therefore, this thesis seeks to analyse secondary school Islamic studies through a religious conflict sensitivity framework to investigate how Islamic studies textbooks promote social cohesion, tolerance, communal harmony, and positive relationships with the people of different religious groups in Bangladesh.

It appears paradoxical that religion is one of the vital political factors in considering conflict and the study of peace. The different religious texts sarcastically refer to numerous ways and benefits of peaceful existence. History shows that various conflicts or wars have occurred due to religion or in the name of religion (Harris 2008). From this, rationally, it can be hypothesised that there might be a potential gap between the texts from the scriptures and their preaching or interpretation dynamics of the followers.

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Revisiting the Myth of Revolution, Civil War and Social Disorders in Doctor Zhivago

Taskia Haq Lyric*

Abstract

This study examines the socio-economic disorders in the lives of ordinary people in Russia generated due to the revolution in 1917 and the consequent civil war illustrated in the historical fiction Doctor Zhivago by Boris Pasternak, a prominent Russian poet and novelist. History and literature are inextricably linked. Literature, especially fiction, provides a detailed picture of people's lives in a society. So, fiction can be a living document of the society it has been written on. Moreover, Boris Pasternak actively participated in the reality of that time. The Russian revolution had left a profound impact on Russian society and the other parts of the world. The word 'Revolution' always makes people thrilled. It has a call for unknown romanticism and dreams of change. But a 'revolution' does not affect everyone's life similarly. This paper finds out the impacts of the October revolution of 1917 and the Russian Civil War—how the myth of revolution paradoxically backfired in the lives of the common mass, bringing social disorders and trauma to the greatest extent in the lives of Russian people portrayed in Doctor Zhivago.

Keywords *Disorder · Doctor Zhivago · Misery · Party · Revolution · Moscow · Russia ·*

1. Introduction

"The relationship between literature and history is clearly an intimate one. Literature is particularly important in spreading ideas and images about things which are unfamiliar to the general reading public, thus helping to shape opinion and through it policy."

--Allen J. Greenberger (Greenberger, 1969)

Doctor Zhivago is a historical fiction that records Russia's socio-economic and political history of its most crucial time. The Russian Revolution in 1917 marked the beginning of the first communist government in Russia and made the

* Lecturer, Department of History, University of Dhaka. Email: taskiahaqlyric@gmail.com

ideology of communism significant worldwide in the 20th century. Communist parties started forming in certain countries after the October revolution of 1917. Russia became the Russian Soviet Federative Socialist Republic (Russian SFSR or RSFSR) and, later on, part of the USSR, ultimately dissolved in late 1991. The revolution made people dream of a society free from centuries of exploitation, slavery and injustice on the one side. On the other, it gave birth to civil war resulting in suspicion, oppression, carnage, famine, death etc. All these profoundly affected millions of people involving their day-to-day lives. Pasternak describes the effects of the Russian revolution of 1917 and the civil war through the protagonist of this novel, a physician and poet, Doctor Yurii Andreievich Zhivago.

Irving Howe opined, "*Doctor Zhivago*, the novel which climaxes the career of the Russian poet Boris Pasternak, is a major work of fiction; but it is also—and for the moment, perhaps more important—a historic utterance…. *Doctor Zhivago* opens in the first years of the century, spans the revolution, civil war and terror of the thirties, and ends with an epilogue in the mid-1940s…. Pasternak refuses to accept any claim for the primacy of ideological systems. Avoiding any quest for the 'essence' of modern terror, he prefers to observe its impact upon the lives of modest and decent people" (Howe, 1958). However, the novel was refused to be published in the USSR. Later, the manuscript was smuggled to Italy, published from Milan in 1957 and subsequently translated into several languages by 1958. Soon after publication, the book became an international best-seller. In that year, Boris Pasternak was awarded the Nobel Prize for Literature. But he was compelled to denounce it. Six days later, after declaring the award stated in a telegram to the Nobel Committee: "Considering the meaning this award has been given in the society to which I belong, I must reject this undeserved prize presented to me. Please do not receive my voluntary rejection with displeasure" (Howe, 1958).

Irving Howe also opined that Yuri Zhivago, the novel's central figure, is Pasternak's alter ego. The novel had been written on a vast and intricate canvas. It was not published in the Soviet Union until 1987. However, this study will examine the effects that the outcomes of the Revolution and civil war left on the mass people of Russia. The English translation of the novel by Max Hayward and Manya Harari in 1958 has been studied for this paper. Many more non-fictional sources have been used for investigation and validation.

Pasternak took the other side leaving the pro-revolutionary authors' premises in this book showing his critical reasoning and understanding of society, humanity and the growth of new statecraft, which shows the silky horizon embedded with equity, justice and morality. Despite the glorification of the October Revolution by most Russian authors, he has shown himself up against the tide of his time. The following points would be the testimony of the statement for establishing the paper's central argument that revolution brought anarchy, not peace; social disorder, not harmony; strain and trauma, not appeasement; totalitarian statecraft, not welfare.

2. Revolution, Civil War and Disorders

The October revolution in 1917 evoked the deadliest civil war of the twentieth century. The war put unbearable strains on Russia with enormous losses. The lives of almost tens of millions were lost or changed forever in the subsequent conflagration—war, epidemic, famine, imprisonment, massacre, dislocation and exile (Bullock, 2008, p. 07). Pasternak sharply illustrates the sufferings caused by the disorders in Russia of that time in *Doctor Zhivago*. Anarchy prevailed throughout Russia, affecting every sphere of life. Towns are burned and plundered. The novel's central character, doctor Yurii Zhivago, worked at the health department of the Army during World War I. He had the opportunity of visiting some of their units, where he observed extreme mismanagement. He wrote to his wife that disintegration and anarchy peaked in thermy (Pasternak, 1958, p. 111).

Mutinies in the army were widespread during the beginning of the revolution, and their slogan was, from Pasternak's novel, "Turn your bayonets against your masters". Pasternak portrays such an incident in *Doctor Zhivago* where he provides the account of Gints, the Cossack officer and Pamphil, the Red soldier, acting under Kerensky. Gints tried to convince the rebels to stop their revolutionary insanity, an enthusiastic young officer. But the soldiers had already seen a lot of bloodsheds. They were not going to be convinced by these words. They laughed at him. Later, Pamphil shot him, and the revolutionaries thrust their bayonets into his body (Pasternak, 1958, p. 130). The whole of Russia was in chaos. Elites and the bourgeoisie were shot. Thousands of Russian soldiers were demobilized. And many of them, without jobs and orders, hungry and desperate, went in search of food or money (Bullock, 2008, p. 38).

The revolution and war also severely affected the agrarian sector. Russia was an agriculture-based country, and many of the population were peasants. The revolution also shook the peasantry. According to E. H. Carr, the hopes and excitement of the October Revolution caused peasant disorders in many parts of Russia. In April 1917, Lenin illustrated that "peasants are already seizing the land without compensation or paying a quarter of the rent" (Carr, The Bolshevik Revolution 1917-1923, 1952, pp. 35-36). This recklessness of the peasants created turbulence in the socio-economic fabric. The peasants became desperate for their own land for which they had been waiting for a long time. Revolution has given them this hope, the dream of their own land. And then they were ready to fight any establishment breaking every rule. Boris Pasternak tells about the outbreaks of peasant disorders. There were peasant rebellions everywhere. They were against whoever happened to be in power, the Reds or the Whites (Pasternak, 1958, p. 186).

3. Violence: Mass Killing of the Civilians

Violence was one of the worst consequences of civil war. There were looting, bombardment, murders, and horrors in Russia (Pasternak, 1958, p. 246). Socialist Revolutionaries particularly wanted to incite a revolution by ousting the old

regime. Assassinations and bombings became the specialism of their terrorist wing (Harris, 2016, p. 16).

This novel is a record of the violent situations during those days. There was a regular battle on the streets between the soldiers who supported the Provisional Government and the Bolsheviks. Social safety also collapsed, and the lives of the commoners became highly troublesome. There was skirmishing all over Moscow. At the time of rifle fire, passers-by were often killed by stray bullets (Pasternak, 1958, p. 159). Day to day life of the people was hampered. Yurii Zhivago is seen as helpless because he could not collect some milk when his son was very sick due to the rifle fire in the street (Pasternak, 1958, pp. 159-60). Pasternak also sporadically records the pogroms on Jews in Russia (Pasternak, 1958, p. 249). Russia had to pay the price of revolution and civil war at the expense of many lives. However, there is no accurate number of lives lost due to civil war. An estimation shows that the number of dead in the Red Army from battle and disease is as low as 425,000 and as high as 1,213,000. In the White Army, the number ranges from 325,000 to 1,287,000. And 200,000-400,000 died in prison or were executed during the 'Red Terror'. Another 50,000 died in 'White Terror' (Bullock, 2008, p. 133).

Reds and Whites both shifted to terror in the second half of 1918. Bolsheviks in Ekaterinburg executed Tsar Nicholas II and his family on 16 July 1918 with the approval of Lenin. After an attempt on Lenin's life on 30 August, the Bolsheviks started the Red Terror, intended to eliminate political opponents among the civilians. In December 1917, Cheka (sabotage) and the Extraordinary Commission were set up under Feliks Dzerzhinsky to combat the counter-revolution carried out the terror. Seeking to reverse social revolution, the Whites savagely waged their ideological war that justified the use of terror to avenge those who the revolution had wronged. However, the White terror was not as systematic as the Bolsheviks but was equally terrifying and arbitrary (Raleigh, 2006).

The Civil war was ruthless, and each side took to torture cruelly the captives of the other side. In the novel, Pasternak wrote through the statement of a character, "The whole town is groaning. They boil people alive. They cut strips out of them. …some they hang, some they shoot, some they question. They beat you to shreds; they put salt on the wounds and pour boiling water on you. Whenever you vomit or relieve yourself, they make you eat it. As for children and women—O God!" (Pasternak, 1958, p. 306). Pasternak observes, "White and Red atrocities rivalled each other in savagery, outrage breeding outrage" (Pasternak, 1958, p. 308). Civil war turned Russia into debris. There were destructions, villages were burned out, and nothing was left but cinders.

Both sides, the Reds and the Whites, used to conscript their armies at gunpoint and executed captured soldiers and commanders. Both sides used to seize property and grain without considering the population they left without food and shelter. And both used to deport entire communities they suspected of disloyalty (Harris, 2016, p. 17).

The Bolsheviks learned from history that the possessing classes would do anything to stifle the revolution. They understood that they had to tackle this threat consistently and ruthlessly to the end. So they not only launched their terror but also encouraged widespread unrest against the 'counter revolution'. Their intention was not to glorify revolutionary violence, but they didn't want to shrink from it in defence of the revolution (Harris, 2016, p. 16). Trotsky clearly said, "They thought that we should be passive, but we showed them that we could be merciless when it is a question of defending the conquest of the revolution…We shall not enter the kingdom of socialism in white gloves on a polished floor" (Carr, The Bolshevik Revolution, 1917–1923, 1950).

James Harris points out that the improvement in Bolshevik fortunes in 1918 seemed to justify terror. In the history of the revolution, terror gradually appears to occupy a glory place. The Cheka earned the reputation of 'sword and shield of the revolution' and the Chekists as 'the best Bolsheviks' (Harris, 2016, p. 31). Both the Whites and the Reds became so enraged that the whole of Russia became a bloody battlefield.

4. Disruption of Law and Order

Civil war and sudden changes in government after the revolution brought severe interruption in law and order. The pre-revolutionary legal system became null and void. Many new laws and decrees were proclaimed. Due to the frequent changes in government since 1917, laws and orders were changing rapidly, sometimes creating confusion among ordinary people. And after the start of the civil war, the legal system collapsed.

Arbitrary arrest, rape, murder, and abduction were widespread in Russia (Pasternak, 1958, p. 320). During the Civil War, thousands of Soviet citizens were arrested and without any trial or material evidence of a crime, they were imprisoned, exiled, or shot (Harris, 2016, p. 31).

The description of robbery and murder in daylight is often found in this novel. Pasternak describes, "The period confirmed the ancient proverb", "Man is a wolf to man." Traveller turned off the road at the sight of a traveller. A stranger meeting stranger was killed for fear of being killed. There were isolated cases of cannibalism. The laws of human civilization were suspended. The jungle law was in force. Man dreamed the prehistoric dreams of the cave dweller" (Pasternak, 1958, p. 313).

Socialism promises people equality, the equal right to land and food and government control of resources. But in Russia, the downfalls during the civil war led the people and supporters of the Bolshevik party to cheat on their beliefs. Sometimes government officials were found to involve in corruption to survive. In *Doctor Zhivago*, some families in Yuratin are seen depending on the extra goods they used to get from Samdeviatov. Yurii's family also received much undue support from him. According to James Harris, when the revolutionaries resorted to terrorism, the old regime suspended all legal norms (Harris, 2016, p. 30).

Economic crisis: The civil war disrupted the country's economic order by altering all normal conditions in agriculture, industry, trade, and the monetary system. The novel records the severe financial crisis of post-revolution Russia. Pasternak depicts the heart-touching scenario of hunger, death, scarcity of daily necessities like medicine etc.

Famine and Scarcity of necessary commodities: People from every stratum of society suffered due to the famine. Their miseries due to food scarcity can be seen everywhere in this fiction. Rice and flour literally vanished from Russia. People were living on potatoes only. Pasternak said, "For a long time, most people's daily food consisted of thin millet boiled in water and soup made of herring heads; the herring itself was used as a second course. A sort of kasha was also made of unground wheat or rye" (Pasternak, 1958, p. 165). Many people didn't even get this. The horrors of famine devastated the whole of Russia. The death toll was rising every day. E. H. Carr describes it as, "…hunger is more often indirect than a direct cause of death" (Carr, The Bolshevik Revolution 1917-1923, 1952, p. 284).

Boris Pasternak depicts a scene of hungry days in Moscow. During those days, Yurii got a duck as a present, and it seemed so lavish that Pasternak wrote about this, "The large duck was an unheard-of luxury in those already hungry days, but there was no bread with it, and because of this its splendour was somehow pointless-it even got on one's nerves…. But the saddest thing was that their party was a kind of betrayal. You could not imagine anyone in the houses across the street eating or drinking in the way at the same time. Beyond the windows lay silent, dark, hungry Moscow. Its shops were empty, and as for game and vodka, people had even forgotten to think about such things" (Pasternak, 1958, p. 147). Yurii Andreievich Zhivago and his in-laws belong to an aristocratic identity. But soon after the revolution, they were found running out of food. Later on, the Zhivago are seen starving. The condition of Zhivago's family had worsened so much that they had to leave Moscow and set off to Varykino for survival, where they tried to get a share of land and produce food for themselves.

Food crises reached their peak after the civil war. The name of bread had vanished from the earth. The food supplies were like a drop in the ocean (Pasternak, 1958, pp. 316, 327).

As a result of the civil war, agriculture and industry were destroyed. Agricultural production fell by one-third in 1921 as compared to 1913. Industrial production plummeted in 1921 in coal, oil, iron, engineering, sugar and textile industries by 30.6; 42.7; 1.6; 9.7; 6.7 and 7.5 per cent compared to 1913. Soon after the civil war, 8 million people died in the famine, 3 million more in the epidemic (Rono, H. A., 2014, pp. 350-51).

There was also an acute scarcity of other consumer goods like firewood, fuel, medicine, and vodka. In *Doctor Zhivago,* people are seen to mix alcohol with

water and use it as an alternative to Vodka. People's suffering knew no bounds during winter because of the shortage of firewood. Once a gentleman like Yurii is seen stealing a beam of wood from a government institution (Pasternak, 1958, p. 163).

Epidemic: Besides war and hunger, people were dying from epidemics. Russia was outraged by typhus, scurvy, influenza and many other diseases. Because of the medical system mismanagement, the death rate in epidemics was exceedingly high. The novel mentions epidemics and the crisis in the medical system several times. The outbreak of Typhus was very acute. Hospitals were unable to give medical support to a vast number of people. So they started to take refuge in railway stations and die miserable death (Pasternak, 1958, p. 176). According to David Bullock, 5 million people died in the ensuing famines of 1921-22, directly resulting from the economic disruption of revolution and civil war. The number of civilians surrendered to typhus, typhoid and cholera epidemics in 1918-21 and the Spanish flu pandemic of 1918-19 totalled-14 million (Bullock, 2008, p. 133).

Inflation: Along with other crises, the rapid devaluation of money made life more difficult. The Russian economy went through the fatal inflation of all time. The scarcity of money and inflation went so extreme that people started to exchange products. In *Doctor Zhivago,* Tonia is found to exchange her favourite wooden wardrobe for only a few pieces of firewood and later on, she is seen to exchange a towel with roasted hare meat (Pasternak, 1958, pp. 166, 183). One thousand rubbles were worth a kopeck after the introduction of NEP (New Economic Policy). Money was called 'lemons' (Pasternak, 1958, p. 425).

