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AGRICULTURAL DEVELOPMENT IN BANGLADESH

VIEWS AND REVIEWS

W.M.H. JAIM

JOINT STUDY ON
RURAL DEVELOPMENT EXPERIMENT

Bangladesh Academy for Rural Development (BARD)
Comilla, Bangladesh

Japan International Co-operation Agency (JICA)
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FOREWORD

Bangladesh is predominatly a sustainable-oriented agricultural country. Her economic development means agricultural development, and rural development in Bangladesh should also be, in fact, synonym of agricultural development since majority of her people live in rural areas with agricultural livelihood. In such situation studies on agricultural development of Bangladesh are very important and Professor W.H.M. Jaim's study deals with essential factors of agricultural development of Bangladesh with antecedent.

It gives me immense pleasure in introducing this publication, *Agricultural Development in Bangladesh: Views and Reviews*, written by Dr. W.M.H. Jaim, Professor of Agricultural Economics, Bangladesh Agricultural University, Mymensingh. This is, in fact, an attempt to project a broad picture of agricultural situation of Bangladesh with particular emphasis on its development over historical times. The author tries to trace agricultural development historically even in the absence of proper historical materials on them and his sincere effort is noticeable in the form and content of the monograph. Historical evolution of agricultural development policies and research, input distribution and credit supply on agricultural development and finally the participation of both GO and NGOs in over-all agricultural development are the principal foci of this monograph. The work basically encompasses the essential elements of agricultural development where the author tries to examine their progress in the given situation of Bangladesh over time.

The author tries to highlight the development strategies and their consequences in proper historical perspectives. The author notices remarkable inconsistency in the allocation of resources and objectives of agricultural development in all Five Year Plan of the Government.

Faced with numerous agricultural problems including persistent food shortage, the Government set up Food and Agriculture Commission in 1959 to suggest ways and means to increase agricultural output and also to recommend ways of organizing agricultural efforts on a more effective and efficient plane. Practically this laid down foundation of institutional research activities for agricultural development of Bangladesh. Later this was followed by the institution of a number of research organizations where researchers from home and abroad participated

In a short canvas he successfully examined the broader aspects of agricultural development of Bangladesh in historical perspectives. I believe that this monograph will certainly draw attention of scholars in agriculture and rural development, both home and abroad.

Professor Yoshihiro Kaida
Japanese Team Leader, JSRDE Project

PREFACE

Like others, this is not an independent review of Bangladesh agriculture; rather it is mainly based on a number of literatures related to agricultural sector review conducted by different people at different periods. Therefore, in a sence, this is a compilation of the main features of agricultural development which took place over a long time since The Mughal period. Although a good number of studies have been conducted on the performance of agricultural development in Bangladesh in recent years, literatures on agricultural development before Pakistan period is really limited. I am indebted to all those who have made valuable contribution in reviewing and analysing agricultural development in Bangladesh, particularly to those who made contribution in reviewing agricultural development before Pakistan period (1947). Without their valuable contributions, the present review which considered agricultural development since The Mughal period would not have been possible. Although emperor Babar was the founder of The Mughal domain, the present review has considered the period since emperor Akbar's reign when Mughal rule was established in Bengal.

Agriculture sector encompasses not only crop sector, but also livestock, fisheries, forestry etc. However, the present review has mainly concentrated on crop sector, the contribution of which is 29 % out of 37 % contribution of the whole agricultural sector in the national GDP of Bangladesh. Moreover, literatures on non-crop agricultural development for such a long time review are also very limited.

The present study was undertaken with the initiative and keen academic interest of Professor Y. Kaida of The Centre for Southeast Asian Studies, Kyoto University, Japan. The broad outline of this study was also given by Professor Kaida. Without his help and cooperation this study would not have been done. I sincerely acknowledge his valuable contribution in conducting the review work. Finally, I acknowledge the support of JICA through JSRDE project in conducting the review work.

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GLOSSARY

Aman	The main monsoon rice crop
Aus	Summer rice crop, harvested between July and August
Baro Bhuiyan	Twelve big independent Zaminders who did not surrender to the Mughals emperors
Bigha	A standard measurement of land; usually about one third of an acre
Boro	Winter cum summer rice, harvested between end of April and May
Char	New deposits of alluvial soil which form very low islands
Gur	Unrefined sugar
Jotedar	A farmer or wealthy raiyat
Kori	Shell used as a coin.
Lakh	One hundred thousand
Mahajahan	Money lender
Maund	Measurement of weight equivalent to 37 kilogrames
Raiyat	Cultivator, peasant
Taka	Bangladesh currency (US dollar 1 = Taka 40 in 1995)
Thana	Administrative unit consisting of about 10 unions.
Union	Unions are the lowest level administrative units, each consisting of 7 to 10 villages
Zaminder	Revenue holder of a zamindari under Mughal system and landholder following permanent settlement
Zamindari	Division of revenue unit

ABBREVIATIONS

ADB	Asian Development Bank
ADP	Annual Development Plan
BADC	Bangladesh Agricultural Development Corporation
BAI	Bangladesh Agricultural Institute
BARC	Bangladesh Agricultural Research Council
BARD	Bangladesh Academy for Rural Development
BARI	Bangladesh Agricultural Research Institute
BAU	Bangladesh Agricultural University
BBS	Bangladesh Bureau of Statistics
BFRI	Bangladesh Forestry Research Institute
BINA	Bangladesh Institute of Nuclear Agriculture
BJRI	Bangladesh Jute Research Institute
BKB	Bangladesh *Krishi* Bank
BRAC	Bangladesh Rural Advancement Committee
BRRI	Bangladesh Rice Research Institute
BTRI	Bangladesh Tea Research Institute
BWDB	Bangladesh Water Development Board
CARE	Cooperative for American Relief Everywhere
CARITAS	A development organization
CIDA	The Canadian International Development Agency
DAEM	Directorate of Agricultural Extension and Management
DLS	Directorate of Livestock Institution
EEC	European Economic Community
FFW	Food for Work
FRG	Federal Republic of Germany
FRI	Fisheries Research Institute
FY	Fiscal Year (July 1 to June 30 of a year)
GDP	Gross Demestic Product
GOB	Government of Bangladesh
IBRD	International Bank for Reconstruction and Development
IDA	International Development Association (IBRD)
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy and Research Institute
IIMI	International Irrigation Management Institute
IRDP	Integrated Rural Development Programme
IRRI	International Rice Research Institute
IPSA	Institute of Postgraduate Studies in Agriculture
JICA	Japan International Cooperation Agency

KSS	*Krishi Samabaya Samity*
MOA	Ministry of Agriculture
NGO	Non Government Organization
OECD	Organization for Economic Cooperation and Development
OPEC	Organization for Petroleum Exporting Countries
SFYP	Second Five Year Plan
SIDA	Swedish International Development Agency
UNDP	United Nations Development Programme
UK	United Kingdom
USA	United States of America
USAID	United States Agency for International Development
WDB	Water Development Board

UNITS OF MEASUREMENT

1 bigha = 33 acres
1 acre = 40468 hectares
1 metric ton = 2204.6 lbs = 26.7939 maunds
1 ton = 1000 kgs
1 maund = 82.29 lbs. = 37.3261 kgs
1 seer = 2.0573 lbs. = 0.933 kgs
1 crore = 10 million .
1 lakh = 100,000

CHAPTER - I

AN OVERVIEW OF AGRICULTURAL DEVELOPMENT IN BANGLADESH

Mughal Period

Agricultural Condition

At the beginning of the 17 th century, Mughal rule was established in Bengal During the period of Mughal emperor Akbar most of the parts of Bengal were under the control of *'Baro Bhuiyan'*. In 1612 Sylhet and in 1666 Chittagong of Bengal came under Mughal rule. During Mughal period, agriculture was the main livelihood of the people of Bengal. Fertile land and low price of agricultural commodities in Bengal were the causes of jealousy for the whole world. There is sufficient proof that Bengal had large surpluses in rice production. In fact, at that time, huge amount of rice was exported to Ceylon, Maldiv, South India, etc. (Faruk, 1983). Numerous varieties of rice were also produced in Bengal. Abul Fazal who was one of the ministers of Mughal emperor Akbar was surprised to see the rapid growth of paddy plants with rising level of flood water (Faruk, 1983). This indicated that deep water aman paddy was also cultivated at that time. It was also reported that three crops in the same land were cultivated in a year.

Although there is mention about wheat cultivation in Bengal in the18 th century, it was never cultivated as a major crop in Bengal. It is important to note that cotton was one of the major crops in Bengal in Mughal period. Cotton was cultivated in a large scale in the districts of Dhaka, Mymensingh, Comilla, Rajshahi, Jessore and Chittagong Hill Tracts (Faruk, 1983). In general the quality of cotton was not so good, but the cotton produced in Dhaka and Mymensingh was of the best quality in the world (Habib, 1990). This special type of cotton was used in making the world famous Moslin cloth. After the fall of that textile industry, cotton cultivation in this area has almost disappeared.

In the seventeenth and eighteenth centuries, Bengal was one of world's major exporters of textiles and it was possible because cotton was produced to a large scale in Bengal (Islam, 1992). Consequently upon the reduction of textile exports, cotton production also reduced from the beginning of the 19th century and it came down to an insignificant level by the mid19th century.

Sugarcane was also cultivated in a vast scale (probably more than cotton) during Mughal period. The crop was introduced in Bengal before The Mughal period. Both in terms of quantity and quality the sugar of Bengal was the best (Habib, 1990). Tourists in the 15th and 16th centuries mentioned that enough sugar was exported to South India, Arabian countries and Persia from Bengal (Faruk, 1983). The export market of Bengal

gradually squeezed when sugar production began in the Dutch colony Java in the 18th century.

Although commercially jute production in Bengal started during mid 19th century, yet farmers started cultivating jute to meet their domestic requirements long before that period (Habib, 1990). Abul Fazal has mentioned about clothes and hessians made of jute in the 16th century (Faruk, 1983). There is proof that during the mid 18th century, the East India Company used to export a small quantity of hand made gunny bags from this region (Faruk, 1983).

Now a days, dye producing crops are not given importance. But in the 17 th century the condition was not like now. In the business letters at that time, the name of indigo which was produced at different regions of India has been repeatedly mentioned (Habib, 1990). However, the quality of indigo produced in Bengal was not so good. Like jute, indigo was cultivated in small quantity in Bengal before emergence of the East India Company (i.e. before the 17th century). Since mid of the18th century, the East India Company cultivated indigo in large scale in the districts of Faridpur, Dhaka, Rajshahi, Pabna, Kushtia and Jessore regions (Faruk,1985). The British gave more attention to cultivate indigo in this region when supply from North America was stopped in 1776.

Oil seeds were also cultivated to a large scale in Bengal during the Mughal period. Compared to the price of foodgrains, the prices of oil seeds were very low at that time. Opium was also cultivated in Bengal although in small quantity. However, the Mughal emperor Aurongozeb ordered to stop its cultivation completely (Habib, 1990). Among spices, chily was very important item for business. There is also mention by Abul Fazal about cultivation of betel leaf and nuts in Bengal (Faruk, 1983).

