

## Impact of Modern Technology on Food Grain Production in Bangladesh

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### Introduction

The economy of Bangladesh is basically agrarian. At present the agricultural sector is the major sector in terms of livelihood and employment with half of the labour force engaged in it (GOB, 2012, p. 1). This sector is the main source of food and nutrition and dominated by crop agriculture. Within the crop sub-sector rice crop dominates in terms of both cropped area (74 percent) and production (54 percent) in 1996-97 (GOB, 1998). Bangladesh is a densely populated country. High pressure of population on limited land is a major constraint to promote agricultural development. Many people live on the verge of starvation or suffer from food deficiency. Every year a lot of money is spent for importing food grains due to the increasing growth of population. The only way to lift the economy from the existing stage is to produce food-grains to self-sufficiency level. It may be noted that agricultural development would not be achieved without the proper application of agricultural inputs like HYV of seeds, fertilizers, irrigation water either individually or in suitable combination. The suitable combination of HYV of seeds, fertilizers, pesticides and irrigation water can increase agricultural output considerably. In a land scarce economy like Bangladesh the adoption of modern technology has opened up opportunities for increasing food production and employment. The last few decades have witnessed major transformation of agriculture, including changes in technology, resource base, and structure and production process. Now agricultural sector is much more diversified. Since no detailed research has yet been conducted on this issue. This paper analyses the impact of modern technology on food grain production in Bangladesh.

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### **Methodology and Importance of the Study**

The study is based on secondary data, collected from different published and unpublished documents. The results of the study may be of great use to policy makers regarding the use of modern technology in agricultural production. The farmer would derive similar benefit from the study. The study will also stimulate interest among researchers to undertake further studies on the issue. The study has also great academic importance to teachers and students of Economics.

### **Impact of Modern Technology**

The crop sector provides staple food such as rice, wheat, pulse, oil etc. Since independence of Bangladesh rice production has increased from 11 million tonnes to about 32 million tonnes (GOB, 2012). Growth of rice production was about 2.8% per year in the 1980s and 3.5% per year since 1990s. Most of the growth in rice production has occurred since late 1980s through adoption of improved varieties of rice supported by rapid expansion of irrigation water. In recent years some policy reforms have been implemented by the government, which include privatization of input distribution, input and food subsidy and import liberalization. The major factors behind food-grain production are the development and diffusion of modern varieties of seeds and rapid expansion of ground water irrigation.

Modern technology in the form of seed, fertilizer and irrigation arrived in Bangladesh as early as 1960s, but its popularity and acceptance grew in the post liberation period. In 1965 - 66, the area irrigated by modern methods was 2,00,000 acres, which increased to 26,38,000 acres in 1979 - 80 (M. Hossain, 1989, p. 27). In 2009 - 10 about 56.9 lakh hectares of land was irrigated. In 2003 - 04 the irrigated area was 48.33 lakh hectares.

Available data indicate that the area under deep tube well irrigation was 6,60,260 hectares and the area under shallow tube well irrigation was 29,31,181 hectares in 2009-2010. (BER, 2011, P. 94).

The farmers of Bangladesh have been using modern irrigation technology because it has the inherent advantage of being affordable. A steady rise of irrigation technology has been influencing the use of HYV of seeds, chemical fertilizers and pesticides. The use of modern variety of seeds was negligible up to the end of 1960s but increased gradually in the 1970s. Total area under modern variety of seeds was nearly 3,78,000 acres in 1968 - 69 but it stood at about 59,53,000 acres in 1979 - 80 (M. Hossain, 1989, p. 25).

In the 2009 - 10 BADC produced 129083 metric tonnes of seeds (B.B.?, 2011). By the end of 1960? fertilizer consumption had increased to over 4 kilogram of nutrients per acre (M. Hossain, 1989, p. 25). In FY 2009 - 10 the total quantity of fertilizer consumption was 30.05 lakh metric tonnes, of which the consumption of urea was the highest - 24.09 lakh metric tonnes (BFR, 2011).

In FY 2009 - 10 nearly 44496 metric tonnes of boro seeds (HYV : 44427 metric tonnes and hybrid : 69 metric tonnes) were supplied to the farmers, which were 7922 metric tonnes larger than the supply in the previous year. However, this distribution is 50 percent of the national demand.

In recent years the agricultural sector is much more diversified than it was three decades go. The last three decades have witnessed vital changes in this sector, including changes in its resource base, technology, structure and production process, which contributed significantly to raising agricultural production. The rapid growth of modern inputs have had a positive impact on food-grain production. Available data indicate that, since independence, rice production has increased from 11 million tonnes to 32 million tonnes (GOB, 2012, p. 5). Most of the growth has occurred since late 1980 through the adoption of modern varieties of rice supported by rapid expansion of irrigation water. During the last two decades more than 80 percent of the increase in rice production has come from the expansion of irrigated boro rice, with reallocation of land from low yielding rain-fed Aus rice. Now, three-fourths of rice area is cropped with modern varieties of rice (GOB, 2012).