E. H. Carr points out that this exchange of goods was not only 'the chief method of collecting foodstuffs' but also 'the test of a correct mutual relation between industry and agriculture (Carr, The Bolshevik Revolution 1917-1923, 1952, p. 332).

The revolutionary government made some attempts to resolve the monetary problem. A commission was appointed to advise the government on currency policy. In November 1921, it was decided to inaugurate a new currency issue of which one ruble would be equivalent to ten thousand rubles of the previous issue (Carr, The Bolshevik Revolution 1917-1923, 1952, p. 348).

Inflation, a fall in industrial and agricultural production, and the government's failure to maintain the market led to a severe famine. E. H. Carr opined that a catastrophic decline in industrial production and breakdown in the state-controlled distribution of commodities at fixed prices led to the rapid growth of illegal private trade at runaway prices and severe inflations. All of this caused a famine which led to the refusal of the peasants to supply necessary grains to the towns (Carr, The Bolshevik Revolution 1917-1923, 1952, p. 272).

When 'War Communism' was not working to recover the economic order, the Bolshevik government introduced NEP (New Economic Policy). Under NEP, strict control over trade was slightly relaxed, and markets were made open to some extent. But the petty bourgeoisie and bourgeoisie also reinforce their position. Haider Akbar Khan Rono opined that there was also the risk of a rise in capitalism because of the policies taken in NEP (SSS p. 351).

The tyranny of the speculators was apparent. According to Pasternak, speculators had made fortunes from the beginning of the introduction of NEP. Artists and scholars close to the government set up houses on a comfortable scale (Pasternak, 1958, p. 397).

After the ban on private enterprise was withdrawn, trade within narrow limits started. Unfortunately, speculation and profit-mongering were outraging the economy. It only benefitted a few people, and they did nothing to relieve the squalor of the town. It could hardly lessen the miseries of ordinary people (Pasternak, 1958, p. 391).

According to Peter Gatrell, money as a medium of exchange literally lost its function between 1918 and 1920. Established economic links were broken, and production collapsed. In 1921 industrial production was merely 12 per cent compared to 1913. It was an economy of absolute shortage. Workers who were on their jobs used to receive payment in kind and exchanged goods to survive. Many returned to the village. Russia faced a demographic haemorrhage (Gatrell, 2008, p. 390).

Communication: The communication system was damaged in warfare. In the novel, we can see the wretched condition of rail communication. Trains became very rare at that time. Getting a train was a question of luck (Pasternak, 1958, p. 176). And in this situation, if someone got trains, there were hardly any passenger coach. After the civil war, most railways were out of use, being neglected and covered with snow. Because of the lack of fuel, the trains stood idle. Transportation had been stopped. Yurii is found being forced to walk all the way back to Varykino.

Forced Labor and Concentration Camp: The most horrible nightmare in post-revolution Russia was forcefully taking people for labour or sending them to the concentration camp. Pasternak records many such incidents in his novel. During their train journey, the Zhivago family met several labour conscripts who had been taken without their will at gunpoint. These people didn't even commit any crimes (Pasternak, 1958, p. 184). Even doctor Yurii Zhivago was suddenly conscripted from a road and couldn't even inform his family at gunpoint. He was taken to a Partisan's camp in a forest in Siberia. There he was forced to serve as a medical officer. Pasternak depicts the tremendous sorrows Yurii went through in the camp,

being separated from his friends and family. Later on, Yurii escaped from the camp.

The novel sporadically records the terrifying condition of the concentration camp or the Gulag. Yurii's one friend Gordon described the concentration camp as worse than frontline fighting in the war. He said, "It was a bliss compared to the horrors of the concentration camp..." . He described, "We got sent to just about the worst of the penal camps. There were very few survivors. Our arrival, to begin with. We got off the train. A wilderness of snow. Forest in the distance. Guards with rifles, muzzles pointing at us, wolfhounds. At about the same time, other groups were brought up. We were spread out and formed into a big polygon all over the field, facing outward so we wouldn't see each other. Then we were ordered down on our knees and told to keep looking straight ahead in pain of death. Then the roll call, an endless, humiliating business going on for hours and hours. And all the time, we were on our knees. Then we got up, and the other groups were marched off, and ours was told: 'This is your camp. Make the best of it!' An open snow field with a post in the middle and a notice saying: 'GULAG 92 YN 90'—that's all there was" (Pasternak, 1958, pp. 418-19).

Millions of innocent people were incarcerated in the concentration camp or Gulag, serving sentences of hard labour. In the camps, prisoners worked outdoors and in mines, in arid regions without adequate food, clothing, tools, shelter, water, etc. Many prisoners suffered from starvation, diseases, violence, and cold, and many people died (David Hosford).

Gulag stands for *Glavnoe Upravlenie Lagerei* (Main Camp Administration). It was formally created in 1929, but the origin of the Soviet system of penal labour can be traced earlier to the 1920s. It was not only vast networks of prisons or labour camps but also places of exile for forced labour (Applebaum, 2003, p. 50). During the Great Terror of 1937–1938, the Gulag further expanded. The secret police arrested 1.6 million people during those years. Most were arrested as the "enemies of the people" and "counter-revolutionaries" (Gheith, 2011, p. 2). Anne Applebaum opined that people were not detained for anything they had done but for who they were (Applebaum, 2003, p. xxxiv).

A Gulag survivor Sira Stepanovna Balashina who was exiled in 1930, tells the horrible story of how she and her whole village were deported. She said, "They dekulakized us initially, but our holding wasn't huge. There were a lot of people in the village who were dekulakized. Fifteen families, maybe. It was a big village. In 1930. Sometime in February. Well, we were already condemned to exile…I don't even really know anymore. They said, "Get ready." Get ready; how? The carts drew up and sat down. And they took us away." According to her, they were taken to Lebiazhevskii Station, where she had seen a lot of people being conscripted. The hall in the station was jam-packed. Lots and lots of people from all over the district were brought in. And then they were loaded in trains and sent to the concentration camp. Her sister and parents died because there wasn't enough to eat. They got sick and died" (Gheith, 2011, pp. 20-22). The number of camps'

inhabitants rose gradually from about 179,000 in 1930 to half a million by 1934. Due to the massive influx of prisoners during the Great Purges in 1937 and 1938, the camp populations grew to 1.5 million by 1940. Besides, during the 1930s, the number of people in police-run prisons and colonies reached 254,354 in 1935 and 887,635 by 1938 (Shearer, 2006).

This scenario of deporting and ultimately death because of hard labour and food scarcity was prevalent then. According to Jehanne M Gheith and Katherine R. Jolluck, in the Gulag, millions of people died, and millions more were drastically disrupted by exile, arrest or hard labour in camps or the labour army. The effects have been evident in people's memories, fiction or other art forms, and many social phenomena (Gheith, 2011, p. 01).

5. Displacement and Deporting

Many people were displaced from the place they had been living since birth, and further settlement was impossible due to the anarchic situation. Many of the former empire's intellectuals, scientists, artists, doctors, actors, administrators, etc., migrated from Russia during and after the civil war. The diaspora has been estimated from 2-3.5 million (Bullock, 2008, p. 133).

At the peak of the civil war, when Moscow was burning, Doctor Yurii Zhivago and his family moved to Siberia. Many people kept moving from one place to another, and many people were deported. Doctor Zhivago's 1st wife, Tonia and her children were deported to Paris after the end of the civil war. This also caused break in familial ties. Yurii lost his family forever. Lara also could never reunite with her husband. This was the story of a large number of families in Russia.

6. Despair and Alienation

In the aftermath of the revolution and civil war, the crisis was accompanied by the breakdown of familial ties and moral values in society. Yurii belonged to an aristocratic family and was seen to steal wood from the roadside. He is seen to tell his wife, "Remember, there aren't any honest people left, or any friends" (Pasternak, 1958, p. 165). Revolution and consequent turbulences had a tremendous impact on people's family life. The novel's protagonist, Yurii Zhivago, could barely maintain a happy family life. Again and again, he had been taken away from his family. Ultimately he couldn't reunite with his family because they were deported to Paris. Lara Antipova's school teacher husband is seen to leave family and became a renowned officer in White Army. But they could never find peace again in life. Once, they had a happy family life which they never got back.

Revolution drew a dividing line among the people. It has 'declassed' (Lyric, 2020) many of the aristocrats. However, two opposing sides were formed, the Mensheviks-who believed in capitalism, and the Bolsheviks, who wanted socialism immediately. And the civil war began. Citizens of Russia found themselves on opposite sides who once were the same. In Yurii's hospital, the doctors were divided.

Even families became divided on this issue. Pasternak wrote, "This class war has run between us like the black cat of discord, and just took at what it's doing" (Pasternak, 1958). During Civil War, Strelnikov is seen fighting against Galiullin, his childhood friend and his comrade in arms in World War I (Pasternak, 1958).

The upper-class and middle-class people were in a dire identity crisis. Revolution bred hatred for the middle class, and it became unsafe to acknowledge that one is educated. After the revolution, Yurii had to hide that he was a doctor in public for a long time. It was also risky to admit family ties to the old wealthy families of Russia. Zhivagos are seen to live in fear as once they belonged to wealthy families. People were unable to bear this situation anymore. All they wanted were freedom from this chaos. They wanted to see a definite outcome. Mr Yurii Zhivago was found to say with regret that those who cherished the revolution aren't at home in anything except change and turmoil. According to him, man is born to live, not prepare for life. All these factors and the violence of the civil war disheartened people from the revolution. People were sinking in extreme distress. Their aspirations and high hope for revolution were falling apart. Pasternak expressed the despair of peasants and workers, "When the revolution woke him up, he decided that his century-old dream was coming true—his dream of living on his own land by the work of his hands, in complete independence and with no obligations to anyone. Instead, he found he had only exchanged the oppression of the former state for the new, much harsher yoke of the revolutionary super state. (Pasternak, 1958, p. 248).

C J Polychroniou expressed his view regarding the hope and reality of revolution. He said, "Dreams are surely renewable, and a new world is waiting to be born, but the possibilities available to create an equalitarian, socially just, ecologically friendly, and decent society lie outside October's ideas, practices, and policiesevolution" (Polychroniou).

7. Mental Trauma

High aspirations of revolution and ultimate disappointment, destruction of civil war, bloodshed etc., created a traumatic situation. People are gradually losing their normal mental health. Yurii's friend Dudorov had been drafted into the army by mistake, and later on, his behaviour became erratic due to mental trauma. Strelnikov, once a mighty officer, committed suicide out of frustration. In addition, Pamphil Palykh, a soldier and devoted revolutionary, fought in World War I and the Russian Civil War and later became mentally unstable. He was always anxious about his family falling into the hands of the White Army and being brutally killed. Pamphil became insane and grew insomnia and hallucinations. Yurii tried to help him. In the end, he killed all the family members with his axe so they wouldn't have to face the atrocities of the Whites.

But once upon a time, Pumphil had an everyday life. He is seen to tell Yurii, "My wife and I, we were young. She looked after the house. I worked in the field.

It wasn't a bad life. We had children. They drafted me into the army. They sent me to the war……Then the revolution. I saw the light. Not the Germans, the Fritzers, were the enemies, but some of our own people...Then came to the civil war…After all that, what do I see now, at the present moment?" (Pasternak, 1958, p. 290). People couldn't bear the distressing conditions. The romanticism of revolution ended up with the violence of civil war.

Conditions of Women and Children: Women and children suffer most in violent situations. Pasternak writes about the sufferings of female hordes during the civil war, "Trudging on foot, loaded with sacks, bundles, and babies, a young mother who had lost their milk, driven out of their minds by the horrors of the journey, abandoned their children, shook the corn out of their sacks onto the ground, and turned back. A quick death, they had decided, was preferable to slow death by starvation. Better to fall into the enemy's clutches than to be torn to pieces by some beast in the forest" (Pasternak, 1958, p. 298).

At that time, most women were housewives, farm labourers, mothers, and industrial workers, who chose the path of easy virtue to stay alive or find enough food to eat. Some women were forced down that road because of hostile environments. According to Bolshevik statistics, the number of women involved in prostitution had increased over the 3 per cent mark in 1917. During the increasing adversities of the civil war, this number must have gone higher. Women were also engaged in the camps, cooking, nursing, and occasional prostitution, sometimes the same woman in all these roles. The first-hand military memoirs, both Red and White, recorded general acceptance and appreciation of these women (Bullock, 2008, p. 107).

Boris Pasternak portrays women who were actively participating in the revolution. They participate in processions and speeches regularly. Socialist revolutionaries were surprised by the women's role in the revolution. During the revolution, the Bolshevik newspaper, *The Pravda,* praised women for being in the demonstration and encouraging men to come out to the streets (Steinberg, 2017, p. 28).

In the Novel, Pasternak portrays a very dedicated women soldier Christina, who later died in World War II. The Reds had many women soldiers, thousands were in the support services, and hundreds also took up arms. The 22-year-old beautiful Larissa Reissner was a wonderful example. According to literary critics, she served as the physical prototype for 'Lara' in Boris Pasternak's *Doctor Zhivago* (Bullock, 2008, p. 112).

After the revolution and the Civil War, many orphans were seen in Russia, called *bezprizornaia*. Most of their parents died during the civil war or in the purge. They used to roam around the country, which later created a severe problem for the state. In this novel, Doctor Yurii Zhivago and Lara's lost daughter, Tania, was portrayed as a bezprizornaia, who later became a laundry girl in the army (Pasternak, 1958, p. 425). These orphan children were the direct outcome of the revolution and civil war. In revolutionary Russia, the regime faced the daunting

task of getting hordes of abandoned and homeless children (*besprizorniki*) off the streets (Kirschenbaum, 2001, p. 01). World War I, Revolution, civil war, famine, and violence left tens of thousands of orphans. In 1945 there were 680 thousand orphans in Russia (Valeeva & Aidar, 2015, p. 2123).

8. Conclusion

The Bolshevik revolution has undoubtedly been an incident of celebration within and beyond Russia. But the miseries, trauma, and strains its subsequent civil war brought have questioned the glory and outcome of the great event. The politics of revolution has been the root of the persistent enthrallment with Russia's twentieth-century economic history. The events of 1917-18 foreshadowed a more equitable and humane, well-equipped modern social and economic order, which seems to hold out hope for millions of impoverished, suppressed and oppressed people in and outside Russia—as believed by the Bolshevik leadership. On the contrary, to the opponents of Bolshevik, the revolution has reversed the economy by half a century, even the economic progress achieved before the tsarist regime under the façade of so-called social and economic goals. It is considered barbaric and destructive because of the totalitarian nature of the state. In this connection, Marot responds, "The seminal event of the twentieth century was not the victory of the October Revolution in 1917 but its final destruction between 1929–33" (Marot, 2012, p. 01). These stands of the two opposite poles have primarily contributed to shaping the lens of assessment, for the next generations, of the aspiration and performance of the revolution at boosting the Russian economy during the twentieth century (Gatrell, 2008). The myth and romanticism revolution possesses, the lofty aspirations the leadership delivers, and the reality the common mass comes across show a paradox to the later generations who look back to history through their own approach and understanding. In his Doctor Zhivago, Pasternak has portrayed strains and trauma, myth and broken dreams, sufferings and deaths a revolution may cause against the hope and aspiration of the activists and leaders of revolution—the other side of the coin.

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Determinants of SME Business in Mymensingh

Md. Tanjil Hossain*

Abstract

The objective of this study is to examine the role of Small and Medium Enterprises (SME) to reduce poverty and unemployment in Mymensingh. Unemployment is major problem in Bangladesh. The unemployment rate is about 4.5 % in Bangladesh. The Small and Medium enterprise growth are about 26% and 8% respectively. Small and Medium enterprise employment growth are about 17% and 12 % respectively during the time between 2003 and 2013. The poor is about 50% and extreme poor is 30% in Mymensingh. So, Mymensing is the important place to study. To surve th purpose, the data have been collected from 252 (SME) owners from three upazilas of Mymensingh. This upazilas are Trishal, Valuka and Mymensingh Sadar during the time between 3rd December 2020 to 3rd January 2021. In this study OLS method is used to determine the determinants of SME turnover. The results show that access to SME credit, education, total investment and initial investment are positively and significantly related to turnover. Another important finding is that the more the educated SME owners are the higher the turnover is. This encourages educated person to start SME business. This indicates that if SME credit is increased the turnover will be high. It is also seen that the higher the initial and total investment is the higher the turnover is. The R2 is 0.50. This indicates that the explanatory variables can 50% explain the variables. It is also seen that women entrepreneur is only 8% in the study area. In addition to this, the SME owners receive more loan from private banks than the public banks although the rate of interest was high in private banks during the study time in the study period. So, policy should be taken to increase women entrepreneur and public banks officials behaviour is to be improved.