The fruits like mango, jack fruits, banana were cultivated in this region from long time. Pineapple was introduced in Bengal at the end of 10th century. The Portuguese brought this fruit from America. They also introduced papaya in this country, but it took time to spread all over Bengal. Guava was introduced in Bengal later on. Many cash crops in this country were introduced by the Portuguese in the 16th century. Among these, tobacco, potato (imported from North America), papaya, pineapple, guava, 'kamranga', etc. are notable. Thus, unlike other foreigners, the Portuguese made a valuable contribution for agricultural development of Bengal (Faruk, 1983).

The cultivation of mulberry has drastically reduced since more than one hundred years ago. There is no doubt that during the Mughal period the largest amount of mulberry was produced in Bengal (Habib, 1990). Lac (ingredient of dye) was produced to a large extent in Bengal, particularly in the North Bengal and Sylhet. Lac was also exported from this region (Faruk, 1983). At that time there was a good demand for lac which was used to produce dye, gum and burnish. Later on when the chemical substitutes of these goods have been invented, the use of lac has been gradually reduced.

In the case of livestock, the condition of the farmers in the 17th century was far better than now. There were vast grazing lands as well as jungles for tendering animals. Even, in most intensively cultivated regions, Bengal had vast grazing land (Habib, 1990). The amount of *Ghee* (produced from milk) available at that time also proofs that the number of livestock per head was very large. Butter in Bengal was produced in such a large quantity that the people not only consumed it, but also exported (Habib, 1990). Compared to now, the price of butter was very cheap. In 1669 the price of butter was only 8.75 times higher than that of wheat (Habib, 1990).

During The Mughul period, there was a tendency to become self sufficient in major crops. However, the main emphasis was given to produce foodgrain crops. Therefore, in the favourable years there were large surpluses of foodgrains without having effective demand.

During the 15th and 16th centuries, land was considered as the most important capital. During that period, the farmers had to pay one-half to one-third of their crops as their land rent Farmers at that time used traditional farm implement like plough, sickles, etc as most of the farmers of Bangladesh are still using to-day.

Economists feel that economy of Bengal achieved the highest prosperity in the 18 th century (Faruk, 1983). The reason was that, during the first half of the18 th century, for about 50 years uninterrupted peace prevailed in Bengal under the rule of capable *Nawabs* although other regions of the sub-continent was disturbed by the external attacks, revoults, etc. In 1722, during the period of Murshid Kuli Khan, the revenue of Bangladesh rose up to 1 crore 42 lakh taka. The price of coarse rice was 4 maunds per taka at that time (Faruk, 1983).

Overall Economic Condition

Before Bengal was invaded by Mughals, Bengal was very rich as wealth of Bengal remained in Bengal. But during The Mughal period lot of wealth has been transferred from Bengal, mostly to Delhi. Islam (1992) in his book, 'History of Bangladesh' has given some indications about the economic condition of Bengal as well as commercial aspects during Mughal period. He has mentioned that Bengal's so called integration to world-system was inaugurated by the Portuguese in the late 16th century. He has also mentioned that though the Portuguese showed up first, it was actually the Dutch who had began extensive commercial transactions with Bengal in the 17th century. The Mughal emperors wellcomed Dutch, French, English, Ostenders and others because through them Bengal merchandise was promoted in the world market, and Bengal always exported more and imported less. Foreign commerce brought huge amount of precious materials for the Government. Every year hundreds of ships arrived to buy Bengal's manufactures in exchange of gold and silver. Thus, huge amount of gold and silver was transferred to Bengal from European countries.

Islam (1992) in his book further described the use of these metals. He has mentioned that, at that time paying the army in cash had a great political advantage for the rulers. But it had nothing to do with the economic life of the people. The producers got some cash in hand while they sold their products, but that cash was taken away from them next day by way of land tax and other ways. Using imported metals as jewelry was another sector. The men and women of the aristocracies had ornamented themselves profusely. That is again useless in terms of economic use of precious metals.

During The Mughal period, Bengal was treated as *Suba* or state. The *Subedars* who ruled Bengal used to take all their savings to Delhi when they left Bengal. Thus, tremendous amount of money was transferred from Bengal. Hossain (1995) in his book (written in Bengali), *Development of Bangladesh and Political Economy of Alleviating Poverty*, gave some indications of transfer of wealth from Bengal, particularly to Delhi. He stated that in the year 1538, when Mughal emperor, Humayan came to invade Bengal, Sher Shah left Bengal and he took 6 crore gold coins with him. Again, Prince Shahjahan, son of emperor Zahangir once visited Dhaka ; when he left, he took 40 lakh taka from the treasury.

During the period of Shaesta Khan, lot of money was also transferred to Delhi. Out of the money collected from tenants (*Riyats*), he saved some portion and gave financial support to Mughal emperor to fight against Dhakinatta for 20 years. Shaesta Khan himself saved 38 crore taka during his period of *Subadari*. When he was appointed as *Subedar* of Bengal for the second time, he agreed to pay 5 lakh taka each year to the emperor Aurongozeb. Since then crores of taka were sent to Delhi. Moreover, when Shaesta Khan left Bengal, he took all the money with him. Further, Khan-e-Zahan was *Subedar* of Bengal for one year during the period of Aurongozeb. He also took 2 crore taka with him when he left Bengal.

Murshid Kuli Khan was appointed as *Subedar* of Bengal in 1713. He was very successful in enhancing rent through continuous pressure to traders and *Jaigirdars* which had immensely contributed to accumulate wealth of Mughal emperors. During his period, each year one and half crore taka was collected as rent. Every year, he sent 1 crore 3 lakh taka to the Mughal emperor, Aurongozeb. This was the time when the Mughal emperor had severe financial crisis as a result of continuous fighting. Because of this personal achievement, Murshid Kuli Khan became *Subedar* of Bengal from a mere accountant. During his period, silver coins in Bengal were exhausted as a result of transfer of tremendous amount of money to Delhi. At that time, use of *Kori* was introduced. During the period of 1713 to 1715, he sent 2 crore 40 lakh taka to the new emperor, Farukh Shour (Hossain, 1995).

Shuzauddin Kha, son of Murshid Kuli Khan took power of Bengal in 1727. He gave 1 crore 50 lakh taka as presentation (*Nazrana*) to Mughal emperor, Mohammed Shah. During his 11 years 8 months ruling period, he sent 14 crore 62 lakh 78 thousand

taka to Delhi. Again, Alibordi Khan had to pay 1 crore taka to Delhi to get *Nawabi*. Besides this, he had to pay other valuable gifts. During his period, he gave 12 lakh taka each year to the *Marathas* (Hassain, 1995). It is clear from the above facts that Bengal was full of wealth at that time. It is also clear from above information that the money transferred from Bengal has tremendously helped to lead luxurious life of the Mughal emperors at Delhi. The lion share of this money came from the peasants of Bengal.

Another drainage of wealth from Bengal was through the participation of the Europeans in the country's inland trade (Islam, 1992). They used to buy goods in one mart and sold in another and out of the profit thus made they bought export goods and left for Europe. Such an export was an absolute loss to the country's economy because it did not bring anything in return.

During The Mughal period, Bengal was exploited for two reasons. Firstly, lot of money was transferred to Delhi as rent, secondly, the *Subedars* as well as employees in the important posts were appointed from Delhi most of whom were non-Bengalis. At the time of retirement, when they returned to their own countries, they took with them huge amount of money (earned legally and illegally). Thus wealth of Bengal was transferred. Bengal was full of wealth at that time and the tourists of different countries have been astonished to see the luxurious life of the rich people. At the beginning of the 16th century, an Italian tourist, Vertema came to Bengal. He said that like Bengal he had not seen so rich merchants in any other country. In the Government papers of 18th century, Bengal has been called the heaven of India. Although Bengal as a whole was very rich, the condition of the common people was not good (Hossain, 1995).

Condition of Peasants

The Mughal regime was more or less an agro-empire. Though the Government received a considerable revenue from import and export duties from the beginning of the 18th century, the highest income always came from agriculture. It was always the policy of the Mughals to protect the raiyats from starvation and deaths at times of famines and scarcities, but at other times their policy was to extract almost the whole of the peasant surpluses in the form of rent (Islam, 1992). The rent rate during Mughal period was in many cases more than the ability to pay by the peasants. Hossain (1995) stated that during the period of Sher Shah, one-fourth of the production was fixed as rent. Later, emperor Akbar fixed value of one-third of crop production as rent which was paid in cash. During the period of Mughal emperor Zahangir the rent was so high that the peasants did not have even minimum income to eat. During the period of Aurongozeb, all the surpluses above the amount needed to consume from one harvest to the another was treated as rent to the Government. Another source (Islam, 1992) states that during Aurongozeb's regime the rent grate was raised to one-half. The surplus thus extracted was used for the luxury of the Mughal emperors as well as management of *Rajshava* (royal court) and maintaining soldiers to control the people.

The glorious picture that was drawn about Bengal economy by the European travelers was based on the splendour of the ruling aristocracies who of course, very rich and glamorous (Islam, 1992). The life style of the ruling aristocrats and great *zamindars* was certainly princely. But the general people lived in thatched huts, surrendered all their surpluses to Government as rent; they had no savings to fall back on at times of famines and scarcities, and their needs were so limited and purchasing power was so low that prices of commodities always remained depressed to the disadvantage of producers (Islam, 1992). During the period of Zahangir, one Dutch tourist made comments that the common people were living in a miserable poverty condition. They possessed lowest level of goods which were needed just to survive (Faruk, 1983). However, though the conditions of the people at large did not change to any considerable degree a striking change took place in the conditions of the commercial classes (*Banians*) interacting with foreign companies (Islam, 1992).

In the light of the discussions made by Faruk (1983), some important conclusions on agricultural prices and standard of living in Mughal period are given below:

Probably in the 17th century among the past few centuries, rice price was the lowest. This was the period of Shaesta Khan. Due to low prices of rice and other commodities, the foreign tourists who visited Bengal at that time have praised the wealth of this country. But its real significance may not be affluence rather it may indicate low purchasing power of the people. One Historian has described such economic condition as a state of surplus production or lack of external demand.

Many people have mentioned about the affluence of Bengal in the 16th century. British tourist, Ralph Fitch came to Sonargoan in 1586. He has mentioned about abundance of rice, cotton and silk clothes in Bengal. He has mentioned that although the bodies of women in wealthy families of Sonargoan were full of ornaments, the men had very little clothes on their bodies. The houses were mostly made of bamboo and straw. Probably due to such low standard of living, it was possible to export large amount of clothes to the western countries and rice to Ceylon, Peru, Mallacca, Sumatra, etc. Through exporting these, huge amount of gold and silver were imported which were used as ornaments besides its use as coins.