Table I presents the food-grains production.

**Table I: Food-grain Production (in lakh metric ton)**

<b>Food grains</b>	<b>2002-03</b>	<b>2008-09</b>	<b>2009-10</b>
Aus	18.51	18.95	17.09
Aman	111.15	116.13	133.07
Boro	122.22	178.09	183.41
Total rice	251.88	313.17	322.57
Wheat	15.07	8.44	9.69
Maize	1.75	7.30	8.87
Total	268.70	328.96	341.13

*Source : Bangladesh Economic Review 2010, GOB, 2011, Dhaka, P. 90*

Table I shows that total food-grains production in FY 2009 - 10 was 341.13 lakh metric tonnes, of which Aus accounted for 17.09 lakh metric tonnes, Aman 122.07 lakh metric tonnes, and Boro 183.41 lakh metric tonnes. The production of wheat

in FY 2009 - 10 stood at about 9.69 lakh metric tonnes between 2002-2003 and 2009-2010, food-grains production increased by 27 percent mainly due to various measures taken by government to provide agro-inputs assistance, which include reduction of price of non-urea chemical fertilizers and cash incentives for diesel. Moreover, the introduction and adoption of non-urea fertilizer ensured balanced use of fertilizers by farmers, which contributed to the increase yield of Boro. During the last two decades, the Boro crop was the major rice crop in Bangladesh. "This indicates a structural shift in Bangladesh's rice production from a largely weather influenced crop to an irrigated crop." (Uttam Kumar Deb et. al, 2007, p. 666)

### **Growth in Area and Production of Food-grains**

Available data indicate that HYV rice output and acreage have been changing over time. M. Hossain (1999, p. 42) observed that HYV rice acreage had increased from 15% to 52% of the total acreage during the period between mid-seventies and mid-nineties, while, HYV rice output increased from 30% to 70% of total rice output during the same period. The increase in the area under rice was responsible for increased production of rice. Uttam Kumar Deb and others (2007) observed that area under rice increased at the rate of 0.7% in the 2000s as against 0.6 percent in the 1990s, whereas it declined at the rate of 0.1% in the 1980s. Wheat area declined at the rate of 7.2 percent in the 2000s compared to 1.2 percent increase in the 1980s and 4.3 percent increase in the 1990s. They further point out that the area under HYV Aus, HYV Aman and HYV Boro increased but the area under the local varieties declined in the 1990s and 2000s. This thing happened mainly due to the adoption of HYV by farmers through replacing local varieties. Production of food grain showed a higher rate of growth during 1980s to 2000s. Production of rice showed a larger rate of growth (3.7% annually) in the 2000s than 3.3 percent in the 1990s and 2.7 percent in the 1980s. Growth rate of Boro production was 8.2%, 7.0% and 4.4 percent in the 1980s, 1990s and 2000s respectively. Growth rate of Aman production was 1.7%, 0.8% and 3.6% in the 1980s, 1990s and 2000s, respectively. Growth rate of Aus rice production in the 1980s, 1990s and 2000s was 3.1%, 1.7% and 1.4 percent, respectively (ibid 2007, p. 674). Growth rate of total food grain production in the 1980s, 1990s and 2000s were 2.4%, 3.5% and 2.9%, respectively.

Shahabuddin (2010) mentioned that the rate of growth in agricultural output increased by 2.7 percent during 1972 - 73 to 1992 - 93. Output grew during 1972 - 73 to 1985 - 86 by 3 percent. He also found that agricultural output grew at the rate of 1.6% during 1990 - 95. Growth rate of output increased sharply by 4.7 percent during 1996 - 2000, but decelerated to 2.8 percent during the period 2001

- 08 (Shahabuddin 2010). It appears that total rice production increased substantially during the 1990s and the 2000s, and Bangladesh had achieved the highest level of food grain production in 2009-10.

The growth rate of output at 2.9 percent in the immediate past decade (2001-2010) is heralded as a success, made possible by the adoption of the new technology. The steady growth of new technology has thus had a positive impact on food grain production.

### **Conclusions**

The agricultural sector is now much more diversified than a few decades ago. The last three decades have witnessed major changes in agriculture, including changes in technology, resource base and production process. During the last three decades Bangladesh have had a tremendous growth in agriculture. The rapid expansion of the new technology has had a positive impact on food grain production. Agricultural output grew by 4.7 percent during 1996 - 2000. The growth rate of agricultural output in 2001-10 was 2.9 percent. The significant improvement in agriculture can highly be attributed to a steady dissemination of the new technology over the last three decades. Policy suggestions that emerge from the paper are the following:

- (1) Strengthening of agricultural extension and support services for promotion of agricultural activities.
- (2) Interdisciplinary knowledge of economists, agriculturists and environmentalists should be incorporated in the modern farming and related research.
- (3) Diversification of farming system should be encouraged in order to help improve economic condition of the farmers.
- (4) In order to increase agricultural output and yield, an integrated land use policy is essential.

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