Key words: *SME credit · Women entrepreneur* · National SME Policy 2019

Introduction

Small and Medium Enterprises (SMEs) are considered as a potential sector for solving unemployment problem through new employment generation. This sector

* Associate Professor, Department of Economics, Jatiyo Kabi Kazi Nazrul Islam University. Email: tanjilhossain@yahoo.com

has been playing a significant role in achieving economic growth and earning foreign currency by encouraging and expanding the business activities. Small and Medium Enterprise (SME) can play an important role to generate employment, investment, export and economic growth. The contribution of broad industry to GDP is about 35.36 percent (BBS) in fiscal year 2019-20. Industry consists of cottage, micro, small, medium and large industries. Among these five industries Small and Cottage Industries contribute a large portion to GDP in Bangladesh. For rapid industrialization government announced National Industrial Policy-2016. The objective of this industrial policy is to generate employment and increase number of entrepreneur by providing loans to the appropriate entrepreneur. SMEs help to expand large scale industry through forward and backward linkage. Many developing countries including Taiwan, Vietnam, South Korea, Chaina has successful story of SME. SME can play vital role for the industrial development of Bangladesh. The sub industries of SME can be defined as follows: Rice Mills, Bakery, Flour Mills, Light Engineering Works, Printing & Publishing, Readymade Garments, Saw Mills, Soaps, Plastic Products, Automobile Servicing & Repairing. The challenges of SME are financing and marketing. The advantage of financing in the SME is taken by the owners of Medium Entrepreneur because the medium enterprise always keep their record and documentation. According to the National Industrial Policy 2016, the definition of Small and Medium Enterprise (SME) are as follows.

The definition of SME can be summarized in the following table :

Industry	Sector	Capital	Number of Workers
Small Industry	Manufacturing	75 lakh to 15crore	31 to 120
	Service	10 lakh to 2crore	16 to 50
Medium Industry	Manufacturing	15 crore to 50 crore	121 to 300
	Service	2 crore to 30 crore	21 to120

Source: Bangladesh Industrial Policy, 2016

Small and Medium Enterprises (SME) are categorized into three parts which are trading, service, and maufacturing

The poor is about 50% and extreme poor is about 30 % in Mymensingh (BBS). The national unemployment rate is 4.5% (labour force survey) The data has been collected from the following enterprises : Fisheries, Horticulture, Feed Mill, Automobile service center and workshop, Auto Rice Mill, Hachery, Bekary, Printing and Press, Muri Manufacturing Dairy farm, Trading Business.

Poverty is multidimensional and complex issue but the dynamics of poverty are indeed very much complex involving many inter-related and often interaction variables. Poverty is defined as the condition of lack of education, Inequality in land ownership landlessness, inequality in income distribution lack of income

opportunities and poor government policies.

Small and Medium Enterprises:

SME is engine of growth in Bangladesh like any other developing countries. This sector's contribution in terms of employment generation, economic value addition and business activities is enormous.

With about 7.8 million SME units. This sector is contributing almost 25 percent of GDP, 11 percent of total industrial investment, 30 percent of total industrial employment and 40 percent of total manufacturing outputs. Basically, most of the establishments of the SMEs are labour intensive. Which emeate employment opportunity for available and cheap labour force. At the same time the cheap labour has made the SMEs the fastest growing sector. The growth trajectory of SMEs shows that small industries grew faster with 26.55 percent growth during 2003-2013 followed by medium industries. Employment generation growth is also larger in small industries between 2003 and 2013.

The National SME Policy, 2019 has been framed creating equal opportunities for all and ensuring equal opportunities for all and ensuring economic empowerment through increased involvement of women in the SME sector. The Cluster based SME Development is going to be adopted by identifying 117 clusters throughout the country. The government is putting its endeavor to enhance the contribution of this sector to 32 percent by 2014. A broad based strategy has been set in the 8th five year plan 2020-24 which are top most attention will be given to protect the jobs and enhance new jobs in the cottage. Micro and small enterprises (CMSE) that presently employ an estimated 21 million people.

Table1: SME Establishments and total Persons Engaged by categories:

Type	**Establishments**		**Total person Engaged**			
Type	Total	%	Total	%	Male	Female
Small	859318	10.99	6600685	26.34	5844088	756597
Medium	7106	0.09	706112	2.88	538526	167586

Source: Economic unit cencus-2013, Bangladesh Bureau of statistics

Table 2: Growths of SME in Bangladesh

Economic	2013	2003	Annual Growth Rate 2003-2013
Small	770063	72935	26.58%
Medium	7105	3236	8.08%

Source: Economic Units Census-2013, Bangladesh Bureau of statistics

Table 3: Employment (TPE) Growth in SME in Bangladesh.

Economic Units	2013	2003	Annual Growth Rate
Small	6330577	1304935	17.22%
Medium	706111	221123	12.31

Source: Economic Units Census-2013, Bangladesh Bureau of statistics.

The above tables shows that the Small and Medium enterprise business growth is about 26 % and 8% respectively during the time between 2003 and 2013. In addition to this Small and Medium Enterprise employment growth rate is about 17% and 12 % respectively during the time between 2003 and 2013. So small and Medium enterprise can play an important role to generate employment in Mymensingh as well as in Bangladesh.

Significance of the study

Bangladesh is a country where poverty and unemployment main economic problem. In 2018-19 poor was 20.5% and extreme poor was 10.5% (BBS). According to labour force survey, the unemployment rate is about 4.5%. The contribution of SME to GDP is about 26%. This SME generates substantial employment opportunity in Bangladesh. This sector has been playing an important role to reduce poverty and unemployment. In Mymensingh, extreme poor is 30% and poor is about 50 % in 2018-19 (BBS). So, SME can play an important role to reduce poverty and unemployment in Mymensingh

Limitation of the study

The role of SME is very important to generate employment and output of Bangladesh. This study is conducted in only one district and only 252 samples are collected due to shortage of fund. This study is conducted based on UGC and Jatiya Kabi Kazi Nazrul Islam University's budget. The budget is only 2,34,000 (Two lacks and Thirty four thousand taka). If the budget is more we can take at least 1000 sample from at least eight divisional headquarters of Bangladesh. Then, this study can be representative for whole country of Bangladesh. In addition to this we did not get up to date article of the world. The library facility of our university is not enough to conduct up to date study on research. Along with this, the main copy of Econometric software such as Eviews, STATA, R, Pythone are not available. We use pirated copy to conduct this study. That's why we faces lot of problem to analyses the results. Fake SME loan receiver are not able to pay the loan. So, Actual SME businessman cannot get loan. SME Loan recovery problem. Political Reference is required to get loan in public bank. Private Bank should participate in the National Industrial Policy 2016, and SME Policy, 2019. Direct relationship between SMEs and poverty reduction is not found in the study area. That's why we examine the determinants of SME business.

Literature Review

SME policy 2019 shows that the government will provide the required assistance to the concerned organizations in order to create a favorable climate and expand the essential infrastructure for the SME sector's growth. The government is aiming to increase funds in this sector and has the policy to find skilled labor. The government would take appropriate efforts to enhance loans, credit risk reduction, and credit transaction through Bangladesh Bank, commercial banks, and SME in order to expand the scope of institutional funding facility in the SME sector. The government will also take the necessary step of collaborating with the private sector and providing money to improve the training program for small and medium Enterprises.

Bangladesh bank as well as other banks and financial organizations have taken many programs to expand the SME enterprises. They are monitoring various SME sectors and listing them in order to provide loans with the fewest formalities and with the least credit risk. The government supports women who are engaged in the SME sector and gives them loans so that they can expand their business.

Ferdous Ara 2020 reported that the Bangladesh Small and Cottage Industries Corporation (BSCIC) and the SME Foundation are the organizations in charge of implementing the SME Policy's strategic goals and action plans. BSCIC and SMEF would get both financial and non-financial support from the Ministry of Industries (MOI), which is in charge of reviewing progress and monitoring action plans. The government undertakes a number of time-bound activities to help the SME sectors thrive and to assist them in exporting their products to the international market.

Analysis of SME research project of Bangladesh

Mamunur Rashid (2012) analyzed that SME organizations are labor-intensive organizations in which capital is low. An SME's success or failure is determined by important internal and external activities and environments, such as management, marketing, financing, production, distribution, research and development, labor, government laws and regulations, and the business environment.

Aladdin & Chowdhury (2015) evaluated that SMEs are backbone of Bangladesh economy and this sector plays important rule to enhance our fragile economy. This industry contributes to the reduction of poverty and the creation of numerous job opportunities. They also find out that the different financial sectors are helping SMEs to expand their market opportunities.

Jahirul, (2011) analyzed that Small and Medium Enterprises (SMEs) provide low-cost employment and economic flexibility. Many of the SMEs are export-oriented, indicating that they are internationally competitive. Given the importance of the SME sector in Bangladesh's economy and an awareness of the restrictions that such businesses face, it is clear that measures to promote the development and expansion of SMEs are required. He also finds out that SMEs are situated in both rural and urban areas and create employment in both areas. He discovers that the government and other financial institutions are supportive of these industries.

Analysis of SME articles

Islam, Rahman, & Nisat, (2020) Evaluated that during the lockdown, the majority of small and medium enterprises were closed and others were partly opened. They conducted a survey of 18 districts in Bangladesh. During that time, their production also declined, as did demand for the product due to a shortage of transportation. Dropped demand and the burden of fixed costs to run the business were prominent reasons behind the fall in profit. They find out that impact of Covid-19 the workers losing jobs and widen the gender discrimination.

Khalil 2020, Reported that Covid-19's influence on the GDP rate is just 4%. SMEs in our country would barely suffer, because this sector generates 20% of our GDP growth and roughly 40% of employees in these areas. After the 4month lockdown 68 % of the small businesses were closing down. Though the government and various private sectors took substantial initiatives to revitalize SMEs after the lockdown, they were insufficient to cover all of the locations. This report mainly based on secondary data focused on Bangladesh.

Hossain June 2021, Showed that The COVID-19 pandemic has had a significant impact on various indicators of Bangladesh's economy, including the readymade garment sector, foreign remittance, bank and financial Institutions, food and agriculture, local trade, foreign trade, GDP, SDGs, government revenue, and so on. He also suggest that if the economy are continuing in such way the country will face a long term recession so government should take the sufficient policy to overcome the situation.

Md.Qamruzzaman 2020, Focused on SMEs in Bangladesh and found that the impact of Covid-19 the contribution of SMEs in the economy might be lower. In the lockdown time the SMEs are adversely affected by crisis persistent instability. The government of Bangladesh should support the people who are engaged to the SMEs business and solve the problem immediately. He also said that although the SMEs are the businesses most affected by the pandemic, they are also crucial for a sustainable economic recovery.

Methodology

This chapter deals with the research methodology which includes questionnaire design, method of data collection. The assessment includes quantative methodologies using structured questionnaire.

Questionnaire Design

A structured questionnaire is constructed on the basis of literature review to conduct a survey. Before finalization of present research questionnaire a draft questionnaire was developed and pre-tested and on the basis of the field experience, necessary corrections were made. This questionnaire extracted information related to respondents household income, household expenditure, savings, credit,

Types of Data and Data Collection Method

The study used both primary and secondary data collected from various sources. The primary data are collected from the owner of various SME structured questionnaire using interview supported by key informants' interview, focus group discussions and personal. Secondary data were obtained from published books and journal articles, as well as unpublished annual reports and records from government offices and other relevant organizations. There are many SME institutions in Mymensingh. For primary data collection the address of SME firms have been collected from Mymensing Chambers of Commerce and Industry (MCCI) and various bank of Mymensingh including Islami Bank, Trishal, Mymensign. The secondary data have been collected from District Statistics Office, Mymensingh and Bangladesh Small and Cottage Industries Corporation (BSCIC), Mymensingh. All data collection processes are completed under close supervision of the researcher.

$$LnY = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \varepsilon \quad \text{..... (1)}$$

Where,

LnY	Log of Yearly turnover / Log of Yearly Production
X_1	Access to SEM loan (if access=1, 0 Otherwise)
X_2	Marital status of household (if yes=1; 0 Otherwise)
X_3	Level of education in year
X_4	Experience of business in year
X_5	Total member of household
X_6	Log of initial investment of enterprise in BDT
X_7	Log of total investment of the enterprise in BDT
X_8	Total number of worker in the enterprise
X_9	Access to training (if access=1; 0 Otherwise)
β_0	Constraint
$\beta_1 - - - - \beta_n$	Estimated parameter

The study apply both quantative (structural questionnaire and qualitative checklist). We conduct an small and medium enterprise (SME) survey of 252 firms in three upazilas such as Mymensingh Sadar, Trishal and Valuka of Mymensingh during the time between 3 December, 2020 to 3 January 2021. This study conducts 20 key Informant Interview (KII) with members of Bangladesh Small and Cottage industries Corporation officials, Officers of various commercial Banks including public and private banks representative. In this study, model- (1) is used to estimate

the impact of various variables on SME turnover. This model is estimated using economic software STATA.

Results and Discussion

The coefficient of access to SME loan is positive and statistically significant. This indicates that access to SME loan increase yearly turnover of enterprise. The coefficient of education of SME enterprises owner are positive and statistically significant. This means that the higher the level of education of enterprise owner, the higher the yearly turnover of the owner is. The coefficient of total investment, the coefficient of workers of the SME enterprises are positive and statistically significant. The magnitude of R^2 is 0.50 which indicates that independent variables of the model can explain 50% of the variations of the dependent variables. st

Empirical Model

Dependent Variable: Yearly Turnover

Variables	Coefficient
Gender	1.438 (1.29)
Access to SME Loan (T)	0.326* (2.09
Education of SME Owner (edu)	edu 0.0461** (2.64)
Family Size (F_size)	F_size 0.00267 (0.14)
Experience of Enterprises (expri)	expri 0.000259 (O.03)
Initial Investment (In invest)	-0.0482 (-0.85)
Total Investment (T_invest)	0.602*** (8.22)
worker	0.0178** (3.25)
Train	-0.166 (-0.94)
_cons	5.189*** (4.00)
R^2	0.50
Adjusted R^2	0.48
F	24.66^{***}

Factors influencing Yearly income of SME Enterprise

The independent variables used in explaining the yearly income of SME Enterprise were gender, access to SME loan, level of education of owner of SME enterprise family size of the respondents, experience of businessman, initial investment of the firm, total investment of firms, the number of workers, and access to the training

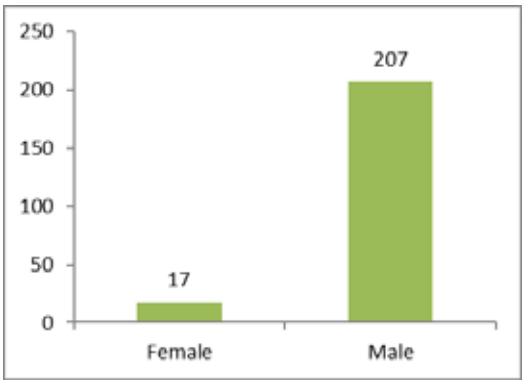
of the firm. Co-efficient having sufficient degrees of freedom were tested for significance level at 1 percent, 5 percent and 10 percent probability; Co-efficient of multiple determinations (R2) indicated the total variations of output explained by the independent variables included the model; F-values were used to measures the goodness of fit for different types inputs.

Above table shows that the intercept term was positive, which means that if all the independent variables gender, access to SME loan, level of education of owner of SME enterprise family size of the respondents, experience of businessman, initial investment of the firm, total investment of firms, the number of workers, and access to the training of the firm were absent, yearly income must happens. The estimated value of the coefficient of gender, access to SME loan, level of education of owner of SME enterprise, family size of the respondents, experience of businessman, total investment of firms, the number of workers income, were positive with SME enterprises yearly turnover, On the other hand, initial investment of SME enterprises and access to the SME training of owner of SME coefficient were negative with individual SME owner yearly turnover. The coefficient of gender, family size and experience are positive but statistically insignificant. The coefficient of initial investment and training are negative and statistically insignificant.

The coefficient of access to SME loan is positive and statistically significant. This indicates that access to SME loan increase yearly turnover of enterprise. The coefficient of education of SME enterprises owner are positive and statistically significant. This means that the higher the level of education of enterprise owner, the higher the yearly turnover of the owner is. The coefficient of total investment, the coefficient of workers of the SME enterprises are positive and statistically significant. The magnitude of R^2 is 0.50 which indicates that independent variables of the model can explain 50% of the variations of the dependent variables.