During the period of Akbar, the rich had little habits to save money and they used to maintain large number of servants. There is little information about middle class, but business men and Government clerks were not so solvent. The condition of common people was bad. The housing facilities were poor and there were almost no furniture. Among the rich people, visit to holy places was very popular and costly. Most of the rich people were outsiders and to have foreign goods they allowed the foreign traders to come to Bengal (Faruk, 1983).

At the end of 16th century and beginning of 17th century when European traders started business in this country, they had to employ many local employees to do their

different tasks. The transactions in cash money had also increased. As a result, the people of the higher class in the society began to become more rich and they started buying more luxurious commodities. During the period of emperor Zahangir, the Government employees and rent collectors started to earn much. Therefore, the creation of urban class started growing upon which the influence of foreigners was more applicable.

During mid 17th century at the time of Mughal emperor Aurongozeb, one French tourist, Frashowa Barnia has mentioned about affluence of food items in Bengal. The Portuguese had introduced different types of sweets in different areas of Bengal where they settled. He has also mentioned about biscuits made of wheat. At that time, 20 hens were sold at one rupee. The goat was also cheap. According to Barnia, compared to other parts of India, Bengal was rich in terms of food items. At the end of 18th century, that is at the last part of Mughal rule, the low and order situation in Bengal began to deteriorate and the prices of daily commodities began to increase (Faruk, 1983). At that time (in 1943) prices of some food commodities in Dhaka are presented in Table - 1.1.

Table-1.1 Prices of Some Food Commodities in 1943

Commondies	Price per maund in Rupee
Edible oil	4.8
Molasses (*Gur*)	8.50
Onion	.60
Pulses	1.0
Rice	1.23

Source : Faruk (1983).

The most important export commodity was textile which was worldwide famous for its incredible fineness, artistic achievement, etc. The financial institutions and credit market in Bengal operated at that time were no less efficient than those of Europe (Islam, 1992). But undoubted proof exists that all these activities contributed very little to the prosperity of general people. Their average income was very low and the prices of staple items were also too low to attract the producers to produce for the market. In 1739 rice was sold eight maunds for a rupee. The price level of 1739 was, of course, an extreme example. Generally the price of ordinary rice varied from 3 to 4 maunds per rupee. Under such conditions, a person earning one rupee per week had little difficulty in meeting basic needs of his average family. But reports about that time suggest that earning four rupees in a month was difficult for the general people. The price of general consumption goods, particularly rice was almost remained stagnant over a long time. The price level of general consumption goods of mid 17 th century was not significantly different even in the mid 18 th century (Islam,1992 and Faruk, 1983).

The prices of a particular commodity over time changes due to its production cost, its demand and value of money. Therefore, it is difficult to analyse change in price of a

particular commodity. However, change in price of a particular commodity compared to other commodities indicates changes in economic activities and production technologies. In this context, the changes in prices of some consumable commodities (mostly agricultural) over time as mentioned by Faruk (1983) are presented in Table - 1.2

Table-1.2 Changes in Prices of Some Consumable Commodities Over Time : 1752 to 1981

Price in Rupee per Maund						
Year	Rice	Flour	Wheat	Salt	Jute	Milk
1752	.55	.93	.55	-	-	-
1760	1.88	3.37	-	1.25	-	-
1805	.67	-	1.14	-	-	1.14
1870	1.37	-	2.50	-	4.75	-
1971	42.50	48.00	-	14.80	41.50	40.00
1981	445.43	187.60	101.43	51.80	136.00	240.00

Source : Faruk (1983).

The price of rice gradually increased after the British came in this country and the price was the highest after the Second World War. Variations in rice and jute prices were very high, but in the 19-th century, the price of one maund of jute was higher than one maund of rice. During that period, the price of one maund of jute was three times higher than the price of rice (Faruk,1983). But in recent years, although per maund cost of production of jute is higher than rice, the price of jute has drastically reduced compared to rice.

British Period

Agricultural Condition

Lost of changes occurred after the control of Bengal by the British. At that time, domestic industries gradually became dead; self reliant economy was broken and the export of raw agricultural products increased. Pressure on agriculture gradually increased as a result of deterioration of small scale rural industries. The interest of the British was to produce agricultural raw materials at low cost and use those in the industries of Europe.

Islam (1992) stated that with regard to cropping, the 19th century had witnessed three major changes which had influenced the general economy very fundamentally. The changes which took place were in relation to cultivation of cotton, indigo and jute as discussed below according to Islam (1992) :

In the 17th and 18th centuries Bengal was one of world's major exporter of textiles and it was possible because cotton of various quantities was produced in Bengal. Consequently upon the reduction of textile export the cotton production was also proportionately shrinked from the beginning of the 19th century and it came down to an insignificant level by the mid 19th century.

During the same period (19th century), a new crop indigo, started to be cultivated on a larger scale. Although indigo was produced in Bengal since ancient time, its scale was very limited then. The policy of colonial Government to cultivate indigo commercially led to its rapid growth. Indigo firmly established its position as a dying agent by the 1740s and its demand was greatly stimulated by the growth of textile industry in England. The supply from America particularly to England, considerably fell after her independence. Bengal gradually emerged as an alternative source of supply. In 1795-96 Bengal, producing 62,500 maunds against 4,952 in 1788-89, alone provided 67% of the total indigo supply to London. Economic depression in both England and Bengal since 1826 affected the market of indigo. The indigo price in the international market fell since 1845-46. When the price declined and became unprofitable, the farmers stopped its cultivation. Then force was applied to the farmers to cultivate indigo even at a loss which caused revolt by the farmers in 1859-60. Since 1860s cultivation of indigo declined and soon it disappeared from export list of Bengal (Islam, 1992).

Like indigo, jute was also producing in Bengal from ancient time, but again, its scale was then limited to domestic use mainly. Though jute products were exported from Bengal from the beginning of the 19th century, the emergence of jute as an important cash crop dated only from the mid - 1850s, and in the 20th century jute became the backbone of the peasant economy of Bengal. Jute brought property up to 1925 when its market price reached the highest point. The recession of the jute economy began from 1926 and it totally collapsed in the early 1930s when jute price came down to such a level that it did not even cover the cost of production (Islam, 1992).

Faruk (1983) has stated that the British were indirectly benefited through the production of indigo and jute. The prices which the farmers received by producing the raw materials like indigo, jute, etc. were fixed by the British customers who did not allow competitive market since the power of the state was in their hands. Moreover, although all cost and labour for producing these crops belonged to the peasants; the share of profit went to Zaminder's hand. Thus farmers were deprived and their capital was accumulated in the hands of Zaminders and 'Mohajans' who were non farmers and who lived in towns.

Islam (1992) has also mentioned about mulberry cultivation for silk production in British period. Bengal silk had an established international market even before British regime. Except for cotton textiles, silk was in fact the most important export commodity of Bengal. Cultivation of mulberry increased with the increasing demand for raw silk. However, the colonial Government's role in increasing the mulberry production was

confined to a short period which was after the famine of 1769-70. Between 1779 to 1785 mulberry cultivation was declined mainly due to uncertainties in the market. The financial crisis faced by the Company during the war of America Independence sharply reduced its investment. Contributory factors were the depression in European silk market in 1781 and 1782, and the sharp rise in the prices of food crops in Bengal during the scarcity years, 1783 to 1785, leading the old mulberry growers to change over to food crops (Islam,1992) With the help of Government's efforts towards improving the quality of raw silk, the export continued at a high level till the commercial depression in the early 1830s. During the depression years, 1813 to 1835, the export fell by 33.5 % (Islam, 1992).

One of the characteristics of British regime was the Government assistance for agricultural development. This was due to the fact that the industrial development of England was mainly based on exported agricultural raw materials from this country. Therefore, particularly from the very beginning of the 20th century, the British introduced new cash crops, established rail lines, introduced improved marketing system, etc. During the period of world wide depression after the First World War, initiative for agricultural development took place by setting Agricultural Commission, introducing Cooperative Movement, establishing Government Agricultural Development Department and Marketing Department (Faruk, 1983). They did all these for their own colonial interest. But except introducing cultivation of jute in Bengal and improving some communication systems in connection to this, they hardly did anything permanently for the improvement of agriculture or for the farmers. The reason is very much clear. Besides jute (with the exception of small quantity of tea), nothing was exportable from this region. Naturally, the British were not interested for other crops which were not exportable. As East Bengal (now Bangladesh) remained mainly a producer of raw material while the processing was done in West Bengal (how in India) and in Dundee (in UK), East Bengal lost the opportunity of a sound development based on the agro-industrial activities that surrounded jute (Ahmed, 1984). In short, while important changes occurred during the British period with respect to the agrarian structure and the composition of output, the basic nature of the peasant economy remained unchanged.

The British involvement in Bengal agriculture was mainly limited to the changes in revenue administration and little attention was paid by the government to production. Before the British came in this country, the *Zaminders* were not the owners of land. The land owner was the emperor or the government and the *Zaminders* were the rent collectors by generations. Then the *raiyats* (peasants) were under the direct control of the government and if they pay rent regularly, the *Zaminders* did not have any power to evict the riyats from land. One of its bad effects was that, none had any interest to invest in land for higher production. Because, the whole system was like a temporary contract. Even the Zaminders had to take permission from the government to transfer land.

The Permanent Settlement Act in 1773 gave the *Zaminders* permanent right to the land and right to sell. This was the first time that anyone other than state became owner of

land, but the condition was that, on a particular date before sunset land rent has to be paid to the government, otherwise the *Zamindari* will be auctioned (Faruk, 1983). As a result *Zamindari* became a business and due to lack of proper administration in the beginning many big *Zamindaris* were auctioned. As business associates of the British traders (*Bonik*) one group of capitalist was emerged in Bengal and the British did not like facing the competition of these local capitalists within the country. To reduce the competition, their aim was to divert these capitalists to *Zamindari*. Moreover, they thought that if production can be increased through investing capital, the export of raw materials will be increased; therefore they introduced this system. Consequently, many business men in Calcutta and bureaucrats bought *Zamindaris* through auction.

As a result of Permanent Settlement although collection of rent was ensured, there was no impact on commercialization of agriculture. Rather, instead of investing capital in agriculture, the new *Zaminders* enjoyed a luxurious life. Since most of them used to live in Calcutta, their intermediaries (*Naweb and Gomasta*) were the real rulers who oppressed the peasants so much that the peasants revolted in different places. Moreover, since the peasants did not have any legal right on land, they were not interested for land improvement as well as investing capital in agriculture. So, the state of agriculture in Bengal remained completely unchanged and unscientific. Therefore, although the targets of Permanent Settlement Act was partially fulfilled, it did not contribute in modernizing Bengal's agriculture (Faruk, 1983).

Absentee - landlordism and the growth of intermediary interests in land which took place because of the rigidity of land policies in response to population growth had gradually led the peasantry into perpetual indebtedness. Towards the beginning of this century cooperative societies were established through government initiatives. However, in the absence of any integrated development programs the institutional loans made no impact on the hardship of the peasantry (Ahmed, 1984).

Before Polashi, Bengal trade fetched high dividend to the shareholders of the Company, but since the establishment of political dominance the Company was running at a loss. To recoup the losses, revenue of the country was increased every year without giving any thought to the capacity of the tax payers. Famines and scarcities began from 1768. From 1768 to 1789 the country was never entirely free from scarcities or famines either regionally or nationally. Through starvation, deaths and desertions the country was declining in population very rapidly since 1767 (Islam, 1992).

To contain the mounting social contradictions and prevent the peasants from exploding, the various reforms passed by the colonial power during the 1920s and '30s, were : the Tenancy Amendment Act (1928), the Money lending Act (1933) and the Rent Regulation Act (1937). The tenancy Amendment Act recognized the legal rights of the raiyats to their holdings by granting them free and unrestricted right to transfer holdings. At the same time, various provisions in favour of the landlords were abolished. The

Moneylenders Act legislated control of money lending and made it illegal to demand interest rates exceeding those permitted by law. The Rent Regulation Act suspended, for up to ten years, all provisions relating to rent increase. In addition, interest on rent arrears was reduced from 12.5 per cent to 6.25 per cent (Khan, 1989).

These measures had the effect of reducing the levels of surplus extracted by the landlord-cum-moneylender-cum-trader class, thus permitting the cultivators to retain a large proportion of the produce (Khan,1989). Khan has further stated that it was no longer in the interests of the colonial power to cultivate the landlord class that was created under the Permanent Settlement (and its subsequent modification) as a political ally. During the final phase of colonial rule, the state could afford to permit a contraction of the market in rural Bengal, and a return to a greater degree of peasant self-sufficiency/ market autonomy in production and consumption.

The following statistics may serve as illustration of this point : at the turn of this century, nearly 30 % of the rice production in Bengal reached the market, and Bengal was in fact a net exporter of rice; by the '40s however, rice had altogether ceased to be a commercial crop (Khan, 1989). Table-1.3 shows the changes in area cultivated by different crops in East Bengal during the period 1911 to 1950. This table highlights both the increase in rice acreage as well as wheat (to meet increasing consumption needs) and reduction in acreages of cash crops like rapeseed, mustard, jute and tobacco. Among cash crops, acreage for sugarcane was also found to increase.

Table-1.3 Changes in Area Cultivated for Major Food and Cash Crops in East Bengal : 1911-1951

(Area in acres)

Crops	1911-12	1950-51	Increase / Decrease
Rice	13,905,000	19,386,000	+ 5,481,000
Jute	1,975,000	1,250,000	725,000
Sugarcane	155,000	235,000	+ 80,000
Tobacco	205,000	128,000	- 77,000
Rapeseed & Mustard	1,169,000	414,000	- 755,000
Wheat and Barley	43,000	96,000	+ 53,000

Source : Khan (1989), P. 11.

Rural Economy

The Dhaka based Like Minded Group (Canada, Denmark, the Netherlands, Norway and Sweden) commissioned a study (Rural Poverty in Bangladesh) on the longer term trends of rural poverty in Bangladesh. The group has mentioned about the following three factors which were responsible for bringing about changes in the economic and social life of the rural areas of Bangladesh under British rule:

First, the cropping pattern within the country underwent significant changes because of the introduction of commercial crop cultivation. The British colonial administration in Bangal encouraged the peasantry to produce crops required by metropolitan interests, either for purposes of trading or for processing in the factories located in Britain. Large scale cultivation of indigo, opium, and jute resulted in changes in the rural economy. Producers were, however, unable to reap the full benefits of expanded overseas markets for new crops because the terms of exchange were controlled by metropolitan traders and the colonial administration paid more attention to the interest of these traders than those of the agricultural producers.

Second, the industrial revolution and production of cheap machine goods in England resulted in the destruction of the thriving textile industry in Bengal. Instead of being the largest producer of cotton cloth in the world, Bengal became a major importer of clothes. De-industrialization and de-urbanization forced many artisans and craftsmen to adopt cultivation to earn a livelihood. Occupational diversity in the rural areas slowly narrowed and dependence on agricultural activities increased significantly.

Third, the system of revenue collection was also changed after the imposition of British rule. The new rulers were eager to earn as much from their activities in the colonies as possible and had limited interest in raising productivity. Instead of depending only on the traditional local elites, *Zamindari* rights were given by the British rulers to anyone who could collect more revenue for them. A competition ensued between the old local elite and the new rich, who were mostly the trading partners of the British rulers, to obtain *Zaminderi* rights and to squeeze more out of agricultural producers, irrespective of their capacity to pay.

The result was increasing pauperization of the peasantry and massive famine in the late 18 th century. Nearly one-third of the rural population of Bengal died of hunger and starvation in the 1770s because of the government's land revenue policy. Famines and resultant dislocation in rural life obliged the British rulers to change their policy. The rural obligation of the *Zaminders* was fixed in perpetuity. But the British failed to determine the obligation of peasants to the *Zaminders*, which meant that the latter were free to collect whatever amounts they could. The continually increasing burden of rent is regarded as the single most important explanation for the increasing incidence of rural poverty during British rule (Like Minded Group, 1990).

Rising pressure on land and failure of British rulers to safeguard the interests of agricultural producers stimulated the growth of a market for land. Proprietary rights to land conferred economic advantages under the colonial production and revenue system which were unavailable in earlier times. The opportunities for maximizing consumption possibilities and enhancing social position through the exploitation of these proprietary rights and the extraction of surplus from producers, together with the lack of improved land management practices, made the rural rich reluctant to invest in productive activities or

engage directly in agricultural production. Agricultural producers themselves had neither the resources, nor the incentive, nor the technology to increase agricultural production (Like Minded Group , 1990).

Pakistan Period

General Economic Politics

The economic policies adopted during Pakistan period (1947 to 1971) benefited West Pakistan (now Pakistan) at the cost of East Pakistan (now Bangladesh). The level of development of the East and West Pakistan at the time of independence from British in 1947 and later on disparity in economic policies between these two wings during Pakistan period, which caused the independence of East Pakistan in 1971 has been well documented by Ahmed (1980) as follows :

Despite many differences two regions of Pakistan at the beginning were similar in that they were industrially underdeveloped and had been the producers of agricultural raw materials. East Pakistan produced 85 % of the world's best quality jute and West Pakistan produced a considerable amount of good quality cotton. At independence the industrial base of the two regions were almost of the same size. In irrigation facilities, however, West Pakistan had a greater advantage. In aggregate there was very little difference in the level of development. Per capita income was, of course, slightly higher in West Pakistan.

The small gap that existed between the regions widened very rapidly over the years and in the 1960s it took critical proportions. The per capita income in West Pakistan increased from Rs. 338 in 1949-50 to Rs. 367 in 1959-60 and to Rs. 533 in 1969-70; whereas in East Pakistan per capita income declined from Rs. 287 in 1949-50 to Rs. 277 in 1959-60 and rose to Rs. 331 in 1969-70 (Ahmed, 1980). It was the outcome of the inter-regional disparity in per capita output and the level of disparity went increasing rapidly since independence. In 1949-50 the disparity was 19 % but in 1959-60 it rose to 32 % and in 1969-70 to 61 %; indicating a highly differential rate of development in the two regions (Ahmed, 1980).

The principal reason for the differential rates of growth in the two regions was the differential shares of investment and the various policies the government of Pakistan had been following since 1948. East Pakistan's share varied from 21 % to 26 % in the 1950s and from 32 % to 36 % in the 1960s ; but by far the largest share of both revenue expenditure and development outlay went to West Pakistan. Out of the total investment of Rs. 1160 crore in the First Plan period Rs. 800 crores was in the public sector and Rs. 360 crores was in the private sector. East Pakistan's share in the public sector was 36.3 % but the actual development expenditure amounted to 30 %. Private investment, on the other hand, amounted to 20 %. The total revenue expenditure in East Pakistan was Rs. 254 crores as against Rs. 898 crores in West Pakistan.

In the Second Plan, East Pakistan's share in the plan allocation was 47 % and 30 % in the public and private sectors, respectively. The plan allocation did not include investment in the Indus Basin Scheme in West Pakistan, the actual expenditure of which amounted to Rs. 291 crores which, in fact, was development outlay. The inclusion of investment in the Indus Basin Scheme reduced the relative share of East Pakistan in the public sector to about 39 %. In actual implementation the share of East Pakistan was 32 % of the total public and private expenditure. During the Third Plan period East Pakistan's share was 36 % (Ahmed, 1980).

A similar policy was followed in respect of the allocation of foreign aid and loans. During the period 1947-48 to 1959-60 East Pakistan received only Rs. 93.89 crores out of total foreign development aid of Rs. 542.14 crores and Rs. 129 crores out of a total U.S. commodity aid of Rs. 409 crores. These represented only 17 % and 30 % , respectively, and the rest were allocated to West Pakistan. The Government of Pakistan received Rs. 7003 million as economic assistance both in grants and loans till December, 1970 and East Pakistan's share in the net foreign resources was about 25 % during the Second Plan period and about 30 % during the Third Plan period.

Apart from disproportionate expenditure in the two regions, disparity increased due to government's agricultural policy, particularly in the first decade. The Government of Pakistan adopted a policy of industrialization through the private sector and, to make the industrialization program a success, fiscal and monetary policies were geared to extract adequately the surplus from agriculture and then to re-channel it to the industrial sector. East Pakistan was severely affected by the policy, because East Pakistan accounted for a larger share of exports than West Pakistan and a greater proportion of agricultural goods in total exports. The transfer of surplus from agriculture to industry was in effect a transfer of the agricultural surplus of East Pakistan to the industries of West Pakistan, because import licenses were distributed to West Pakistani manufactures and traders against East Pakistan's foreign exchange earnings. The process continued throughout the 1950s. When in the 1960s the government began to subsidize agriculture, most of the benefits went to the landlords and rich peasants, 90 % of whom were from West Pakistan (Ahmed, 1980).

Furthermore, through a surplus in international trade and a deficit in interwing trade, a sizable amount of East Pakistan's foreign exchange earnings was diverted to the West wing. Exports from East Pakistan earned the bulk of Pakistan's foreign exchange. At the same time the major share of foreign imports was destined for West Pakistan. Therefore, it may be concluded that West Pakistan grew at he expense of East Pakistan.

Throughout the period 1947-71 economic development in East Pakistan wasguided by the following strategies (Ahmed, 1984) :

(a) The rate of growth of GNP was given priority over distribution of the benefit of development.

(b) Industrialization through private initiative was encouraged. In the beginning it was mainly of the import-substitution type.

(c) Agriculture was not considered to play an active role in the contribution to the growth of output or employment. Its role was limited to the supply of resources for the benefit of the industrial sector. While the overall strategy remained more or less the same throughout the period, several changes in policies with respect to agriculture occurred. These changes ensued because of the changes in economic and political circumstances. Ahmed (1984) has described these strategies as follows:

During the 1950s, the shortage, and instability of foreign exchange earnings from the primary sector, and the partition of India which created a domestic market for the manufactured goods, favoured an industrialization strategy of the import-substitution type. Since foreign exchange was the crucial factor in industrial development, agriculture was assigned the passive role of supplier of foreign exchange.