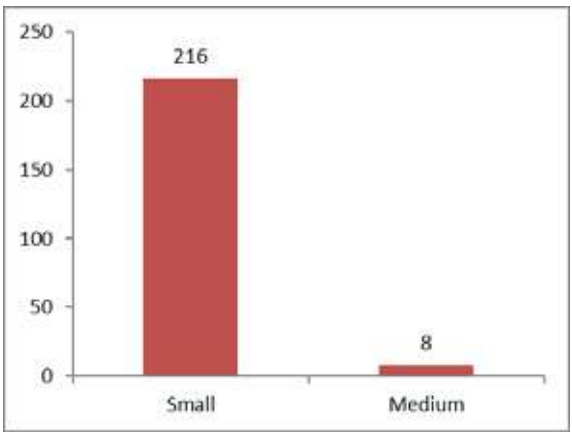
The Value of Inflated Factor (VIF) is 1.36 which is less than 10. This indicates that this model is free from multi collenearity problem.

Figure 1: Gender of the respondent



Among these SME firms 92. 41 % are male and 7.58 % are female

Figure 2: Types of Business



Among the surveyed firms, the proportion of small firms is 96.42 % and medium firms is 3.57 % . Small firms are higher than medium firms.

Conclusions and Recommendations

The results show that access to credit, education level of the owners of small and medium enterprise play positive role to increase turnover of the SME business. So, SME loan should be provided to the right SME businessman with simple and easy conditions. The data shows that the SME loans disbursement have been increased over the years. But field experience of the study area shows different picture. The SME businessman claim that they faces lot of problems to get loan from government banks. In this banks behavior of the officers and staff are not good. Sometimes, political reference is required to get SME loan. In addition to this broker and agents or middleman take opportunity and take money to arrange SME loan. Some corrupted officers take bribe to sanction SME loan. It is seen that SME businessman take more loan from private banks than public or government banks although rate of interest is high private bank compared to the public banks. So, measures have to be taken to eradicate these irregularities. One of the solutions is to form economic intelligence agency to eradicate these corruption. Moreover, Punishment and justice have to be ensured.

In Bangladesh, educated persons unemployment is high. They want public and private job but job opportunity is limited relative to the number of persons seeking jobs. But they do not like to become entrepreneur. But the study shows that the educated SME businessman turnover is high. So, educated person can do business becoming an entrepreneur. The mindset of young educated people have to be changed. They should come forward to start business to get relief from curse of unemployment.

The total investment and number of workers are two more important determinants of SME business. If investment are high, the turnover is high. If number of workers are high, the turnover is high.

Recommendations

1. Since access to SME loan and higher total investment increases yearly turnover sufficient SME loan should be provided with easy conditions from Bank NGOs and Non-bank Financial institutions without any political Reference
2. Loan Should be provided to the actual SME businessman
3. Loan defaulters case should be solved within 6 months.
4. Government should take essential steps to make credit guarantee scheme effective.
5. Branches of commercial bank should conduct prospective business survey in their respective region and encourage young entrepreneur to start SME business.
6. Since higher level of education of SME owner increase turnover, educated person should encourage to start SME business.
7. In the study area, medium entrepreneur is only 3.57% more emphasis should be given to set up medium enterprise in the national industrial policy, because it create more employment opportunity.
8. In the study area, female entrepreneur is less than 8%, so special attention should be given to the female enterprise in the national Industrial Policy .

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GDP Impact & Economic Analysis of Dhaka Chittagong Expressway: The Case of Bangladesh

Shamema Akter*

Abstract

*This analysis has been undertaken to assess the economic viability of the project. Dhaka Chittagong National Highway (NH1) is considered to be the most important National Highway and lifeline of trade in Bangladesh and carries port traffic to Dhaka and others location in the country. Dhaka Chittagong Expressway (DCE) is a 199.3 km long 4 lane new expressway, connecting Dhaka with Comilla, Feni and Chittagong districts of Bangladesh. The traffic forecast emanating from the model results were then used in the economic analysis**. The economic analysis compares the costs and benefits of investing in the at-grade and elevated option, as compared with the 'without project' case where National Highway1 (NH1) remains the only road on the Dhaka–Chittagong corridor. All costs and benefits are expressed in economic terms, the actual resource costs to the Bangladesh economy.*

The economic analysis of the expressway project based on traffic projection and cost estimates of the routes has carried out. Dhaka Chittagong Expressway is the sole viable alternative from the economic point of view. Its EIRR is 20.3%, and NPV @ 12% is USD 2,243.4 million, largely driven by VOC saving as well as benefit and cost ratio is 2.26 (benefit: cost ratios>1). It was found that DCE is a robust project, as only very substantial cost increases (126%) or traffic reductions (56%) would affect the overall viability of the project.

Also, the objective of the study is to explore the relationship between the DCE and GDP. For this purpose, time series data from the World Bank (WB) and DCE project data are used for analyzing bivariate linear regression using SPSS. Thus, I have economic researched of DCE Project and from my research emphasizes that Bangladesh GDP growth will be increase for this project and this amount by 0.60% i.e. GDP would be 8.75% pa with the Project over the 30 years of the Expressway of Dhaka Chittagong Corridor.

* Senior Economist of BCL Associate Limited and life member of BEA, Bangladesh
shamema008@yahoo.com, shamema.mphilecon@gmail.com

** The engineering team (PPP DCE) provided input into the traffic modelling, which was reported separately.

This paper focuses to find out what will be impact of DCE on Bangladesh's economy specially on economic growth, and how Bangladesh will be benefited from this project, besides what steps Bangladesh government should be take it meaningful. It gives the more economic benefit with potential for intellectual transportation System and also gives the positive impact it will have on their economic growth.

Also, the expressway can be connected Chittagong and Cox's Bazar with Kolkata, Myanmar and China in the future and may create an economic corridor among Bangladesh-China-India-Myanmar (BCIM) countries and there is enormous economic potential of Chittagong District with an exclusive advantage of ports, roads and railways. Yet, Bangladesh is part of the proposed BCIM corridor. And, BCIM corridor is included with Belt and Road Initiative (BRI). Besides, Bangladesh has the geographical boost to connect itself to neighboring countries including China, the Association of Southeast Asian Nations (ASEAN), central Asia and west Asia and beyond using multimodal connectivity through road-rail-air and shipping. This DCE project is absolutely relative with the BCIM economic corridor. In addition, Dhaka-Chittagong Highway, which is part of the Asian Highway (AH) network, by widening it to four lanes and building the Dhaka-Chittagong Expressway.

The potential of the project area for economic growth will be increased and poverty reduction in the Bangladesh. No adverse socioeconomic effects on employment and income trends.

First time I have made a presentation of this paper on 49th ETC-2021 of AET. Now I am specifically requesting for publication in the journal.

Key words: GDP growth · EIRR · NPV · B : C ratio · VOC · DCE

Short abstract

This paper describes, 'there were five options were study under this project but option1 Dhaka Chittagong Expressway (at grade and elevated) has a positive impact on GDP of country and is being the sole viable alternative from the economic point of view. The construction of the 4-Lane expressway from Dhaka to Chittagong will bring in direct economic and social benefits to the people in districts of Dhaka and Chittagong Divisions and indirect benefits to other parts of the country as well. Therefore, this project has an appropriate road transport policy should be hold to boost transportation infrastructure and hence sustainable economic growth in Bangladesh.

1.1 Introduction

The People's Republic of Bangladesh lies in the north eastern part of south Asia and is bounded by India on the north and west, Myanmar on the south east and the Bay of Bengal on the south. The country cover 147,630 km^2 and consists mostly of low, flat and fertile land. There are hilly regions in the north east and south east and some areas of high lands in the north western part. A network of rivers, and

especially the Padma, the Jamuna, the Teesta, the Brahmaputra, the Surma, the Meghna and the Karnaphuli is important for navigation, drainage, water supply and as a source of sand for construction.

This is the most important national corridor ushering in high traffic demand. And, this report contains the economic evaluation of the proposed project. three alignments (and 5 options) were studied on the Project, and, alignment1 (option1, at grade + elevated) was recommended by the consultants and the same has been approved by the Government of Bangladesh. The expressway has considered to be 4 lanes throughout, and tolled with a closed toll system that charges traffic according to the length of the journey along the expressway. This requires toll plazas at all entry and exit points of the expressway. The Dhaka–Chittagong is the busiest road corridor in the country. The expressway links the country's two largest cities, Dhaka and Chittagong.

More than 166 million people were estimated to live in Bangladesh in 2019, making it one of the most densely populated countries of the world, with 1,272 persons per km^2. Men account for 50.4% of the population and women 49.6%. In 2019 the annual population growth rate was 1.1%. According to the UN (2019) its Human Development Index (HDI) score was 0.614. While poverty reduction in both urban and rural areas has been significant, 24.3% of the population live below the national poverty line of USD 2 per day. This proportion is higher in the rural areas where it is 35.2% compared to 21.3% for the urban population. Bangladesh's GDP has been estimated at USD 302.6 billion. According to BBS, GDP growth rate is expected to reach 8.15% in FY 2018/19 which was 7.86% in FY 2017/18. The economy has grown at an annual average of about 6.6% over the last two decades and the country reached World Bank lower-middle income status in 2015. The per capita national income touched USD 1,909 in FY 2018/19, up by USD 158 from a year earlier. The macroeconomic environment has remained stable with the continuance of fiscal prudence. The rate of inflation slightly increased to 5.47% in FY 2018/19 at national level.

This project crosses through Dhaka, Comilla, Feni, and Chittagong Districts of Bangladesh. These Districts are located in central eastern part of the country. The expressway between the two key centres of Dhaka and Chittagong will support the economic development of this area and also of the country. Dhaka and Chittagong are also linked by air, inland waterways, and railway; however, road and railway links handle the bulk of passenger and high-value cargo traffic in this corridor. Both of these modes of transport are facing serious capacity bottlenecks. There is a need for additional road capacity on this corridor. The Government is also concentrating their efforts on increasing the capacity of the road link. In order to address part of this effort, the Government of Bangladesh has received a loan (Loan 2856 BAN) from Asian Development Bank (ADB) for the Dhaka-Chittagong Expressway PPP Design Project for the preparation of the Feasibility Studies and Detailed Designs for a new access controlled Expressway between Dhaka and Chittagong.

1.2 Background

As the capital and commercial centre of Bangladesh, Dhaka must have good communication links with the principal sea port of Chittagong, which handles approximately 90% of the country's imported and exported goods. The two cities, the largest and second largest in Bangladesh, are approximately 250 km apart, and about one quarter of the nation's population lives in this area.

Dhaka to Chittagong Highway, which is part of the Asian Highway network, by widening it to four lanes and building the Dhaka-Chittagong Expressway. Road traffic between Dhaka and Chittagong is hampered by the lack of capacity of the existing 250 km highway and load restrictions on bridges. In general, a fully loaded container cannot be quickly transported by road to Dhaka. Road safety on the two lane highway is poor because it is overcrowded with different types of vehicles, including rickshaws, bicycles, motorcycles, cars, buses, and trucks. Also, it is demonstrated that uninterrupted faster traffic flow, safety and can appropriate more trips than 4 lane existing road. It is the major Economic corridor of Bangladesh and around 92% of all of country import and export by NH1(existing road) and average speed of NH1 is 35km/hr. On NH1 traffic congestion has hotspot and in 2018, there was 7,221 people killed and 15,466 others injured in 5,514 road crashes across the country.

Indeed, this economic analysis presents an economic of the benefit to the country of this Corridor. Dhaka-Chittagong Corridor to provide substantial economic and social benefits to south eastern region of Bangladesh. For this reason, this expressway should be given priority in a large extent.

1.2.1 Outline of Project Influence Area

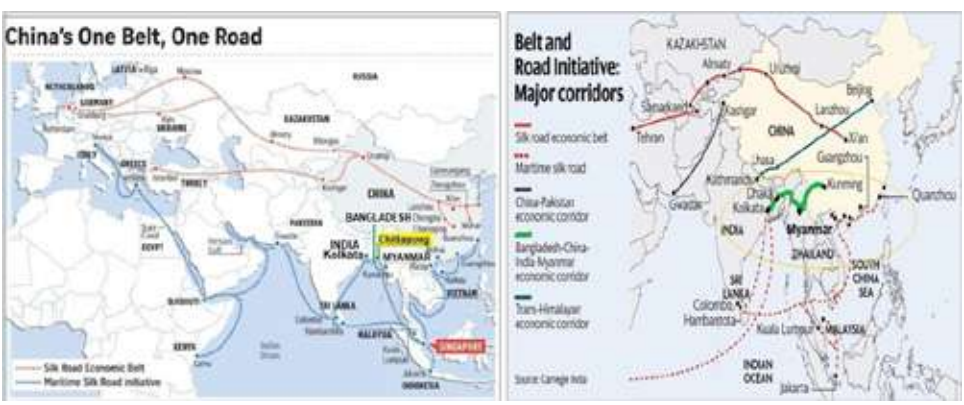
This Project is an important expressway for the connection to the north eastern part of the country to Dhaka and beyond. More than 85 million people of Dhaka, and Chittagong divisions comprising 28 Districts are connected to Dhaka through various corridors and the proposed DCE Project has a significant bearing from both improved connectivity and socio-economic point of view for a large number of people. The implementation of "the expressway (DCE)" of the Project will reduce travel times by improving the connectivity between the northern and southern regions.

The Project-influenced areas illustrate important road transport connectivity for the passenger, cargo traffics of the Bangladesh Roads and Highways. Chittagong port is the main foreign trade entry and exit point for the country, and is likely to stay that way. Mongla is important for vehicle imports and may have a growing role for Nepalese and Bhutanese traffic in the future, but this will not significantly affect growth at Chittagong port. There is a proposal for a new deep sea port at Matarbari, south of Chittagong. But such a port will also require use of the highway or expressway between Chittagong and Dhaka.

➢ Regional Road Connectivity Bangladesh Perspective

The present trade flows along the corridor, as found in the traffic surveys (DCE Traffic survey separate report) are thus likely to continue. These could be augmented in the future if proposals to open up Bangladesh as a transit route between the Indian states of Tripura and West Bengal are proceeded with. Such a corridor could gain further importance if Bangladesh and India support the 'BCIM' concept, initiated by China. BCIM (Bangladesh-India-China-Myanmar) would primarily be a land-based economic corridor from Kunming to Calcutta, passing through Bangladesh. Such ideas are conjectural at present, but they could potentially have a significant influence on trade flows and land transport. The road transport corridor is also important for establishing an improved transport link to Bangladesh-India-China-Myanmar (BCIM), thereby facilitating trade from Nepal, Bhutan and north eastern India to and through Bangladesh. The corridor plans are expected to further accelerate the associated economic growth in the region. Along the corridor, the land use pattern is largely dominated by industries including the largest export processing zone (EPZ) of Chittagong in Bangladesh, which demands improved transport facilities. Since the Chittagong Port is a major origin or destination of a large share of the freight traffic generated from the Dhaka EPZ and its adjoining areas, this Project will contribute to growth of the economic transport corridors. The implementation of the Project will improve journeys between Dhaka and Chittagong, and will also boost the economy because of efficient transportation of goods among the neighbouring countries.

Figure 1: Map -BCIM-Economic Corridor (that BRI)



Source: http://today.thefinancialexpress.com.bd/anniversary-issue-3/bcim-in-the-shadow-of-belt-and-road initiative

The expressway is essential for seamless movement of passenger and cargo transports within Bangladesh and for establishing regional connectivity with neighbouring countries under the southern corridor of the South Asian Association

for Regional Cooperation (SAARC), Bangladesh, China, India, Myanmar (BCIM) Forum for Regional Cooperation (BCIM) and Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC). The expressway is also an important aspect of the Bangladesh Roads and Highways Department Master Plan. Consideration to be made for projects that support regional and sub regional connectivity initiatives such as SAARC, BCIM corridors with BRI and BIMSTEC. The impact of BIMSTEC, BCIM Economic Corridor has many positive aspects. It will escalate regional trade through the developments of transit and transport facilities among boarders and World Bank Logistics performance index will also be improved.

South Asia is the least integrated region and the cost of trading across borders is one of the highest in the world. Co-operation with its neighboring countries offers benefits to Bangladeshi owned road, rail and water transport services and port services. There will be improved domestic and sub regional trade flow and passenger movement in Bangladesh. The consequence will be an improved road transport system in Bangladesh. For this reason, this Project will enable efficient and safe transport within the country in the Dhaka-Chittagong corridor and with India and, through India, with Bhutan and Nepal.

1.2.2 Need for the project

- **Benefit of the Project**

The construction of the 4 Lane expressway from Dhaka to Chittagong will bring in direct economic and social benefits to the people in districts of Dhaka and Chittagong Divisions and indirect benefits to other parts of the country as well. More than 37.1 million people of Dhaka, Feni Comilla and Chittagong Districts are comprising two Divisions are direct connecting from Dhaka to Chittagong via Comilla and the proposed this Project has a significant bearing from both improved connectivity and socio-economic point of view for a large number of people. The 4 Lane expressway will deliver better connectivity to the capital city of Dhaka and port city of Chittagong facilitating speedy and timely transportation of export and import of goods and services. In addition, cumulative advantageous impact of the project will result developed tourism, industries, employment as well as better economic integration of other cities within the country along with major economic & trade centers of the country.