During the 1960s, the changing political and economic circumstances in the country gave rise to policy changes that favoured agriculture. The deteriorating condition of agriculture, the greater inflow of foreign aid reduced the dependence on the agricultural surplus for industrial development. On the political side, the new government which came power in 1958 after a military coup sought support among the rural elite groups in order to curb the influence of the urban-based politicians. Consequently, some attention was paid to agriculture. However, specific policies still reflected the emphasis on industrialization and overall growth oriented strategy (Ahmed, 1984).

Technological Base in Agriculture

Although land in this region is particularly suitable for agriculture, yet productivity per acre is low as a result of low technological base. Continued population pressure and low productivity resulted in import of foodgrain even before 1947. At that time (1945) about 2-4 lakh tons of rice was imported annually for this region (present Bangladesh).

As mentioned earlier, compared to West Pakistan East Pakistan got less attention which resulted in low capital accumulation as well as low technological base in agriculture of East Pakistan. According to Baranov (1986), the technological base of agriculture in East Pakistan was extremely poor compared to West Pakistan. To prove this Baranov (1986) has shown the yield rates of different products as yield indirectly represents technological base. During the period of 1959-60 to 1968-69 in West Pakistan, per acre yield of wheat increased from 8.7 maunds to 11.6 maunds, cotton yield increased from 2.3 maunds to 3.3 maunds, paddy yield increased from 9 maunds to 14.2 maunds. On the other hand, during

the same period, per acre jute yield in East Pakistan decreased from 19.6 maunds to 12.9 maunds, and tea yield decreased from 8.9 maunds to 7.4 maunds. In 1968-69, yield per acre of paddy in West Pakistan was 14.2 maunds while it was 12.6 maunds in East Pakistan.

Irrigation plays an important role for agricultural development. At the end of British rule, that is in the year 1945-46, only 1 % cultivated land of East Pakistan was under irrigation. In terms of land area, it was 2.2 lakh acres (Faruk, 1983). According to 1960 Agricultural Census, the land under irrigation in that year was 3 lakh acres. The implementation of mechanized irrigation program after 1947 brought 4.8 lakh acres under irrigation in 1967-68 out of which 3.1 lakh acres were under BADC's pump and tubewells and 1.7 lakh acres under the Water and Power Development Authority (Faruk, 1983) Compared to East Pakistan, irrigation facilities expanded faster in West Pakistan. In the 1965, the number of tubewells installed in West Pakistan was 35 thousands which was increased up to 79 thousands in 1970. On the other hand, at the end of Third Five Year Plan of Pakistan (in 1970), only 900 tubewells were installed in East Pakistan (Baranov, 1986).

Mechanized cultivation is important for modernization of agriculture. The number of bullock power in East Pakistan indicated the need for mechanized cultivation. According to Agricultural Census of 1960, there were 66,75,130 bullocks for 64,64,400 agricultural farms (Baranov, 1986). Further, there was no bullock for about 35 % of agricultural farms. Fifty nine per cent farms having farm size up to 2.5 acres (representing 51 % of all agricultural farms) did not have any bullock. On the basis of available draft power at the end of 1960s, Baranov (1986) estimated that ideally (without affecting quality of cultivation and without exceeding the optimum level of draft power use) it was possible to cultivate 1 crore 10 lakh acres of land out of 2 crore 15 lakh acres of cultivable land. Therefore, there was shortage of draft power for a satisfactory level of cultivation in East Pakistan. So, introduction of mechanized cultivation even in 1960 did not mean the replacement of bullock power in any case.

In the year 1965-66, 200 power tillers were imported experimentally. In 1970 there were more than 1200 power tillers in East Pakistan. The use of usual tractors could not be expanded in East Pakistan. At the end of 1960s, there were a few hundred tractors used for different purposes; among those, 150 were under the control of Agricultural Development Corporation. At the end of sixties although 200 tractors were imported annually, most of these were used for non-farm uses (Baranov, 1986).

During 1960s, the use of chemical fertilizers increased tremendously in East Pakistan. This had increased from 101 thousand tons in 1964-65 to 300 thousand tons in 1969-70. Government took different measures to increase use of fertilizers by the farmers. Among those measures, 50 % subsidy on fertilizer price, sell of fertilizer through

Agricultural Development Corporation, demonstration of the effects of fertilizer use through Comilla Cooperatives, etc. were important.

There were five fertilizer industries in East Pakistan in the year 1970. The production capacities of these industries were : 446 thousand tons of urea, 152 thousand tons of TSP and 12 thousand tons of Amonia Sulphate (Baranov, 1986). Although at the end of sixties use of fertilizers in East Pakistan considerably increased, still it was 2.5 times less than West Pakistan. In the year 1969-70, total production of fertilizers in whole Pakistan was 179 thousand tons out of which 49 thousand tons were produced in East Pakistan and the rest 130 thousand tons were produced in West Pakistan. The import of fertilizers on the other hand was less in East Pakistan compared to West Pakistan. In the year 1969-70 the import of fertilizer in East Pakistan was 182 thousand tons while at the same time the import in West Pakistan it was 280 thousand tons. Only during the years of Third Five Year Plan, in West Pakistan, 450 thousand tons more fertilizers were sold compared to East Pakistan (Baranov, 1986).

Seed production and distribution was initially under the control of Agricultural Development Corporation (ADC). The Corporation performed these tasks with the help of research institutes. At the end of 1960s, the Corporation had 22 seed production farms under which total land was 6500 acres. Besides this, there were 8 thousand private farms in East Pakistan which produced improved variety of seed according to the contract with ADC.

The activities relating to production of seed were mostly related to IRRI variety of rice. IRRI variety was invented by International Rice Research Institute (IRRI, Philippines). In the year 1967-68, 156 thousand acres were under IR-8 variety in East Pakistan. For this, 2100 tons of seed was used; about half of which was produced in East Pakistan and 1000 tons were imported from Philippines. In 1969-70, IR-8 was cultivated in 700 thousand acres of land. The area under IR-5 variety was only 5 thousand acres in 1968-69.

Compared to East Pakistan, the cultivation of IIRI paddy expanded faster in West Pakistan. In 1969-70, IRRI paddy was cultivated in 15 lakh acres in West Pakistan while in East Pakistan it was 700 thousand acres. It may be mentioned here that in East Pakistan, the land suitable for paddy cultivation (considering double cropping) in East Pakistan was about 2 crore 40 lakh acres which was about 7 times higher than West Pakistan (Baranov 1986).

Rapid expansion of HYV paddy and wheat in West Pakistan was an important factor for increased production in West Pakistan. The wheat production in West Pakistan increased from 4325 thousand tons in 1966-67 to 70 lakh tons in 1969-70 and paddy production increased from 1343 thousand tons to 2300 thousand tons. Very high level of agricultural production in West Pakistan was possible due to increased irrigation facilities to a considerable extent, use of fertilizers, HYV seeds and agricultural machinery. On the

other hand, disparity in public investment in West and East Pakistan caused sluggish agricultural development in East Pakistan.

Production of High Yielding Variety (HYV) seed for jute got less importance as a result, at the end of 1960s only 6 % of jute land was under HYV (Baranov, 1986) Jute Research Institute also did not take effective measures to introduce a new variety of jute which had yield capacity of 22 maunds per acre compared to 17 maunds per acre of the traditional variety.

Further, low price of jute in one hand and high cost of production on the other hand, discouraged the farmers to produce jute in large scale In 1970, only 10 % of the export of jute and jute products were controlled by Bengali Companies (Faruk, 1983) These companies deprived the farmers from fair price of jute. The central government policy was responsible for fixing jute price. The motive of fixing low price of jute was to benefit the industrialists. Because, this reduced the cost of production of jute goods in the export market. Such a policy of export earning had an adverse effect on the farmers' interest. Jute was the main source of cash earnings of the farmers. The costs of fertilizer, seed, irrigation are usually met from the income earned through selling jute. Therefore, through depriving the farmers of East Pakistan from fair price of jute, the foundation of their savings was severely affected.

Allocation of Public Expenditure in Agriculture

Like others, Ahmed (1984) has mentioned that low public expenditure was one of the major causes of slow agricultural development in East Pakistan. Agricultural development is highly dependent on the volume and pattern of public investment since private investment is negligible and is also influenced by the government's investment and price policies. From 1947 to the emergence of Bangladesh in 1971, East Pakistan did not receive her due share of the national public sector expenditure. Besides, as the general policy was discriminatory towards agriculture, this sector received proportionately less than other sectors.

During the First Five Year Plan, 1955-60, only Rs. 159.9 million or 13 2 % of total expenditure was allocated to agriculture proper. With the expenditure on Village Agriculture and Industrial Development, the proportion of expenditure devoted to the rural sector amounted to 16 %. A substantial amount was also allocated to water, power and rural industries which indirectly helped agricultural development. In the beginning, actual expenditure fell far short of the planned allocation, since the planning and administrative machinery were weak. During the First Five Year Plan Rs. 225.8 million was actually spent for agriculture. In absolute terms, this amount was highly inadequate for the development of this vast sector which bore the burden of 50 million people or 90 % of the population of the country, although the proportion of total expenditure actually spent on agriculture (37 %) was not extremely low (Ahmed, 1984).

During the Second Five Year Plan (1960-65), a greater amount was allocated to agriculture both in absolute and relative terms. Moreover, the realized expenditure turned out to be more due to improvement in the planning and administrative machinery. Total estimated expenditure on agriculture and agricultural related items was Rs. 769.4 million which was 40 % of total estimated expenditure in the whole economy. The rate of growth of output during this period showed an upward trend surpassing the rate of population growth, which indicated that agricultural output responded positively to public investment. However, investment was still far below the needs of this sector given the fact that the quality of research, education, infrastructural facilities in rural areas was extremely poor (Ahmed, 1984).

During the Third Five Year Plan (1965-70), the proportion of expenditure allocated to agriculture proper was smaller than in the previous period. However, more resources were available (Rs. 4617.1 million) in absolute terms because the Plan was much bigger in size than the previous plans. But even during this period, the agricultural sector could not reach the goal of self-sufficiency in spite of its emphasis on the input strategy (Ahmed, 1984).

With respect to pattern of allocation of funds within agriculture Ahmed (1984) has pointed out that many of the possibilities for increasing food production through the intensive use of land and labour remained largely ignored by the people responsible for planned economic development in East Pakistan. More emphasis was therefore, placed on large flood-control projects with a long gestation period. Some attention was given to irrigation projects during the Second and the Third Five Year Plans of Pakistan. However, most of the funds continued to be spent on large-scale projects. To enhance agricultural production, the government emphasized the supply of subsidized inputs such as water, fertilizer, seed and pesticides. But investment in research on crop breeding, irrigation and water technology, the design of simple mechanized implements, and education of farmers did not receive adequate attention.

Moreover, the market mechanism was so structured as to facilitate the transfer of resources from the rural economy of East Pakistan on a massive scale. During 1950s and '60s, East Pakistan produced more than 80 % of the world's jute and accounted for over 70 % of Pakistan's total foreign exchange earnings (Khan,1989). Commercial agriculture in East Pakistan was handicapped by a double disadvantage. On the one hand, the prices of agricultural produce were artificially depressed, while the cost of inputs was overvalued. On the other hand, tax collection increased from Rs. 19 million in 1949-50 to Rs. 108.3 million in 1960-61.

Bangladesh Period

Growth in Agriculture

Historically, Bengal was known as *Sonar Bangla* , meaning 'Golden Bengal' since rich alluvial soil, warm year-round temperatures, and abundant surface and subsurface water resources give this region immense agricultural potential. But, today the average rice yields of Bangladesh is among the lowest in the world, and the majority of the rural population is underfed. Thus, a region once renound as uniquely favoured and prosperous, today has a reputation as a unique disadvantaged land, cursed by overpopulation and plagued by natural disasters, in which millions are fated to live and die in extreme poverty with no hope of escape (Boyce, 1987).

According to Boyce (1987), the plight of the rural poor in Bangladesh is in part a legacy of colonial rule. Further, he added that the poor majority of Bengal - whose ancestors witnessed the destruction of a great handloom textile industry, the imposition of an oppressive landlord system, and the systematic neglect of irrigation, drainage, and flood control - have yet to reap the promised rewards for their past sacrifices.

Although the government has professed to give top priority to agricultural production and attainment of food self-sufficiency, no radical change in policies can be observed after the emergence of Bangladesh in 1971. In this section growth of agricultural production during Bangladesh period has been analyzed while major policies and strategies for agricultural development have been described in other chapters.

The annual growth of production for the crop sector as a whole turns out to be 2.08 and 1.62 respectively for the two overlapping periods of 1973/74 to 1983/84 and 1979/80 to 1989/90 (Mahmud, et.al., 1993). The statistical estimate of the trend growth for the later period presents some problems because of the adverse effect of severe floods in two consecutive years 1987/88 and 1988/89 and the sharp upturn in rice production in the post-flood years. By disassociating the effect of floods (through the use of dummies for the two flood years), Mahmud, et. al. (1993) estimated trend growth rate of 2.05% annually for the period of the eighties. It would thus appear that the overall growth in crop agriculture has bearly kept pace with population growth, which is estimated to have been 2.3% annually in the seventies and about 2% in the eighties. Another estimate by Murshed (1991) showed that growth rate in the total crop output during the period of 1967-70 to 1985-88, was 1.53% per annum, which was considerably less than population growth rate of 2.40 per annum.

Foodgrain production has steadily grown all along, although stagnation in wheat production in the eighties. The Production of wheat increased by 26.47% per annum during the period of 1973/74 to 1983/84 while it increased at only 0.19% during the period of 1979/80 to 1989/90 (Table-1.4). However, growth rate of rice production in fact accelerated in the eighties. Among rice crops, the output growth rate for *Boro* was-

significantly higher than that for *Aman* and *Aus*. In fact growth rate of production for Aus during the period of 1979/80 to 1989/90 was negative (-2.06%) while for *Aman* it was 1.80% and for Boro it was 8.52% per annum (Table-1.4).

One recent study (Abdullah, et. al., 1995) showed a considerable slowdown in rice production in Bangladesh in the early nineties. They have found that trend growth rate for the 1990-91 to 1993-94 period has been as low as 0.37 per cent, as compared to 3.07 per cent during the 1984-85 to 1989-90 and 2.83 per cent for the entire decade of 1984-85 to 1993-94. They have also mentioned that although the growth has decelerated in recent years, rice production was still above the trend line in 1990-91, 1991-92 and 1992-93 Only in 1993-94 did rice production fall below the trend level. This, of course, is the outcome of slower growth during the nineties.

There have been sharp variations in foodgrain production in different years which are largely due to weather factors. For example, since independence up to 1982, production declines (as measured by the reduction from the previous year's production) have occurred five times, with the most severe occurring in 1976 and 1977. The 1975 production decline of 5.2% was due mainly to a very bad flood which affected the *Aman* crop. The 1977 reduction was 7.9% and involved declines in all three rice crops associated with a general drought. Even so, total rice production in 1982 was 3.5 million tons more than in 1973 (Wennergren, 1983). In recent years, severe floods in 1987, 1987 and most recent flood in North Bengal in 1995 has caused serious damage to agricultural production.

Therefore, although rice production has shown a general rise, it is characterized by weather induced annual variations. The weather factor is so critical that due to favourable weather, the import of food grain reduced to only 8.28 lakh tons in 1992-93 from about 15 to 20 lakh tons in the previous years (Table-1.5). Again severe drought followed by devastating flood up to August, 1995 resulted in about 40 lakh tons of food grain shortage in 1994-95 financial year (Sangbad, 15-7-'95). Flood in Northern region at the end of September and early October, 1995 has further aggravated the situation.

Despite all these factors affecting agriculture, production of rice is increasing due to its higher yield. Growth in the overall rice yield is almost entirely explained by the shift of area from local rice to HYVs. There has been in fact a significant decline in the yield rate of rainfed (*Aus* and *Aman*) HYVs, particularly in the earlier periods. Some improvements in yields seem to have taken place only in the case of local *Aus* and transplant *Aman* rice in the eighties. The major contribution to production growth has come from the expansion of area under the dry-season (Boro) HYV rice with no discernible trend in its yield rate (Mahmud, et.al., 1993).

Wheat production grew at a phenomenal rate of 26% annually during the earlier period, with both area expansion and yield improvements; but production has become virtually stagnant in the eighties.

Jute, the most important cash crop of Bangladesh witnessed a negative growth rate both in area and production during the period 1979/80 to 1989/90 (Table- 1.4) Among non-foodgrain crops, only vegetable production has steadily grown nearly at the rate of population growth. Perhaps the only other instances of noteworthy growth performance is provided by the production trends of tea and tubers in the earlier periods, although in both cases, production became virtually stagnant in the eighties. On the other hand, the production of pulses declined, especially in the eighties, while minor cereals exhibit the most dramatic rates of output decline (Table- 1.4). Yasmin and Jaim (1989) have shown that reduction in the production of minor crops is due to expansion of HYV *Boro* which has in many cases displaced some minor crops including major cash crop, jute.

Table-1.4 Trend Rates of Growth of Area and Production of Agricultural Crops

(% per year)

Crop	1973/74 to 1983/84		1979/80 to 1989/90	
	Area	Production	Area	Production
Foodgrain	1.20*	2.74*	0.13	2.33*
Paddy	0.72*	2.19*	0.052	42*
Aus	- 0.31	0.79	- 3.22*	- 2 06*
Aman	0.79*	1.74*	- 0.51*	1.80*
Boro	3.02*	5.12*	7.72*	8.52*
Wheat	18.33*	26.47*	1.77	0.19
Non-foodgrain crops	- 0.53	0.57*	- 1.73*	- 0.28
Jute	- 0.85	1.20	- 1.51	- 0 44
Oil seeds	- 0.20	0.66	- 1.55*	- 0.57
Pulses	0.15	- 0.94	- 2.84*	- 1.82*
Spices	0.05	- 0.65	- 0.51	1.32*
Fruits	1.66	- 0.08	1.30*	- 0.04
Vegetables	2.24*	2.12*	2.85*	1.99*
Tubers	1.74*	2.93*	- 0.39*	- 0.15
Sugarcane	1.35*	1.27*	1.85*	0.54
Tea	0.37	3.93*	0.71*	0.61
Minor cereals	- 6.88*	- 5.80*	-12.03*	-11.42*
All crops	0.78*	2.08*	- 0.28	1.62*

*Significant at 5% level.

Source : Mahmud, et.al. (1993), P.18.

The production of potato also increased at a high rate (4% annually) in the earlier period (Mahmud, et.al.,1993). This was possible due to increases in both area and yields; but the momentum seems to have lost in recent years. Sweet potato is a crop much favoured under official policies for crop diversification, although its production has rapidly declined in the eighties. For jute, tea and mustard (the major oil seed crop), there were some yield improvements in the earlier period which could not be sustained in the eighties. Area under pulses has declined significantly in the eighties; but in the case of *Masur* (lentil), this seems to have been compensated by yield improvements. This seems also to have been the case for chili which is the major spice crop. Among fruits, the yield rate of mango has been falling sharply, but there has been some area expansion. Banana production has become stagnant in the eighties after experiencing some growth in the earlier period. Among vegetables, the growth in production is mainly through area expansion without much improvement in yields, if at all (Mahmud, et.al. 1993).

The analysis of growth in area and production of different crops showed (Table -1.4) that except foodgrain and vegetables, there have been insignificant growth for other crops. In fact, in most of the cases there have been negative growths in both area and production (Table-1.4). Again, despite major efforts for foodgrain production, Bangladesh has to import a large quantity of foodgrain every year since independence as can be seen in Table - 1.5.

Table-1.5 Yearly Foodgrain Import Over Time from 1972-73 to 1993-94

(in lakh tons)

Year	Rice	Wheat	Total
1972/73	3.90	24.35	28.25
1973/74	2.85	13.84	16.69
1974/75	3.63	19.30	22.93
1975/76	4.95	10.75	14.70
1976/77	1.93	5.15	8.10
1977/78	3.04	13.32	16.36
1978/79	0.45	11.12	11.57
1979/80	6.75	20.59	27.34
1980/81	0.83	9.93	10.79
1981/82	1.44	10.10	11.54
1982/83	3.17	15.27	18.44
1983/84	1.80	18.77	20.57
1984/85	6.90	18.99	25.89
1985/86	0.33	11.62	11.95
1986/87	2.61	15.07	17.68
1987/88	5.93	23.29	29.22
1988/89	0.62	20.76	21.38
1989/90	3.00	12.34	15.34
1990/91	0.11	15.66	15.77
1991/92	0.39	15.24	15.63
1992/93	0.19	8.09	8.28
1993/94 (Esti.)		8.50	8.50

Source : Ministry of Finance, Government of Bangladesh, June, 1994.

CHAPTER-II

CONTEMPORARY AGRICULTURAL DEVELOPMENT POLICIES

Flow of Development Funds to Agricultural and Non-agricultural Sectors

Public Sector Expenditure in Agriculture

Every year the government channels financial resources to various sectors and sub-sectors through its budgetary mechanism. The allocations are made under two heads - the revenue and capital. The former presents the details of the day to day expenditure of the government while the latter shows the development outlays. Rahman (1985) has shown that despite the overwhelming importance of agriculture in Bangladesh economy, the public sector allocation in this sector is very limited which may be clear from the descriptions in the following sections :

Between 1973/74 to 1985/86 revenue expenditure has increased from 4.4 billion taka to 33.1 billion taka and the overall rate of growth per annum was 17.4% (Rahman, 1987). On the other hand, agricultural sector's share of revenue budget which was about 2.2% in 1973/74 remained more or less constant over time with a slight decline in the late seventies. In 1984/85, the share of the agricultural sector was estimated to be 2.5% (Rahman, 1987).