- **Project Performance Indicators and Performance Targets**

The performance indicators should be geared to the objectives. The objectives of constructing a PPP expressway between Dhaka and Chittagong are not defined in the project Terms of Reference, but can reasonably be regarded as:

1 providing a faster and safer route between Dhaka and its main port that meets the traffic need at the lowest overall net public cost (by obtaining toll contributions from users)

2 to provide benefits to the road users that exceed the toll that they are required to pay (if this does not happen, they will not use it)

3 ensure the sustainability of the investment by making the investor responsible for its construction and life-cycle maintenance

4 providing relief from congestion, pollution and accidents to the inhabitants and remaining road users on NH1.

These may be regarded as the key objectives. Of course, secondary benefits follow from these, such as social benefits, better export competitiveness, lower consumer prices, etc. But these secondary gains will be harder to measure, and if objectives 1–4 above are achieved, the secondary benefits will follow. Thus, it is proposed that the monitoring is concentrated on these four aspects. **Table1** on the next page shows the key proposed indicators and some potential targets.

Table 1: Proposed Performance Indicators and Targets

Objective	Indicators	Targets
1. Reduced journey times and better safety between Dhaka and Chittagong, with good value for money	Use made of expressway (per cent of combined NH and expressway traffic that is using expressway between each interchange) Journey times and average speeds, by each vehicle class, between Dhaka (Kanchpur) and Chittagong (on NH and on expressway) Accidents per 100 million vehicle-km on NH and expressway, and overall Toll revenue Leakage (number of vehicles not paying toll, or toll revenue not accounted for) Average delay time at toll plazas Maximum delay time at toll plazas	To be taken from traffic model output To be taken from traffic model output 25 for NH and 13 for expressway assumed in HDM analysis. These should be verified and then target should be a progressive reduction of each As in PPP agreement Less than 0.5% Not more than one minute (20 seconds to slow down and start, 10 seconds per transaction, 30 seconds queuing) Not more than 5.5 minutes (maximum queue time in annual peaks to be 5 minutes)
2. Benefits to users that exceed the toll paid	Toll levels Value of time savings Value of vehicle operating cost savings (calculated from road roughness and HDM equations) Customer satisfaction with expressway experience	As in PPP agreement As assumed in traffic model Expressway IRI average of 2, and expressway market share at least as indicated in traffic model 99.5%

Objective	Indicators	Targets
3.Sustainability	Asset management (road roughness, lane availability, condition of structures, condition of assets at handover after end of concession period)	Expressway IRI 2 Lane availability each year average 98%, not less than 95% (allowing for 10-year periodic maintenance cycle) Other conditions to be set out in PPP agreement
4. Better conditions on NH1	Air quality and noise levels in populated areas along NH1 Pedestrian safety on NH1 (reduction in pedestrian casualties)	No specific targets for NH1 (beyond scope of project), but these trends should be monitored so that project benefit is understood

1.2.3 Distribution Analysis

This section considers the distribution of the costs and benefits among the different members of society. Being a new road project, the main beneficiary is the road user. The main road users who will benefit from the project are the travellers, cargo owners and transport companies that presently use NH1 between Dhaka and Chittagong. The main benefit will be time savings, as the HDM4 analysis shows that the vehicle operating costs (VOC) savings are not significant. This will be because vehicles consume more fuel at higher speeds. The time savings are substantial, however, and apply both to the users of the expressway, and to the remaining users on NH1, who suffer less traffic congestion. For the export products, such as ready-made garments, the time savings are also very significant. They will help the export industries retain and expand their markets, and thus help sustain and increase employment levels and net incomes in Dhaka.

The Project costs will be shared between the road users of the expressway (the tolls), the Government (in the support to the PPP) and the private investors (the equity). Ultimately the private investors will get their money back and it is the expressway users and the Government who fund the project. The expressway users will have a benefit (or they would not use it), while remaining NH1 users will have a benefit without having to contribute directly to the investment.

The Government contributions are either direct or by loan repayment and they are thus paid for by the general taxpayer - with a resulting redistribution of wealth from society as a whole to the beneficiaries. The expectation is of course that there is a resulting gain in economic activity, GDP and tax revenue in the future.

The contractors and labourers employed under the Project will also be beneficiaries and their skills should be enhanced as a result of the intended works.

Overall, the distribution of the benefits will be widespread throughout the region and society and proves to be justified when compared with the costs.

1.3 Objective of The Economic Assessment

The main purpose of economic analysis of the approved 4-Lane Dhaka- Chittagong Expressway (DCE) at grade and elevated is to present the economic wellbeing viewpoint and to estimate the economic benefits and EIRR of the resources invested to the proposed Expressway which would be reduced journey times, VOC and better safety between Dhaka and Chittagong.

Objective of this assessment was to perform economic analysis with economic parameters i.e. EIRR, ENPV, B/C (under reasonable postulates). The current and future development of trade, other future changes in the road transport network, regional and international connectivity of Bangladesh. Also, the benefits of the DCE for include enhanced transportation safety, positive environmental impacts, time savings, lower transport costs, poverty reduction, an increased standard of living and enhancement of trade and commercial activities and there is optimistic impact on Bangladesh GDP.

Figure 2: Project Area (map source: DCE Project)

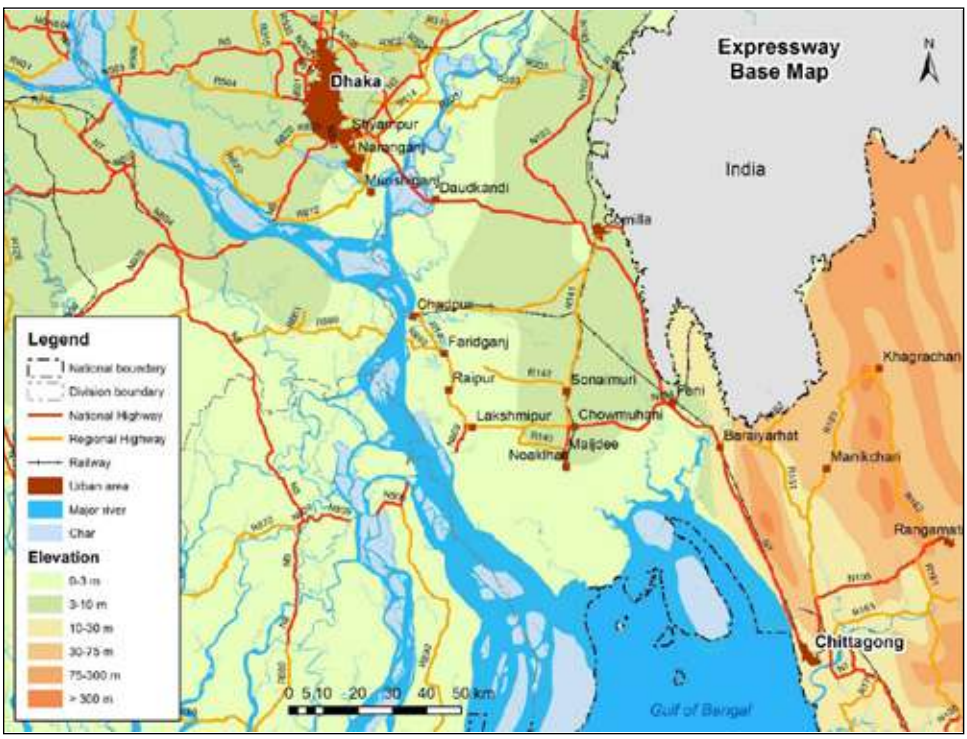
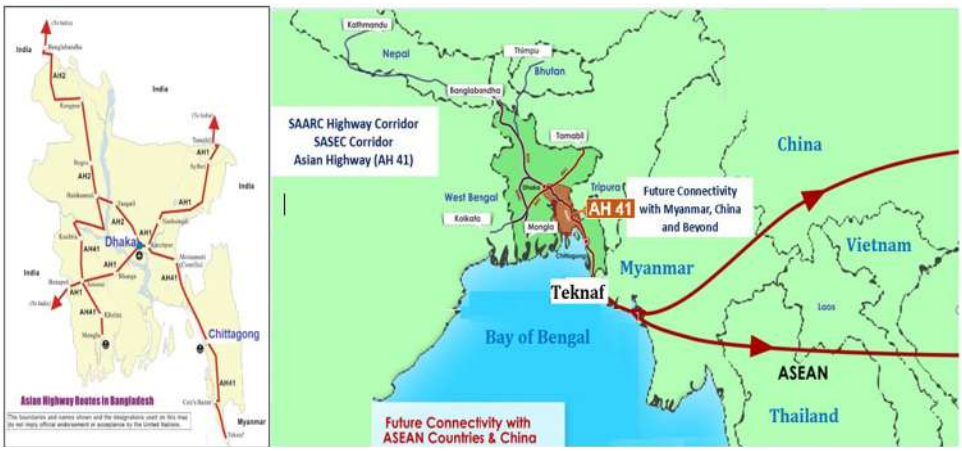


Figure 3: Asian Highway Routes in Bangladesh



1.4 Literature Review

RTHD (January 2016) study has conducted on Regional Road Connectivity: Bangladesh Perspective. From this report, Bangladesh has agreement to the Asian Highway Network on 8 November 2009 to connect the country with 28 countries. And in Bangladesh, there are three Asian Highway (AH) Routes namely AH1, AH2 and AH41. And AH41 routes could be connected with DCE. Of these three routes, AH41 remains within Bangladesh, but could be extended to neighboring countries. Total length of the AH routes in Bangladesh is 1771 kilometer. In this background, one of the options for BCIM corridor could be part of AH41 within Bangladesh. (see Figure 3). Kolkata (India) – Jessore (Bangladesh)–Dhaka (Bangladesh)-Chittagong (Bangladesh)-Cox'sBazar (Bangladesh) - Ghundum (Bangladesh) - Taungbro (Myanmar)- Bawlibazaar (Myanmar)- Kyauktaw (Myanmar). Likewise, in Bangladesh side, the condition of this route which is generally part of AH41 is well. In addition, the finance from ADB, the feasibility study and detailed design for upgrading Chittagong-Cox'sBazar-Ukhia-Balukhali-Ghundum expanse has been done. AH41 Route (Bangladesh): Mongla Port – Jessore –Bonpara – Hatikamrul-Katchpur-Comilla-Chittagong- Cox's Bazar-Teknaf -Myanmar Border. Total Length is 762 km (excluding common part of 162 km of AH2). Whatever, the investment will be needed to upgrade the route to AH Standard. Although, a number of projects has under prosses for upgrade and some projects have been upgrading almost completed with ADB finance. Also, some projects for feasibility study and detailed design for upgrading in this section have been completed.

RHD analyses and the study describes on 2nd 4-Laning of Dhaka-Chittagong National Highway (March 2010), the existing Dhaka-Chittagong National Highway (NH) was a 2-lane single carriageway except from the Mukti Sarani (Dhaka end) to Daudkandi section which has upgraded to a 4-lane carriageway. Considering

the importance of this road, the Government of Bangladesh (GoB) had decided to upgrade this highway from 2 lane to 4-lane carriageway to cater for the current traffic demand, capable of transporting heavy container traffic from the port of Chittagong to the capital city of Dhaka. This corridor is most important economic corridor of Bangladesh and within 21st century accompanying in high traffic demand. In general, a fully loaded container cannot be quickly transported by road to Dhaka. Road safety on the 2 lane highway was poor because it was overcrowded with different types of vehicles, including rickshaws, bicycles, motorcycles, cars, buses, and trucks. Therefore, according to the RHD's traffic count, the average motorized traffic volumes are around 27,000 of which 43% are trucks. This is consistent with the findings of the 2009 traffic study. But, after construction of 2nd Dhaka-Chittagong National Highway, it has been shown that it is not fulfil the transport needs between these two important cities of the country. Because poor road safety issue and frequently traffic congestions with different types of vehicles movements.

BBA Project Completion Report (April 2013), Feasibility Study for multi lane road tunnel under the Karnaphuli river, Chittagong, Bangladesh, the Karnaphuli river divides Chittagong city into two parts. One part is confined with the city and the port, the other part is the area of heavy industry. The current two bridges are not sufficient to accommodate the existing and increasing huge traffic flow. Due to river morphology, siltation on the bed of the Karnaphuli river is a big problem and the major threat for proper functioning of the Chittagong Port. To face the problem on siltation, Bangladesh government intends to construct a tunnel crossing the Karnaphuli river instead of another bridge over the same river. The focus of the KTP project is to carry out detailed economic and engineering investigation to examine the economic viability and technical feasibility for construction of tunnel under the Karnaphuli river. There were 3 alignment options (A, B and C) for detailed study in this feasibility stage and based on the traffic survey, analysis and forecast, demonstrated by expressway service level analysis, dual two lanes expressway standard with design speed of v=80km/h was recommended for Alignment C (Patenga-KAFCO crossing) with considerations of road network plan, traffic volume forecast, overall transportation system, and long term development of the project area. The Karnaphuli tunnel (KTP) is an under construction underwater expressway tunnel in the port city of Chittagong, under the Karnaphuli river. And, the tunnel length is 9.3 km (about 3.4km of which would be under the river) and width 10 metres. It is expected to complete the construction work by 2022 that would ease communication and boost trade and businesses along with industrialization of this area. And after accomplished construction of the tunnel project, it will be connect Chittagong City with planned development areas to the east of the Karnaphuli river and the existing port, airport reduced congestion in the Chittagong and on existing bridges, shorter journey times and travel time savings, direct connectivity with the new Deep Sea Port to be developed in Matarbari and catering to the additional traffic. The tunnel will connect Dhaka Chittagong expressway, Chittagong port

and Anwara upazila and is expected to make communication between Chittagong and Cox's Bazar easier. It will also ease traffic congestion on two bridges over the Karnaphuli river.

The Chittagong city is connected with Dhaka through Dhaka truck road in the north direction and in the south direction, it is connected with the proposed Asian Highway (AH41) through Cox's Bazar road, and will reach Myanmar through the Asian Highway (AH41). Furthermore, KTP, Chittagong City Outer Ring Road, Dhaka Chittagong Expressway (DCE) are also part of the Asian Highway Route (AH41, **Figure 3**) in Bangladesh. The transport corridor is important for establishing an improved transport link on the Trans-Asia highway, thereby facilitating trade from Nepal, Bhutan and northeastern India to and through Bangladesh. The corridor plans are expected to further accelerate the associated economic growth in the region. Along with the corridor, the land use pattern is largely dominated by industry including the largest export processing zone (EPZ) of Bangladesh, which demands improved transport facilities. Since the Chittagong port is a major origin or destination of a large share of the freight traffic generated from the Dhaka EPZ and its adjoining areas, the DCE and its future connections to the Chittagong City Outer Ring Road (CCORR) will contribute to the economic transport corridors. Major road works are presently taking place in Dhaka - Chittagong and are interrupting the normal traffic and creating congestion on NH1. In this regard, the DCE along with other ongoing road projects are expected to be a great reliever in providing diversion to the affected road users.

SMEC (April 2012) study reveal, according to the project report, the 14.7 KM Chittagong City Outer Ring Road (CCORR) comprising additional 5 km long two feeder roads and three approach roads will perform as a strong coastal embankment cum 4 lane highway stretching from Patenga Sea Beach to Sagorika Junction and considered to be the future main gateway to the port city. The arterial road connecting the city center with the port, airport, and EPZ was not well developed, which has resulted in chronic traffic congestion. Thus, it is required to improve the transportation network through the construction of a ring road. this road is under constructing.The main aim of constructing the this outer ring road is to save the people of coastal areas of Chittagong as well as resolve the alarming traffic congestions in the city and to mitigate damages caused by the natural disasters, such as cyclones and high flood tides etc., thereby contributing to the promotion of the city and country's economic development. it would be used as gateway the Karnaphuli Tunnel which would help to facilitate movement of vehicle from south Chittagong, Teknaf, Bandarban to enter in the Dhaka Chittagong expressway. As the connectivity of proposed Dhaka Chittagong expressway and communication through the Karnaphuli tunnel and ring road will be the most modern which would speed up the economic activity. A new city will be developed in the southern part of Chittagong.

1.5 Traffic Assessment and Forecast

For each road section, the traffic model was interrogated to ascertain the forecast traffic at the selected toll rate. Full details of the traffic on each section, for each future year in the analysis period (up to 2051) were entered into HDM4. HDM applies the annual traffic growth forecasts to these 2022 traffic flows. **Table 2** (reproduced from the traffic volume) shows the growth rates that were used.