The annual compound growth rate of public expenditure on agriculture was estimated at 17.2% per annum (Table-2.1). In comparison, both the industrial sector and defense experience higher rates of growth in revenue expenditure. Revenue expenditure in the industrial sector increased annually at a rate of 18.1% per annum while that of the defense sector increased at a rate of 21.3% (Table-2.1). In the revenue budget of 1985/86, the agricultural sector was allocated 1.3% of total revenue expenditure. The industrial sector also got a low 1.3% while defense got more than 15% (Rahman, 1987).

The development expenditure of the government also experienced quite high growth rates between 1973 and 1985. Total development expenditure per year was about 8.3 billion taka over the First Five Year Plan (FFYP). It increased rather sharply to 18.5 billion taka per year over the Two Year Plan (TYP) and further to 30.3 billion taka over the Second Five Year Plan (SFYP). In 1985/86 the allocation of budget for development expenditure was 38.3 billion taka (Table-2.1).

Expenditures on the industry and the power sectors (which provided about 1.1% of GDP) however grew rapidly- registering a growth rate of 24% per annum over 1973 to 1985 (Rahman, 1987). The agricultural sector on the other hand registered a lower rate of

growth in expenditure. Expenditure on agriculture was on an average about 1.1 billion taka per year over the FFYP (13.1% of total development expenditure per year). Expenditure per year increased to 3.7 billion taka over the SFYP. This expenditure was about 12.1% of total development expenditure. The 1985/86 budget reduced allocation to agriculture drastically allocating this sector only 1 billion Taka (which is about a fifth of what was spent on this sector in 1983/84).

Per capita development expenditure on agriculture was only 7.8 Taka over the FFYP period (Table-2.1). This represented about 13% of total development expenditure. Over the SFYP period per capita development expenditure on agriculture was 10.2 Taka i.e., about 12.1% of total development budget. The 1985/86 budget allocated only 2.8% of development expenditure to agriculture reducing per capita allocation to only 2.2 Taka in 1972/73 prices (Table- 2.1). Thus, per capita expenditure in 1985/86 is about a third of that over the FFYP.

If agricultural sector is defined broadly to include expenditures on rural development and rural institutions, then public expenditure on agriculture comes to about a third of total development expenditure in 1973/74. Since then the share has gradually declined to 31.2% over the FFYP, 28.9% over the TYP and 23.6% in the revised budget of 1984/85. In the budget of 1985/86, the share was further reduced to 16.4%, thus making the allocation to this sector a sixth of total 1985/86 allocations (Rahman, 1987). Thus although agricultural sector contributes about half of the GDP and provides livelihood to about two-thirds of the population, its share in total public expenditure (both revenue and capital) has been only marginally higher than 10% (Rahman, 1987).

Table-2.1 Public Expenditure on Agriculture in Bangladesh

Particulars	1973/74 1977/78	1878/79 1979/80	1980/1981 1984/85	1985/86	Rate of growth 1973-1985
Revenue expenditure per year (Current prices, million Taka)					
Total	6999	13555	21634	33130	17.4
Agriculture	117	170	455	442	17 2
Industry	200	298	353	428	18.1
Defense	1256	2248	3900	5012	21.3
Development expenditure per year (Current prices, million Taka)					
Total	8295	19633	30346	38257	18 5
Industries &Power	2323	6591	9270	12574	24.0
Agriculture (proper)	1087	2641	3673	1091	11 4
Agriculture (incl. rural dev. & institution)	2596	5673	8912	6283	15.4
Per capita revenue expenditure per year (Taka)					
Total	50.4	70.0	60.1	67.5	
Agriculture	0.8	0.9	1.3	0.9	
Industry	1.4	1.5	1.0	0.9	
Defense	32.6	11.6	10.8	10.2	
Per capita capital expenditure per year (Taka)					
Total	59.8	95.5	84.3	77.9	
Industry&Power	16.7	34.0	25.7	25.6	
Agriculture (proper)	7.8	13.6	10.2	2.2	
Agricul. (incl. rural dev. & institution)	18.7	29.3	24.8	12.8	

Source : Rahman (1987), P.12.

During the FFYP, the largest share of expenditure in the crop and livestock sector is accounted for by the subsidies - the share being about 46.6% of total expenditure in 1973-74. But since then it gradually declined to about 29.2% in 1977-78. Agricultural services account for a fifth of total expenditure while agro-industries account for another fifth. The share of expenditure on agro-industries increased from a low 6% in 1973/74 to 21% in 1977/78. In the agricultural services category, both research and education and training received small share of total expenditure - the two together accounting for 5-6% of total expenditure (Rahman, 1987).

In Table- 2.2 the changes in actual development expenditure during the period 1980-81 to 1986-87 have been shown. It shows that the actual expenditure under the main

heading agriculture, rural development and water resources have fallen to about half in 1986-87 compared to 1980-81. The expenditure on agriculture, forestry, fishing and livestock had fallen to only slightly above one-third of the 1980-81 level. Expenditure on rural development and water resources were about 60% of what they had been 6 years earlier. The share of agriculture etc. in total development expenditure is shown to have fallen from one-third to 17% in the course of these six years. In reality, the fall is not quite steep. There are also expenditure on agriculture, rural development and water resources under the heading 'Upazilas', but the exact amount was unknown (Norbye, 1988).

Table-2.2 Change in the Allocation in ADP during 1980-81 to 1986-87

(1980-81 =100 Const. Prices)

Particulars	1980/81	1982/83	1984/85	1986/87
Subsector Agriculture etc.	100.0	90.6	61.9	51.4
of which : Agriculture	100.0	125.6	64.4	34.2
Rural Development	100.0	90.4	59.0	58.9
Water & Flood Control	100.0	66.6	60.8	60.1

Source : Norbye (1988).

In 1980-81 almost four-fifths of the allocation for agriculture in the Annual Development Plan (ADP) went to crops. At the end of the SFYP the proportion had fallen to two-thirds, and in 1987-88 ADP it is only a bit more than half of the allocation (53%). In short, the reasons have been given by Norbye (1988) as follows :

The decision to reduce BADC's role in fertilizer procurement, distribution and sale eliminated virtually 40 to 50% of the expenditure on crop agriculture under the ADP, and the slow down of the Ministry of Food's program for foodgrain storage added another 10 to 20% to this reduction. It may be argued that the government's program of privatization made up to two-thirds of the expenditure on crop agriculture under the ADP unnecessary. On the other hand, it is difficult to argue that less than 4% (3.7% in the original ADP for 1987/88) of the ADP is enough to promote development in a sector which in 1986/87 accounted for one-third of the GDP of Bangladesh (Norbye, 1988). In this context Norbye (1988) argued that the resources liberated through the reduction of fertilizer subsidies and the cost of building of storage capacity both for fertilizer and foodgrain should have been used for other development expenditure of crop agriculture.

In order to find out what government spends on crop agriculture, the allocation under this heading in the recurrent budget and in the ADP (1987-88) is presented in Table-2.3. Close to 80% of crop agriculture budget goes to extension, training, research, education and study. Most of the reminder is allocated to provision of current farm inputs, viz seed and seedlings. The fact that 80% of the recurrent budget plus the ADP for 1987-88 were allocated for extension, research and training raises question. What are the actual results of the relatively large sums ploughed into extension and research ? That both

activities are highly desirable is beyond doubt, but are their performances sufficiently effective to merit such a large proportion of public sector expenditure on crop agriculture ? (Norbye, 1988).

Table-2.3 Allocation of Crop Agriculture in 1987-88 Recurrent Budgetand ADP

(in million Taka)

Head of Expenditure	Recurrent Budget	Annual Capital	Develop. Current	Programme Total	Grand Total
Administration	7	0	0	0	7
Extension & Training	660	374	140	514	1174
Research, Education & Study	192	442	188	630	822
Seed, Seedlings, Stock, etc.	7	16	405	421	428
Plant Protection	10	18	3	20	30
Fertilizers (godown)	0	16	0	16	16
Others	0	92	8	100	100
Total Crop Agriculture	877	957	744	1700	2577

Source : Norbye (1990).

The allocations under the heading Water Resources and Flood Control have increased, in current prices, but not at constant prices (Table-2.4). In 1984-85 allocations in real terms were somewhat higher than in 1980-81, but since then they have fallen to around three quarters of the level at the beginning of the SFYP (Norbye, 1990). The reason for this is very obvious as described by Norbye (1990) as follows :

In constant prices the allocation to BADC fell by one-third during the SFYP, and has continued to fall, in 1987-88 to less than 30% of its level 7 years ago. BADC accounted for 53% of the allocations in 1980-81, a share which fell by one-third in 1984-85, one-quarter in 1986-87 and one-fifth in 1987-88. This fall reflects both reduced subsidies on irrigation equipment rented or sold to farmers or groups of farmers, and less direct involvement in fielding of irrigation equipment by BADC. As in the case of crop agriculture, the combination of privatization and reduced subsidies has drastically reduced both the development expenditure through BADC and consequently government expenditure on agriculture, rural development and water resources. In the case of water resources, though, the reduced activities of BADC have to some extent been offset by higher activities under the other large institution responsible for activities in this sector, viz. Bangladesh Water Development Board (BWDB). In constant prices the 1987-88 allocation under the Annual Development Program to BWDB was 30% higher than in 1980-81 while it was about 70% lower for BADC.

Table-2.4 Annual Development Programs for Water Resources : 1980-81 to 1987-88

(% distribution of expenditure)

Organizations	1980-81	1984-85	1986-87	1987-88
BWDB	45.7	67.0	74.7	79.2
BADC	3.0	32.6	25.2	20.8
Others	1.3	0.4	0.1	
Total for Water Resources (million Taka)	3571.8	6142.5	5206.0	5595.3
ADP 1980-81 to 1987-88 at Constant Prices (1980-81=100)				
Subsector/Organization	1980-81	1984-85	1986-87	1987-88
Water Resources	100.0	108.9	77.8	75.0
BWDB	100.0	159.7	127.1	130.5
BADC	100.0	66.8	36.9	29.5

Source: Norbye, 1990.

The agricultural sector in Bangladesh did not grow at a rapid rate despite considerable emphasis that was sought to be placed on this sector for rapid growth and for attaining of self-sufficiency. Public sector expenditure in agriculture has also grown at a rather low rate. In fact expenditure per capita has declined in recent years. These observations might be interpreted to mean that the slow growth in agriculture is caused by low levels and growth of public expenditure on agriculture.