The traffic model identified the remaining traffic on NH1, which differs for project alignment. Options1(at grade and elevated) give greatest relief to NH1 as they serve the important midway centre of Comilla. The difference between the traffic on NH1 when there is no project, and that remaining on NH1 when the alternative option-1 is considered, is the traffic diverted to the expressway.

The traffic model did not predict any generated traffic. This is considered a reasonable result since the expressway will be tolled. Payment of a toll will reduce the consumer surplus that the road users gain by the project, and thus reduce any propensity to make extra trips.

Table 2: Annual Traffic Growth Rates

Period	Passenger	Freight
2014–2020	3.0%	6.1%
20202030	5.99%	4.5%
From 2030	5.32%	4.0%

Source: DCE Traffic Survey and Analysis Report, March 2016

Table 3: Diverted traffic from NH1(existing road) to XW (expressway)

LINK TRAFFIC FLOWS			Vehicles/PCU			LV			Bus		GV				
			0.82	0.42	0.92	39%	10%	51%	25%	75%	13%	76%	11%		
			Alternative XW1: Alignment 1(with project)												
			PCU			Vehicles									
Link	Km	Code	LV	Bus	GV	PC	LDV	Micro8	SB	LB	LGV	MGV	HGV	AADT	Year
SECTION 1		XWDKC	6,986	6,914	22,569	2,869	1,105	3,307	1,729	5,186	2,954	17,152	2,488	36888	2014
Kanchpur - Daudkandi	53.8					2,995	1,204	3,587	1,884	5,652	3,911	20,421	2,954	43920	2017
						3,707	1,521	4,278	2,380	7,139	4,980	26,228	3,796	53530	2022
			Initial composition(%)			6.9%	2.8%	8.0%	4.4%	13.3%	8.4%	49.0%	7.1%	100.0%	2022
Daudkandi - Comilla	47.3		7,280	6,322	23,147	2,839	1,165	3,276	1,581	4,742	3,009	17,591	2,546	36749	2014
						3,095	1,270	3,571	1,723	5,169	3,581	20,834	3,030	42371	2017
						3,909	1,604	4,510	2,176	6,528	4,601	26,900	3,893	54121	2022
			Initial composition(%)			7.2%	3.0%	8.3%	4.0%	12.1%	8.5%	49.7%	7.2%	100.0%	2022
SECTION 2	55.9	XWDCF	5,183	5,844	22,334	2,021	829	2,332	1,461	4,383	2,902	16,966	2,456	33351	2014
Comilla - Feni						2,203	904	2,542	1,593	4,778	3,454	20,190	2,922	38585	2017
						2,783	1,142	3,211	2,011	6,034	4,438	25,944	3,755	49318	2022
			Initial composition(%)			5.6%	2.3%	6.5%	4.1%	12.2%	9.0%	52.6%	7.6%	100.0%	2022
SECTION 3	66.3	XWDFC	4,754	5,674	18,423	1,864	761	2,129	1,418	4,255	2,895	16,002	2,027	29851	2014
Feni - Chittagong						2,021	829	2,332	1,546	4,638	3,450	16,662	2,412	33280	2017
						2,552	1,047	2,945	1,953	5,858	3,962	21,411	3,099	42827	2022
			Initial composition(%)			6.0%	2.5%	6.9%	4.6%	13.8%	9.4%	50.3%	7.3%	100.0%	2022
Total	199.3														

Table 4: AADT at sections along the Project Road Alignment

				Vehicles/PCU			LV			Bus		GV			
				0.82	0.42	0.40	39%	16%	45%	25%	75%	13%	76%	11%	
				Alernative 0 (without project): NH only											
				PCU			Vehicles								
Link		Km	Code	LV	Bus	GV	PC	LDV	Micro8	SM	LB	LGV	MGV	HGV	AADT	Year
Kanchpur - Madanpur	Section 1	3.1		11,046	25,376	53,091	4,620	1,895	5,331	6,344	19,032	6,902	40,349	5,840	90,313	
Madanpur - Daudkandi		28.8		7,623	10,803	46,007	2,973	1,220	3,430	2,701	8,102	5,881	34,966	5,061	64,433	
Kanchpur - Daudkandi		31.9	NH0KD	8,033	12,219	46,696	3,133	1,285	3,615	3,055	9,164	6,070	35,489	5,137	66,948	2014
							3,415	1,401	3,940	3,330	9,989	7,224	42,232	6,112	77,643	2017
							4,313	1,769	4,977	4,205	12,616	9,293	54,268	7,855	99,286	2022
				initial composition(%)			4.3%	1.8%	5.0%	4.2%	12.7%	9.3%	54.7%	7.9%	100.0%	
Daudkandi - Bhairi	Section 2	25.7		6,026	3,202	45,846	3,130	1,204	3,612	2,301	6,902	5,860	34,043	5,043	63,074	
Bhairi - Mainamoti		21.2		7,227	8,666	46,364	2,819	1,156	3,252	2,166	6,499	6,027	35,236	5,100	62,256	
Mainamoti - Comilla		10.6		8,338	9,453	49,754	3,252	1,334	3,752	2,583	7,089	6,468	37,813	5,473	67,545	
Daudkandi - Comilla		57.5	NH0DC	7,789	9,050	46,758	3,038	1,246	3,505	2,263	6,788	6,078	35,536	5,143	63,596	2014
							3,311	1,358	3,820	2,466	7,399	7,233	42,287	6,121	73,996	2017
							4,102	1,716	4,825	3,115	9,344	9,295	54,339	7,865	94,681	2022
				initial composition(%)			4.4%	1.8%	5.1%	3.3%	9.9%	9.8%	57.4%	8.3%	100%	
Comilla - Chauddagram	Section 3	30.9		6,407	8,395	46,617	2,493	1,025	2,883	2,099	6,296	6,060	35,429	5,128	61,419	
Chauddagram - Feni		27.7		4,239	8,029	48,979	1,653	678	1,908	2,007	6,022	6,307	35,704	5,168	59,247	
Feni - South Feni		12.4		5,082	9,517	47,769	1,982	813	2,287	2,379	7,138	6,270	36,305	5,255	62,369	
Comilla - South Feni		71.0	NH0CF	5,329	8,448	46,960	2,078	853	2,398	2,112	6,336	6,105	35,689	5,166	60,737	2014
							2,265	929	2,614	2,302	6,906	7,265	42,470	6,147	70,899	2017
							2,861	1,174	3,301	2,908	8,723	9,335	54,574	7,899	90,775	2022
				initial composition(%)			3.2%	1.3%	3.6%	3.2%	9.6%	10.3%	60.1%	8.7%	100.0%	
South Feni - Barayarhat	Section 4	8.9		5,082	9,517	47,769	1,982	813	2,287	2,379	7,138	6,270	36,305	5,255	62,369	
Barayarhat - Mirzhurai		12.1		4,584	7,873	45,867	1,788	733	2,063	1,968	5,905	5,963	34,859	5,045	58,324	
Mirzhurai - Sitakunda		21.0		4,144	7,960	46,741	1,616	663	1,865	1,990	5,970	6,076	35,523	5,142	58,845	
Sitakunda - Chittagong		30.6		7,686	11,233	47,868	2,998	1,230	3,459	2,808	8,425	6,225	36,395	5,268	66,807	
South Feni - Chittagong		72.6	NH0FC	5,824	9,515	47,204	2,271	932	2,621	2,379	7,136	6,137	35,875	5,192	62,543	2014
							2,476	1,016	2,857	2,593	7,778	7,303	42,692	6,179	72,893	2017
							3,127	1,283	3,608	3,275	9,824	9,384	54,859	7,940	93,299	2022
				initial composition(%)			3.4%	1.4%	3.9%	3.5%	10.5%	10.1%	58.8%	8.5%	100%	
Total		233.0														

Note: here, the vehicle types adopted for the analysis of vehicle operating costs are such as PC= Passenger car, LDV= Light delivery vehicle (includes pickups and utility vehicles), MB= Microbus SB= Small bus, LB= Large bus, LGV= Light goods vehicle, MGV= Medium goods vehicle, HGV= Heavy goods vehicle. *Data source: DEC project traffic survey Oct./Nov. 2014 and calculation by Author*

1.6 Road Networks Characteristics of Section

NH1 and the proposed expressway alignment1 (option-1) have been divided into three Section, and the traffic forecast for each section is taken from the output of the traffic model. There are three Sections as follows:

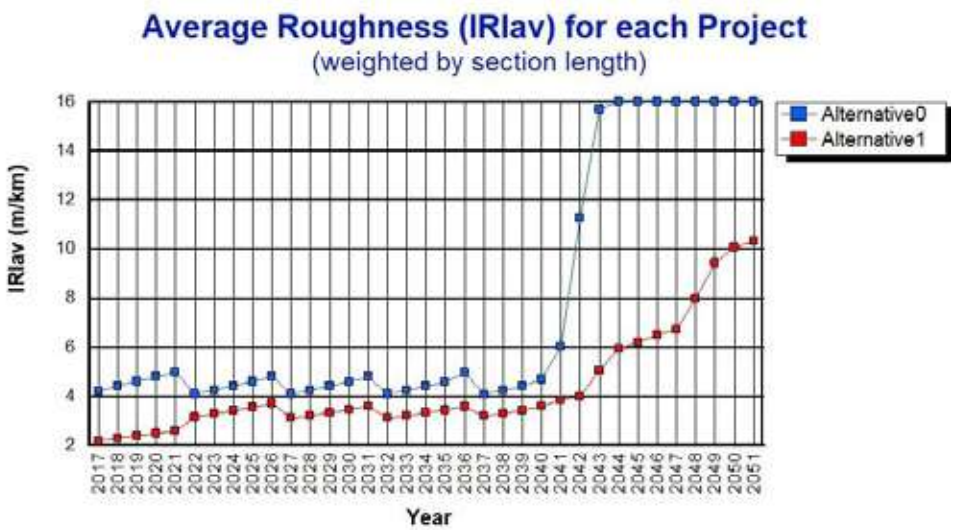
Section 1 Kanchpur (Dhaka) – Comilla = 78.1 km
Section 2 Comilla – Feni = 55.9 km
Section 3 Feni – Chittagong =65.3 km

The proposed expressway is divided into four hypothetical sections such as (i). For approved alignment1(at grade and elevated), the existing National Highway corridor from Dhaka to Chittagong Road link, HDM4 need specifics of road section and specifics of the vehicles fleet. Variables for each road sections are actual values. A number of parameters such as length of road section, carriageway width, shoulder width, effective number of lane, surface class, pavement type, traffic flow, speed flow type, traffic flow pattern, climate zone, road class, motorized (MT) and non-motorized(NMT) traffic, geometry, rise+fall, average horizontal curvature, speed limit, altitude, Drain type, Base thickness, surfacing thickness (mm), Resilient

Modulus thickness (Gpa), Relative compaction (%),Structural Number (SNP), Sub grade CBR (%).The roughness is the estimated IRI (international roughness index)(IRI- m/km), which expresses road roughness in terms of m/km. Total area of cracking, Ravelled area (%),Number of potholes (No/km), Edge break area (m2/km), Mean rut depth (mm), Texture depth (mm),surface texture ,superelevation (%).The value of parameters which has adopted for road.

This being a route choice study and not a detailed design (to which HDM can contribute), other more detailed aspects were left at the default values in the HDM program. These include such items as resilient modulus thickness, relative compaction, texture depth, surface texture, and other technical parameters. These default values are proposed by HDM in relation to the climatic conditions and other road attributes that are entered into the program, so they are appropriate for the study purposes. The initial roughness on the existing road alternative(A0) has been measured to average around 4 to 5m/km whereas the DCE (alternative A1) is expected to have an initial IRI of 2 m/km. (**see Figure 4**)

Figure 4: Roughness Development on Existing Road Section Alternatives and DCE



Source: by Author and HDM-4 Version 1.3

1.7 ECONOMIC ANALYSIS

1.7.1 Methodology

I have used the Highway Development and Management program, (HDM4, Version 1.3) for the project evaluation. This program, originally developed by the World Bank, takes into account the road standard and quality, and the effect of the traffic load and road maintenance on the road condition, for each future year of

the evaluation period (taken as 30 years), both for the national highway and for the approved expressway, in accordance with the traffic forecasts. The program automates many of the calculations needed for a realistic project appraisal and proper assessment of the option1.

1.7.2 Gather Data

The data has been obtained and research of the new Expressway by phasing in Dhaka-Chittagong corridor in assessment with the overall data of Bangladesh. The data inputs came from various sources. This economic analysis has been prepared based on site investigation (DCE Project), data collection from Bangladesh Roads and Highways Department (RHD), World Bank(WB), ADB, IMF, BBS, Chittagong Port (CPA), traffic and O-D surveys data (2015/16), from tunnel project under the Kurnapuly river, Chittagong outer ring road project and various sources for the economic analysis. This step was to gather the inputs required for the economic comparison. Information on capital costs, costs of operations, and time savings forms the core of the economic analysis. Also, I was collected data from engineering and traffic modelling teams of DCE Project. Data on the economy, population, vehicle operating costs(VOC), time values, and trends in all these values was compiled from desk research and provided to the traffic team for use in their model. The economic costs were provided, based on an analysis of the tax element of the project inputs (taxation accruing to Government not being a cost to the economy). This economic study report has been prepared based on site investigation, data collection, traffic and O-D surveys required as per terms of reference for the study for the alignment option selected.

The main steps in the economic evaluation have been as follows:

1. prepare basic economic parameters for the traffic forecasts, which are fed into the traffic model;
2. enter into HDM4 the relevant engineering information on standards and costs for each existing and proposed road section. This is done for NH1 and selected alignment of the expressway;
3. from the completed traffic model enter the existing and forecast traffic on each section;
4. enter details of the vehicle fleet and the costs of vehicles and major inputs such as fuel, tyres, maintenance and crew wages;
5. enter details of the value of time and the rate and cost of road accidents;
6. run the program and summarise and interpret the results, also running sensitivity tests and calculating switching values;
7. from the results, estimate the distribution of benefits and the poverty impact.

Each of these steps is explained in the following chapters.

Using the model, the total transport costs such as vehicle operating and time costs on the existing national highway and nominated alignment is compiled on a yearly basis for the proposed project operational period, i.e. 30 years starting from 2022, when it is assumed that the expressway will open to traffic. The benefit will be the reduced transport costs for each option when compared with the cost of the base case (Option 0) which is the 'without expressway' project situation. For this base case it is assumed that the four-lane of NH1 will be completed by 2020.

When the expressway is constrained a portion of the traffic will be diverted from NH1 to the new facility, giving faster speeds, time savings, reduced congestion and a better and safer travelling environment. The expressway is also designed to be stronger than NH1, to accommodate the heavy traffic loads expected.

The financial costs are converted to economic costs for the purpose of the evaluations. This is done by using 'shadow prices', which are the costs faced in the market place by the users adjusted to remove taxes or add subsidies. Taxes and subsidies are referred to as 'transfer payments' as they are not a cost or benefit to the national economy, they are simply transfers to or from the Government. Tax revenues are available to Governments for spending elsewhere in the economy.

Similarly, the toll revenues, which are fundamental for the financial analysis, are omitted in the economic analysis. They are paid from one part of the economy (the road users) to another (the toll road operator). It is from this flow of funds that the toll road operator meets his operating and maintenance costs – it is the latter costs that are part of the economic analysis, together with the road user costs, and in the economic analysis these costs are compared with the economic benefit, not with the financial revenue.

Economic indicators such as NPV and EIRR are calculated for approved alignment of option-1.

Many different variables have been collected from field survey data and secondary sources and can broadly be grouped as follows:

i. road network: existing (NH1) and expressway road sections (XW)
ii. vehicle fleet: vehicle operating costs (VOC) (economic costs) and vehicle specifications
iii. work standards: the routine and periodic maintenance and their economic costs
iv. the road configurations: speed-flow characteristics, traffic patterns, the climatic conditions, accident rates by road type
v. discount rates, traffic flows and growth rates, and travel time costs.

The new expressway will be constructed as well as the existing highway will be maintained. And when the expressway will be constrained then a portion of traffic will be diverted to new alternative route from existing highway for advantage of time saving, no congestion and faster speed, better and safe environment traveling,

reduce accident as well as emission. The expressway (XW) is stronger than existing highway (NH1) to take the load of heavier vehicles.

The economic review has been based on the economic costs for avoiding distortion, due to market imperfections in the input prices of several component of the project. It may be pertinent to carry out that that the investments in the elevated expressway also contribution a good consecutively surface to motorized traffic would main to an overall development in the transport system in the project region.

1.7.3 Cost components

The basic concept of the investment of the project roads is to minimize the total transport costs to the project road users by comparing the two scenarios i.e. 'With project' (new expressway) and 'without project' (existing National Highway). The total transport costs have two basic cost components as follows:

a) Capital, Operating and Maintenance (O & M) Costs: the cost of the intervention strategies being appraised including routine and periodic maintenance and the operational costs incurred by the expressway operator.
b) Road User Costs: vehicle operating costs and travel time costs, which are based on the future traffic levels and road conditions.

The economic construction and O&M costs were provided by the engineering team and are shown in **Table 5**. They have been compiled net of taxation, as the taxes are not an economic cost. Unlike in the financial assessment, the capital costs include the land acquisition and resettlement costs. The economic assessment has to consider all the costs (and benefits) to the economy, no matter who incurs (or receives) them. It does assume that the market price of the land and the resettlement is equivalent to the true economic value, which may not always be the case.

Table 5 also shows the calculation of the residual values of the investments estimated to apply at the end of the 30-year assumed 30-year project life. The concrete structures are assumed to have a 60-year life, so they retain their value. The embankment will still be in place, and the land acquisition and resettlement costs are assumed dot being sunk costs, as they need not be repeated. It is assumed that the expressway, after reconstruction, can continue to benefit from these assets during the following years.

1) Routine Maintenance

The routine maintenance activities included vegetation clearance, clearing of side ditches and culvert, bridge, and minor repair to the various elements of the cross section. A separate patching activity has been triggered based on the number of potholes /km.

2) Periodic Maintenance

To have the long term benefit s substantial capital investments in the project roads on one hand and the proper maintenance activities subsequent to the initial improvement on the another, the following periodic maintenance activities have.

Table 5: Summary of Cost Estimates for DCE Currency: US Dollar (million)

Project	(Dhaka - Comilla)	(Comilla - Feni)	(Feni - Chittagong)	(Dhaka-Chittagong)
At-Grade and elevated Section (A1)				
Economic cost	1,052	556	612	2,219
Length (km)	78.1	55.9	65.3	199.3
Economic cost/km	13.5	9.9	9.4	11.1
Earthworks	198	106	105	409
50% of structures	142	75	77	293
Resettlement and land acquisition	196	102	124	422
Residual value	536	283	305	1,123.8
Residual value as % of cost	50.9%	50.9%	49.9%	50.6%

calculation by the Author

Note:1. Foreign Exchange Rate is based on Bangladesh Bank/2017.Exchange Rate (USD 1 = BDT 78.5);
2. Data source: Costing data collection from our Engineering team of DCE Project-2017, Roads and Highway (2004/05), BBS, Bangladesh Bank, World Bank, ADB

Table 6: Annual Undiscounted Project Cash Flows of DCE (USD, million)

Year	Road Agency Costs (RAC)			Road User Costs (RUC)				Net Benefit
	Capital	**Recurrent**	**Total RAC**	MT Vehicle Operation	**MT Travel Time**	**Accidents**	**Total RUC**	
(1)	**(2)**	**(3)**	**(4)**	(5)	**(6)**	**(7)**	**(8)**	**(9)**
2017	421.7	0.0	**421.7**	0.0	0.0	0.0	**0.0**	**-421.7**
2018	288.5	0.0	**288.5**	0.0	0.0	0.0	**0.0**	**-288.5**
2019	532.6	0.0	**532.6**	0.0	0.0	0.0	**0.0**	**-532.6**
2020	621.4	0.0	**621.4**	0.0	0.0	0.0	**0.0**	**-621.4**
2021	355.1	0.0	**355.1**	0.0	0.0	0.0	**0.0**	**-355.1**
2022	0.0	0.5	**0.5**	428.9	79.7	1.0	**509.6**	**509.1**
2023	0.0	0.5	**0.5**	450.7	84.2	1.0	**535.8**	**535.3**
2024	0.0	0.5	**0.5**	473.3	88.8	1.1	**563.2**	**562.7**
2025	0.0	0.5	**0.5**	497.2	93.8	1.1	**592.1**	**591.5**
2026	40.7	0.5	**41.3**	522.4	99.0	1.2	**622.6**	**581.3**
2027	0.0	0.5	**0.5**	546.7	104.3	1.3	**652.2**	**651.7**
2028	0.0	0.5	**0.5**	574.1	110.0	1.3	**685.5**	**685.0**
2029	0.0	0.5	**0.5**	603.0	116.2	1.4	**720.6**	**720.1**

Year	Road Agency Costs (RAC)			Road User Costs (RUC)				Net Benefit
	Capital	**Recurrent**	**Total RAC**	MT Vehicle Operation	**MT Travel Time**	**Accidents**	**Total RUC**	
(1)	**(2)**	**(3)**	**(4)**	(5)	**(6)**	**(7)**	**(8)**	**(9)**
2030	0.0	0.5	**0.5**	630.2	121.9	1.4	**753.5**	**753.0**
2031	40.7	0.5	**41.3**	658.6	127.9	1.5	**788.0**	**746.7**
2032	0.0	0.5	**0.5**	686.2	134.1	1.6	**821.8**	**821.3**
2033	0.0	0.5	**0.5**	716.9	140.7	1.6	**859.3**	**858.8**
2034	0.0	0.5	**0.5**	749.2	147.7	1.7	**898.6**	**898.1**
2035	0.0	0.5	**0.5**	783.0	155.0	1.8	**939.8**	**939.3**
2036	24.8	0.5	**25.3**	818.4	162.7	1.9	**983.0**	**957.7**
2037	0.0	0.5	**0.5**	854.1	170.7	2.0	**1,026.8**	**1,026.2**
2038	0.0	0.5	**0.5**	892.8	179.2	2.1	**1,074.0**	**1,073.5**
2039	0.0	0.5	**0.5**	933.6	188.1	2.1	**1,123.8**	**1,123.3**
2040	0.0	0.5	**0.5**	977.4	197.6	2.2	**1,177.2**	**1,176.7**
2041	0.0	0.5	**0.5**	1,033.0	208.0	2.3	**1,243.4**	**1,242.9**
2042	0.0	0.5	**0.5**	1,098.2	227.9	2.5	**1,328.6**	**1,328.1**
2043	0.0	0.5	**0.5**	1,211.1	287.6	2.6	**1,501.2**	**1,500.7**
2044	0.0	0.5	**0.5**	1,339.4	302.0	2.7	**1,644.0**	**1,643.5**
2045	0.0	0.5	**0.5**	1,412.1	317.2	2.8	**1,732.0**	**1,731.5**
2046	0.0	0.5	**0.5**	1,491.9	333.9	2.9	**1,828.6**	**1,828.2**
2047	0.0	0.5	**0.5**	1,591.1	361.0	3.1	**1,955.2**	**1,954.7**
2048	0.0	0.5	**0.5**	1,730.6	454.5	3.2	**2,188.3**	**2,187.8**
2049	0.0	0.5	**0.5**	1,943.5	489.5	3.3	**2,436.4**	**2,435.9**
2050	0.0	0.5	**0.5**	2,085.3	513.9	3.5	**2,602.7**	**2,602.2**
2051	-1,122.9	0.5	**-1,122.5**	2,181.9	539.5	3.7	**2,725.0**	**3,847.5**
Total	1,202.6	15.3	1,217.8	29,914.9	6,536.3	61.9	36,513.0	35,295.2
HDM-4 Version 1.3						Economic NPV		2,243.4
						EIRR %pa		20.3%
						B:C Ratio		2.26

Calculation by Author

1. Note: The analysis period is 30 years
2. The project capital cost (USD 2,219 M economic cost) is spread over five years 2017 to 2021.
3. Physical contingencies are included but not financial contingencies. Cost inflation and price escalation during construction are not economic costs. Price escalation does not alter the materials used or the end result.
4. In keeping with previous road project analyses, economic costs are computed by multiplying financial costs by the standard conversion factor (SCF) 0.85 and financial costs converted to economic costs using a standard conversion factor of 0.85 and there

are is no tax or contingency included into economic costs. Residual value is 50.6% after 30 years.

1.7.4 Sensitivity Tests and Switching Values

Sensitivity tests have been carried out and switching values calculated. Up to 20% variation is tested. This **Table 7** shows the results of the analysis of sensitivity tests and switching values. In this table *the blue numbers represent the base case, the black numbers the sensitivity tests, and the red numbers the switching values.*

Table 7: Economic IRR, Sensitivity Tests and Switching Values for DCE

Inflation rate: 5.47%

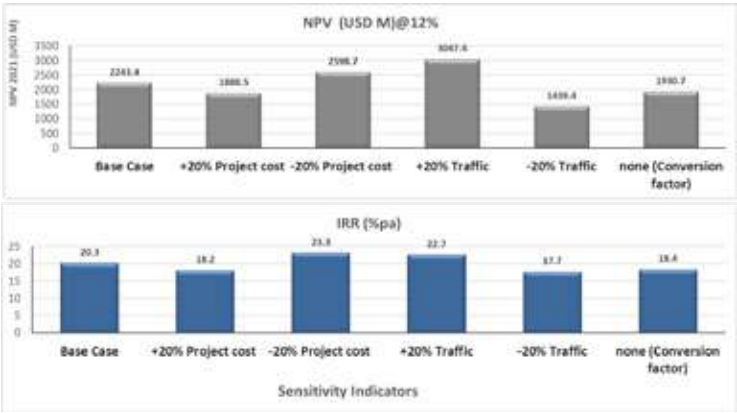
DCE Project	Net Present Values Discounted at 12%/year					Real 'Economic IRR	Nominal 'Economic IRR	Benefit: Cost Ratio*
	Project Costs	VOC savings	Time Savings	Accident Cost Savings	Net Benefit			
Option1: Alignment 1, At-Grade and Elevated	**1776.6**	**3345.0**	**667.6**	**7.5**	**2243.4**	**20.3%**	**25.8%**	**2.26**
Project cost +20%	**2131.9**	3345.0	667.6	7.5	**1888.1**			
Project cost -20%	**1421.3**	3345.0	667.6	7.5	**2598.7**			
Project cost +126%	**4020.0**	3345.0	667.6	7.5	**0.0**		12%	1.0
Traffic +20%	1776.6	**4013.9**	**801.1**	**9.0**	**3047.4**			
Traffic -20%	1776.6	**2676.0**	**534.0**	**6.0**	**1439.4**			
Traffic -56%	1776.6	**1478.2**	**295.0**	**3.3**	**0.0**		12%	1.0

Calculation by Author

Note1: EIRR=Economic Internal Rate of Return, NPV (USD million), *For ease of reading, only the benefit side of the ratio is shown, i.e. 2.26 is shown rather than 2.26 :1.

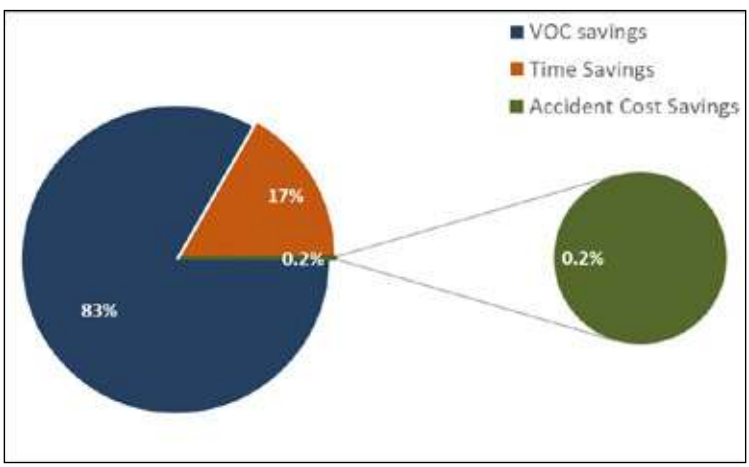
The result of sensitivity analysis has been summarized in above table. From analysis and above table has shown that DCE project is viable from the economic point of view. Its real economic internal rate of return (EIRR) is 20.3% as well as benefit and cost ratio are 2.26 (Benefit/cost ratio is greater than 1). It has found that DCE is a robust project, as sole very substantial cost increases (126%) or benefit reductions (56%) would affect the overall viability of the project. **Table 6, 7 and Figure 5** summarizes the result of sensitivity analysis.

Figure 5: Sensitivity Indicators & Switching Values



The main benefits generated by the DCE Project come from a combination of savings in vehicle operating costs for both passenger and freight traffic and travel time-savings. Reduced accident costs further contribute to the overall benefits. **Table 6,7, and figure 5, 6** shows the net present value (NPV) of the costs and benefits generated by the project. In addition are the distribution of benefits is illustrated graphically. Benefits from reduced vehicle operating costs represent the majority and correspond to 83% whereas benefits from travel time-savings represent 17%, reduced accident costs 0.2%.

Figure 6: Distribution of Benefits



1.7.5 Poverty Impact Analysis

The impact on poverty is hard to assess on a major project such as this, as it covers such an important area of the country and will touch the lives of almost everybody in the two cities and along the line of route. The main beneficiaries are

not poor, however. The transport operators and the cargo owners cannot, as a class, be regarded as poor. Nor can the users of private cars and privately-owned utility vehicles.

Thus, the poor who benefit from the project may broadly be classed as the following:

- The bus passengers – those that have low incomes – especially those who have dependents. In general, the poorest section of the community will not make much use of bus travel, but those who work for low incomes in the city, and need to go home to share their income with family members in the village, will be poor and will benefit from faster journeys and lower fares.
- The low-income workers such as those in the ready-made garment (RMG) industry. Even if they make no use of the corridor themselves, the benefits to the industry should help to preserve or expand their job opportunities and perhaps also create opportunities for the employers to pay higher wages.
- Other members of the poor who may benefit from an increase in employment opportunities due to the greater competitiveness of Dhaka in world markets, or due to lower costs of imports and consumer prices.
- Pedestrians along the route of NH1 will have a safer, cleaner and quieter environment, though NH1 will still be there and still be busy.

It has not proved possible, within the confines of the present study, to quantify this impact on poverty. The international definition of poverty is normally taken as earning less than $1.90/day at 2016/17 prices at purchasing power parity. The threshold for extreme poverty is regarded as $1.25 on the same basis. By that definition 31.5% of the population was regarded as extremely poor in 2010. For urban areas this figure was 21.3% and for rural areas 35.1%.

The national poverty line varies according to the price of food items (based on a daily consumption of 2122 calories per person) and selected non-food items. Those with a daily intake of less than 1805 calories are regarded as ultra-poor. The present value of these thresholds in monetary terms has not proved easy to find. In 2014, by these definitions, a quarter of the populations are regarded as poor, and half of these are ultra-poor.

The minimum wage, for example for garment workers, is now equivalent to $68/month in USD terms (BDT 78 =$1), or $2.27 (178 taka) a calendar day. Adjustments for purchasing power parity, however, use an exchange rate of 30 (a rate calculated in 2011), so the equivalent value in international terms becomes equivalent to 2.6 times more than this, or $5.90 in PPP terms.

Thus, such a worker would only be poor, by this definition, if he or she had more than one dependent. In practice, of course, most people would regard these workers as poor.

In the project area, about one-third of the population are regarded as poor under the $2/day (at 2019 PPP) definition. But it is not known how many of these

will gain significantly from the project.

Not much can be added to this discussion without more research, which is beyond the scope of this project. If the conclusion would be that not more than 15% of the project beneficiaries are defined as poor, and that these persons gain half the benefit each as compared with the non-poor, then the poverty impact.

1.7.6 Impact on GDP: Dhaka Chittagong Expressway (Option 1: Alignment 1, At-Grade and Elevated)

In terms of direct impact on GDP, it has found that the DCE project of Roads and Highways Department has only a slight impact on economic growth. I assumed a base case of 8.15% GDP growth, consequently benefit in the 2022-2032 period will be in the range of 0.25-0.40% and 2022-2051 period will be in the range 0.25-1.85% of 2051 GDP, it may say 0.60%. So, this project would increase this amount by 0.60% i.e. GDP would be 8.75% with the project over the 30 years of the project.

I have observed from the measures of central tendency of the variables used in my study and I have observed from the skewness and kurtosis values that data set is not normally distributed. Thus, I have used log values to solve this matter. Therefore, I can see from the histogram that after the log transformation the data set is normally distributed (**Figure 7 and Table 8**).

Table 8: Descriptive Statistics

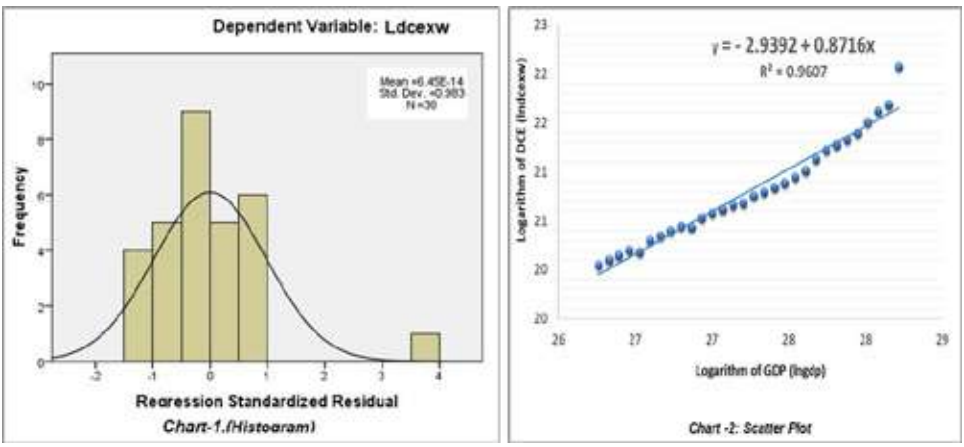
	GDP (Constant Market Price) USD	**Dhaka Chittagong Expressway Project (DCExw)*, USD***
Mean	27.239	20.802
Median	27.239	20.715
Standard Deviation	0.593	0.528
Sample Variance	0.3522	0.2785
Std. Error	0.108	0.096
Kurtosis	-1.200	-0.399
Skewness	0.000	0.559
Minimum	26.262	20.048
Maximum	28.216	22.071
Range	2	2
Count	30	30

Note: calculation by Author and SPSS

For GDP mean, median is 27.24 & 27.24 respectively. For DCExw mean, median is 20.80 & 20.71 respectively. And for GDP Std.Error, Kurtosis and Skewness are 0.108, -1.200 & 0.000 respectively. For DCExw Std.Error, Kurtosis and Skewness are 0.096, -0.399 & 0.559 respectively.

Using the log values, I have the following Histogram and scatter plot

Figure 7: Histogram (Chart -1) and Scatter Plot (Chart -2)



Here from the scatter plot I can observe a likely positive association between DCExw and GDP variables. The value of β is positive 0.871. This is also the slope term. The intercept term α has a value of -2.9392.

The coefficient of determination $r^2 = 0.961$. This is also high. Which states almost 96 percent of the total variation in Dhaka Chittagong Expressway Project (DCExw) explained by the regression model.

The coefficient of correlation r = ± 0.980. I can clearly see that there is strong positive correlation between GDP and Dhaka Chittagong expressway (DCExw).

In this analysis, time series data from the World Bank and others data from DCE project are taken and OLS linear regression has done.

Using SPSS data analysis software, I have derived linear regression analysis and the result is as followed (**section 1.7.6.1**).

1.7.6.1 Estimation of the Econometric Model

Regression analysis is the main tool used to obtain the estimates. Using this technique and the data given in Table 8, I obtain the following estimates of α and β, namely, −2.9392 and 0.871. Thus, the estimated Dhaka Chittagong expressway (DCExw) project function is:

$$Y\ (DCExw) = \alpha + \beta Xi\ (GDP) + \mu i \quad 0 < \beta < 1 \text{ ----------(1)}$$

$$Y = -2.9392 + 0.8716Xi \text{ ----------(2)}$$

$$R^2 = 0.961 \text{ ----------(3)}$$

The coefficient of determination (r^2) = 0.961. This is no higher. Which states almost 96%(percent) of the total variation in DCExy explained by the regression model.

The coefficient of correlation (r) = ± 0.980, it can clearly see that there is strong positive correlation between GDP and DCExy.

where, Yi = DCExw (dependent variable) and X_i = GDP at constant market

price (independent, or explanatory variable)

α = the intercept 2.9392(negative) this is a constant term and

β = the slope coefficient (the GDP coefficient is 0.871. It is a log-liner model)

μ_i= error term

From these results I see that GDP coefficient is positive + 0.871. Implying that for 1 percent increase in the GDP, the benefit of Dhaka Chittagong expressway (DCExw) on the average increases by about 0.871 percent. I can say that there is positive association between GDP and Dhaka Chittagong expressway (DCExw) project.

To find out if the parameters are statistically significant, I have used t-test, p value. Here the calculated t-values for both the variables are much higher that the critical t-values thus I can say the parameters are statistically significant. P-values are also very low thus I can say that variables are statistically significant.

The values of Standard error are also very low which stats statistically significant variables.

Observing the upper and lower values of confidence interval, so it can say zero is not included in this range. Thus, β cannot be zero ($\beta \neq 0$), this supports alternative hypothesis (H1).

As a consequence, I can see that findings are matching alternative hypothesis (H1). Moreover, there are a positive association between GDP and DCExw. If GDP increases by 1 percent then the benefit of Dhaka Chittagong expressway (DCExw) project on the average increases by about 0.871percent.

1.7.6.2 Findings

The value of this project (DCExw) is thus the benefit lost if this project is not undertaken. As a consequence, I can see that findings are matching alternative hypothesis (H1). Moreover, there are a positive association between GDP and Dhaka Chittagong expressway (DCExw) project.

Similarly, I have found, this infrastructure has a significant positive impact on GDP growth. It might well be the case that high GDP and high infrastructure investments are correlated. Therefore, this project would increase this amount by 0.60% that is GDP would be 8.75% with the project over the 30 years of the new Dhaka Chittagong expressway.

1.8 Results And Recommendation

The construction of the 4-Lane expressway from Dhaka to Chittagong will bring in direct economic and social benefits to the people in districts of Dhaka and Chittagong Divisions and indirect benefits to other parts of the country as well.

This paper recommends that development of road transport infrastructure with gross capital build will lead to robust growth of the Bangladesh economy. So, it is emphasizing, an appropriate transport policy should be hold to boost transportation infrastructure and hence sustainable economic growth in Bangladesh. On economic

criteria, therefore, the recommendation would be to proceed with Alignment 1 of the expressway, at-grade and as a tolled PPP project, as soon as possible. The economic analysis should take into account all on going and future road and transport infrastructure project and future development plans in the project area.

1.9 Conclusions of Economic Studies

In conclusion, this alignment at-grade and elevated, is the sole viable alternative from the economic point of view. Its Economic Internal Rate of Return is 20.3% as well as benefit and cost ratio are 2.26 (benefit cost ratios>1). It was found that Option 1 is a robust project, as only very substantial cost increases (126%) or traffic reductions (56%) would affect the overall viability of the project.

The benefits of the expressway will be widespread throughout the economy. Though the project is not directly aimed at poverty reduction, it will have knock-on effects on growth, incomes and employment that will benefit the poor.

The objective of the study is to explore the relationship between the DCExw project and GDP. For this purpose, time series data from the World Bank (WB) and DCE project data are used for analyzing bi-variant linear regression using SPSS. It is found that there is a positive linear relation of DCE project with the rise of GDP. Likewise, it has found that the DCE project of Roads and Highways Department has positive impact on economic growth.

Also, the expressway can be connected Chittagong and Cox's Bazar with Kolkata, Myanmar and China in the future and may create an economic corridor among Bangladesh-China-India-Myanmar (BCIM) countries and there is enormous economic potential of Chittagong District with an exclusive advantage of ports, roads and railways. Yet, Bangladesh is part of the proposed BCIM corridor. And, BCIM corridor is included with Belt and Road Initiative (BRI). Besides, Bangladesh has the geographical boost to connect itself to neighboring countries including China, the Association of Southeast Asian Nations (ASEAN), central Asia and west Asia and beyond using multimodal connectivity through road-rail-air and shipping. This DCE project is absolutely relative with the BCIM economic corridor. In addition, Dhaka-Chittagong Highway, which is part of the Asian Highway (AH)network, by widening it to four lanes and building the Dhaka-Chittagong Expressway.

The potential of the project area for economic growth will be increased and poverty reduction in the Bangladesh. No adverse socioeconomic effects on employment and income trends.

1.10 ACKNOWLEDGEMENT

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years. I am worked on several project i.e. water, roads, railways (MG, BG, DG and electric traction, also double stake and single stake container trains, passenger trains analysis, forecast, double track and single double, new and conversion railway line), port ICD forecast and analysis, road bridges, rail bridges, 4lane marine drive expressway, expressway, elevated expressway, and social development projects. And, Mr. Martin Kerridge (British), who is a Transport Economist/Advisor/ Director at LanXang International, Consultant (various and independent) UK. He had encouraged me for analysis on transportation. I'm thankful to him.

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Notes

1. European Transport Conference
2. The Association for European Transport
3. www.worldbank.org/en/country/bangladesh/overview (last update: Apr 05, 2019)
4. Human Development Report 2019 published by the United Nations Development Programme (UNDP)/ Page-3/Table A/HDI rank-135/ http://hdr.undp.org/en/countries/profiles/BGD.
5. Bangladesh Bank, statistical table, April.2020/TABLE- VII (P=Provisional) and base year 2005-06,
6. Consultancy Services for Feasibility Study and Detailed Design (Package-I) Under Technical Assistance for Detailed Study and Design of Dhaka-Chittagong Expressway on PPP Basis (ADB Loan 2856 – BAN)
7. Public Private Partnership
8. Road Transport and Highways Division of the Ministry of Road Transport and Bridges
9. Government of the People's Republic of Bangladesh Bridges Division Bangladesh Bridge Authority (BBA)
10. The International Monetary Fund
11. The Bangladesh Bureau of Statistics
12. Million
13. Bangladeshi Taka
14. Gross Domestic Product
15. Ordinary Least Squares

Footnoting and *Writing Style* of the Bangladesh Journal of Political Economy

1. The Bangladesh Journal of Political Economy will be published in June and December each year.
2. Manuscripts of research articles, research notes and reviews written in English or Bangla should be sent in triplicate to the Editor, The Bangladesh Journal of Political Economy, Bangladesh Economic Association, 4/c Eskaton Garden Road, Dhaka-1000, Bangladesh.
3. An article should have an abstract preferably within 150 words.
4. Manuscript typed in double space on one side of each page should be submitted to the Editor. Submission of electronic version is encouraged.
5. All articles should be organized generally into the following sections: a) Introduction: stating the background and problem; b) Objectives and hypotheses; c) Methodological issues involved; d) Findings; e) Policy implications; f) Limitations, if any; and g) Conclusion (s).
6. The author should not mention his/her name and address on the manuscript. A separate page bearing his/her full name, mailing address and telephone number, if any, and mentioning the title of the paper should be sent to the Editor.
7. If the article is accepted for publication elsewhere, it must be communicated immediately. Otherwise, the onus for any problem that may arise will lie on the author.
8. The title of the article should be short. Brief subheadings may be used at suitable points throughout the text. The Editorial Board reserves the right to alter the title of the article.
9. Tables, graphs and maps may be used in the article. Title and source(s) of such tables should be mentioned.
10. If the Editorial Board is of the opinion that an article provisionally accepted for publication needs to be shortened or particular expressions deleted or rephrased, such proposed changes will be sent to the author of the article for clearance prior to its publication. The author may be requested to recast any article in response to the review thereof by any reviewer.
11. The numbering of notes should be consecutive and placed at the end of the artile.
12. Reference in the text and in the Reference list at the end of article should follow it as below:

i. Book (one or more authors)

- Start your full reference with the last name of the author(s) so it connects with the citation; then give initials or first name(s) of the author(s).
- Year of publication comes next.
- Next, give the title of book: in italics or underlined (but be consistent throughout your list of references).
- Finally, give the place of publication and name of publisher.

Example

In-text citation:

(Wilmore 2000)

(Just cite the last name(s) of writer(s) and the year the book was published).

Full reference:

WILMORE, G.T.D. (2000). Alien plants of Yorkshire. Kendall: Yorkshire Naturalists' Union.

Chapter from an edited book

- Start with the full reference entry with the last name of the chapter's author, followed by initials, then state year of publication.
- Then give name (s) of editor(s). The last name of an editor precedes his or her initials, to distinguish editor(s) from the name of the writer of the chapter. Indicate single editor by an abbreviation: (Ed.), or editors: (Eds.).
- State full title of book - in italics or underlined. It is helpful to then give a chapter number.
- Finally, give place of publication and name of publisher.

Example

Citation:

(Nicholls 2002)

(Cite the name of the writer of the chapter or section in the edited book).

Full reference:

NICHOLLS, G. (2002). Mentoring: the art of teaching and learning. In P. JARVIS (Ed.) The theory and practice of teaching, chap. 12. London: Kogan Page.

iii. Referencing journal articles

- Start with the last name of the author of the article and initials of author.
- Year of publication.
- Title of article (this can go in inverted commas, if wished).
- Name of the journal or magazine (in italics or underlined).
- Volume number and part number (if applicable) and page numbers.

- References to journal articles dojroMnclude the name of the publisher or place of publication unless there is more than one journal with the same title, e.g. International Affairs (Moscow) and International Affairs (London).

Example

Citation:
(Bosworth and Yang 2000).
Reference:
BOSWORTH, D. and D. YANG (2000). Intellectual property law, technology flow and licensing opportunities in China. Internationa! Business Review, vol. 9, no. 4, pp.453-477.

The abbreviations, 'vol.' (for volume), 'no.' (for number) and 'pp' (for page numbers) can be omitted. However, for clarity and to avoid confusing the reader with a mass of consecutive numbers, they can be included, but be consistent. Note how, in the example above, the initials of the first author follow his last name (Bosworth, D.), but precede the second named (D. Yang). This is the practice illustrated by British Standard in their guidelines with Harvard and both numerical-referencing styles, although you may find the guidelines at your institution may differ on this point.

iv. Example of referencing an electronic source

Example

Citation:
(Djxons Group 2004)
Reference:
D1XONS GROUP PLC (2004). Company report: profile. [Accessed online from Financial Analysis Made Easy (FAME) database at http://www.bvdep.com/en/FAME. html 13 Dec. 2005].

13. Reference mentioned in the text should be arranged in alphabetical order and provided at the end of the article.
14. The Bangladesh Economic Association shall not be responsible for the views expressed in the article, notes, etc. The responsiblity of statements, whether of fact or opinion, shall lie entirely with the author. The author shall also be fully responsible for the accuracy of the data used in his/her manuscript.
15. Articles, not accepted for publication, are not returned to the authors.
16. Each author will receive one complimentary copy of The Bangladesh Journal of Political Economy and 5 off-prints.

Lizon Mia, Ankan Chandra Dey & Md. Tanjil Hossain
Single-Digit Interest Rate and Future of Bangladesh Economy: A Brief Analysis

Sonjoy Chakraborty
Developing Gold and Jewellery Sector in Bangladesh: Problem Identification and Policy Recommendation

Md. Fazle Fattah Hossain & Md. Abdul Wadud
How Efficient Are Commercial Banks in Bangladesh? Evidence from the Stochastic Frontier Approach

Md. Hafiz Iqbal & Md. Aminul Islam
Transformation of Waste into Energy in Pabna Municipality Area of Bangladesh: An Economic Valuation

Md. Anisur Rahman
Bangladesh and the World: In 2050 and beyond

Madhusudan Bhattarai, Md. Saidur Rahman & P K Joshi
Comparative analysis of power tiller and tractor rental services market as part of the Agricultural Machinery Development in Bangladesh: Farmers' evaluation using service quality based on SERVPERF

Kazi Muzafar Ahammed
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Md. Enamul Haque
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Tasnim Sultana, Bidduth Kanti Nath & Sujan Kanti Biswas
Women Entrepreneurs of Small and Medium Enterprises: Failures and Remedies

Radia Tamim
Climate change and vulnerabilities of women: Voices of the victims in Dhaka City

Shishir Reza & Rajibur Rahman
Economic Impact of Climatic Catastrophes among Penniless Communities in Bangladesh

Sanzida Tabassum & Md. Saidur Rahman
Nutritional and Recreational Benefits of Roof Top Gardening: An Empirical Evidence from the Selected Households of Dhaka City

Mohammad Mohidul Islam
Evaluating the Energy (Power) Security in Bangladesh

Foyasal Khan
Economic Development and Bilateral Trade Cooperation: Prospects for a Bangladesh-Malaysia Free Trade Agreement

Md. Enamul Haque
Responses of Fishermen to Climate Change in the South-Western Coastal Regions of Bangladesh

Md. Bayazid Sarker
Predetermined History of War Economy

Jasia Tahzeeda
Valuing non-market goods, services & leisure time analysis of tourists of Coxsbazar beach, Bangladesh: Hybrid Travel Cost method

Shahedul Halim Kazi & Mohammad Sharif Ul Islam
The Significance of Sadri Language in the Socio-Cultural Context of the Oraons in Bangladesh

Kazi Sameeo Shees
Dynamics of Dichotomy and Conflict in Religion and Education: Historical and Current Context of Bangladesh

Taskia Haq Lyric
Revisiting the Myth of Revolution, Civil War and Social Disorders in Doctor Zhivago

Md. Tanjil Hossain
Determinants of SME Business in Mymensingh

Shamema Akter
GDP Impact & Economic Analysis of Dhaka Chittagong Expressway: The Case of Bangladesh

Bangladesh Economic Association
4/C, Eskaton Garden Road
Dhaka-1000, Bangladesh
Tel : 880-222225996
E-mail : bea.dhaka@gmail.com
Website : bea-bd.org