Private Investment in Agriculture

Despite government's efforts to raise agricultural productivity, the actual growth rate in agricultural output remains lower than the rate of growth of population, is best explained by the lack of education and resulting inadequate farming competence and behavioural norms of small landowners (Like Minded Group, 1990) Stagnation in agriculture continue to dominate the rural sector because of market constraints, the relative profitability of non-agricultural activities, and the transfer of resources from rural to urban areas under private account. The discounted rate of profit from agricultural investment has not exceeded the surplus which can be extracted from share-croppers and, therefore, there has been no rapid increase in the level of private investment in agriculture in Bangladesh. The factors responsible for the comparatively low level of profits from agricultural investment and the reluctance of large landowners to undertake agricultural activities on a wider scale has been explained by the Like Minded Group (1990) as follows :

First, the government has been engaged in efforts to ensure an adequate supply of food at stable prices, since the 1943 famine, through the ration system. The food procurement and distribution system has helped keep prices at a comparatively low level and the government has been keen to ensure that rural as well as urban consumers were not priced out of the foodgrain market. Presumably, this has ruled out the possibility of earning supernormal profits in agriculture.

Second, increasing development expenditure by the government, both rural and urban areas, and increasing integration of the national market, have increased trading profits. The rural rich are thus able to earn more profits by investing in trading activities.

Third, poor and marginal peasants and others less well-to-do rural people, who are denied access to institutional credit facilities, are required to borrow money both to sustain consumption during lean periods as well as to pay for production costs during the busy season. These borrowers are obliged to pay high rates of interest. Surplus available to rich peasantry, when invested in the money-lending business, generate a very high rate of return. This leads to a diversion of resources from productive investment to usury.

Fourth, most of the rural rich and surplus peasants prefer to spend money on educating their sons and daughters, so that they may get well-paid jobs in the town On the other hand, this enhances the social position of the family and, on the other, helps establish linkages with the government bureaucratic and patronage distribution systems and thus increases the family's access to resources. This attitude is adverse to farm modernization. Also it strengthens the educational and technical status quo in farming because educated people refrain from working on the farm.

Fifth, in a situation of increasing land values and decline in the value of money, purchasing land appears a save form of investment than undertaking agricultural activities, given the uncertainties of output and prices and the limited capability of owner-operators to manage much land with the available technology. Resources, therefore, tend to be diverted to increasing the size of holdings rather than to increasing agricultural productivity.

Generally speaking, the middle peasantry have shown greater interest in increasing their land productivity than other groups. But these peasants also tend to invest in highly profitable non-agricultural activities once they are able to accumulate some surplus. Therefore, a high and stable level of private investment in agriculture can not be ensured. The major contradictions in Bangladesh arises from the fact that those who have resources do not have the necessary incentive to invest in agriculture, and those who want to grow more do not have access to resources. Available evidence shows that massive public investment will be necessary to create a congenial climate for private investment in agriculture by the rich and that this will have a long gestation period. Unless more attention is paid to designing and ensuring the delivery of a package of inputs to small peasants

rather than developing programs for rich peasants, relative stagnation in agriculture is likely to persist in Bangladesh (Like Minded Group, 1990).

Low investment in agriculture both by the public and private sectors have contributed to slow growth in agriculture. The Table - 2.5 shows clearly that the government expenditure for the development of crop, fisheries, forestry and livestock as a whole is not only low, but it is also declining rapidly. Agriculture sector accounts for nearly one-half of the gross domestic product in Bangladesh. But the total public and private sector expenditure for the development of this sector amounts to less than 5% of the output accruing in this sector. Government's failure to allocate sufficient amounts of development funds to this sector may be taken as the most important causative factor for near stagnation in agriculture in Bangladesh (Majid, 1991).

Table-2.5 Development Expenditure on Agriculture in Relation to Its Contribution to Bangladesh Economy

Year	Value added in agril. sector (million Tk.)	Total ADP (Million Tk.)	ADP allocation to agril. sector (Million Tk.)	Private invest-ment in agricul. (Million Tk.)	Total expendi-ture for agricul. (Million Tk.)	ADP alloc. to agri. as % of value added in agril. sector.	ADP alloc. to agn. as % of total ADP	Total exp for agn. as % of value added in agr.sector
1975-76	57339	8426	2990	-	-	5.2	35.5	-
1976-77	53315	10057	3148	-	-	5.9	31.3	-
1977-78	63049	12030	3480	-	-	5.5	28.9	-
1978-79	91352	16026	4688	-	-	5.1	29.3	-
1979-80	99502	23300	6658	2000	8658	6.7	28.6	8.7
1980-81	108953	23654	7893	2570	10453	7.2	33.4	9.6
1981-82	121839	23911	7834	3140	10974	6.4	32.8	9.0
1982-83	135871	26877	8382	4390	12722	6.2	31.2	9.4
1983-84	169328	30060	9393	6820	16213	5.5	31.2	9.4
1984-85	212494	31681	7714	7770	15484	3.6	24.3	7.3
1985-86	222407	34294	7172	4413	11585	3.2	20.9	5.2
1986-87	259930	44391	7598	6189	13787	2.9	17.1	5.3
1987-88	268388	41464	7984	4920	12904	3.0	19.3	4.8

Source: Majid (1991), P. 309.

Major Goals and Strategies for Agricultural Development in the 5-Year Plans

The First Five Year Plan (1973-78)

The First Five Year Plan had the major objectives of reconstructing the war-torn economy, reducing poverty and achieving social justice. Specifically it aimed at an annual growth rate of GDP at 5.5%, creation of employment opportunities for 41 lakh man-years to bring about a substantial improvement in unemployment situation, a reduction in the dependence on foreign assistance to 27% of total investment and curbing population growth from 3% to 2.8% annually (Government of Bangladesh, 1980). The specific objectives for the agricultural development were as follows :

Self-sufficiency in the production of foodgrains and
Creation of employment opportunities for the rural unemployed and
under employed so as to attain a basic minimum level of consumption.

But the First Plan targets largely unrealized as the necessary action program could not be supported by adequate resources. The share of agriculture in total development expenditure was much lower in the post liberation period than in previous periods although the total volume was higher in 1973-74 prices. Agriculture received only 33.8% as against 40.4% during the previous plan period. This indicates that there was in fact, no change in development strategy in favour of agriculture after the emergence of Bangladesh.

It can be seen from the Table-2.6 that the sectoral composition of the FFYP of Bangladesh was rather biased against agriculture and rural development. In comparison to the allocation proposed in Pakistan's Fourth Plan (1970-75), the FFYP of Bangladesh largely neglected agriculture as is evident from the Table - 2.6.

Table-2.6 Sectoral Allocation in Fourth Five Year Plan of Pakistan and First Five Year Plan of Bangladesh

Sector	Pakistan's Fourth Plan (1970-75) %	Bangladesh's First FYP (1973-78) %
Agriculture and Rural Activities:		
Agriculture	17.9	7.3
Rural Development	7.6	3.7
Water & Flood Control	17.2	13.0
Sub-Total	42.7	24.0
Industry & Allied Activities	34 0	51.7
Public Services (Physical planning & housing; Health & family planning; Social welfare & manpower, Education)	23.3	24.3
Total (%)	100%	100%
Total in million Taka	44,410	44,550

Source: Alamgir (1980), P.107.

Compared to a share of 51% for industry and allied activities, the share of agriculture and rural activities was stipulated to be not more than 24%. The relative share of agriculture and rural activities proposed in Pakistan's Fourth Plan was much higher than that in Bangladesh's First Plan. It thus became clear that despite declaration by the planners themselves of the overwhelming importance of the sector, the main thrust of the Plan was not, in reality, given to agriculture. Again, a major portion of the actual expenditure on agriculture and rural development in 1972-73 was utilized to provide subsidized current inputs rather than to build up the needed infrastructural, specifically lasting flood control and irrigation facilities (Alamgir, 1980).

In agriculture, the most important target was to attain foodgrain self-sufficiency by the end of the Plan period. The scheme for provision of inputs, materials and institutional were however, not realistically related to the target of self-sufficiency. For the five years, the annual foodgrain import averaged 1.6 million tons, representing over 10% of the total requirement. In addition, vegetable oil averaging 51000 tons a year and constituting 60-70% of the annual requirement had to be imported. The food shortage was the severest in 1974-75 when, despite a record import of 2.46 million tons of rice and wheat, per capita availability went down to the lowest in the recent past and thousands starved to death (Alamgir, 1980).

One main reason for the food shortage was, an inadequate attention given to agriculture. In this field, the allocation was comparatively smaller and attention given to

quick yielding small scale irrigation projects supported by supply of adequate fertilizers and the HYV seeds lesser than what self-sufficiency in production of food, if really aimed at, would have demanded. Besides foodgrain, physical targets and achievement during the First Plan period for other important crops are shown in Table- 2.7. The table shows that there have been actual fall in the output of jute and pulses during the FFYP although foodgrain and tea production increased (but not up to the planned level). Jute production fell due to the shrinkage in the jute acreage on account of an increase in the rice acreage following a sharp rise in foodgrain prices. This could have been corrected through expeditious increase in per acre productivity of both jute and food crops by an application of seed-fertilizer-irrigation technology, rather inadequately provided for in the Plan (Alamgir, 1980). Expansion of rice acreage also affected pulse production as stated previously.

Table-2.7 Physical Targets and Achievement during the First Five Year Plan

Commodity	Unit	Bench-mark	Plan Target	Est. level achieved by 1977-78	% change over benchmark		Achievement as % of planned increase
					Planned	Actual	
Rice	Lakh ton	112.40	150.80	129.73	34	15	45
Wheat	Lakh ton	.90	3.60	3.50	300	289	96
Jute	Lakh bale	66.60	91.00	53.59	36	- 20	- 53
Tea	Lakh lbs.	630.00	810.00	820.00	29	30	94
Pulses	Lakh ton	2.90	3.50	2.35	17	- 19	-92

Source : Govt. of Bangladesh, 1978

Strategies for Non-foodgrain Crops in FFYP

In the FFYP, besides foodgrain, the planners laid greater emphasis on tobacco production because of its significant contribution to the national exchequer. However, the planners could have thought of alternate cash crops to replace tobacco. This would be a better, safer and logical national policy (Zaman, 1992).

Zaman (1992) also pointed out that the objectives / policies on sugarcane were not adequate. The basic constraint was a wrong policy of Sugar Mills Corporation that in the mill zone area, the cane growers were not allowed to install either Deep or Shallow tubewells to irrigate the sugarcane crops which would have allowed to increase the yield by 100 - 200% and intensify cropping intensity to increase cash earning and employment opportunities. Moreover, they were not permitted to produce *Gur*, - the brown non crystalline sugar. Further, the Planning Commission ignored the significant role to be played by the Sugar Research Institute located at Ishurdi (Zaman, 1992).

As regards tea plantation, industry and marketig the Plan pointed out the constraints like lack of a clear policy on ownership of tea lands and unremunerative prices and as remedial measures they suggested to create Tea Industries Management Committee The Planners also identified the importance of growing more vegetables and fruits and suggested the establishment of Horticulture Development Board:

In the case of jute, the government could not find proper policy to integrate research, extension, processing (as well as industrialization) and marketing (both locally and internationally). The Jute Research Institute, the Jute Board, Jute Industry, Jute Mills Corporation, Jute Marketing, etc. faltered and did not know who would be their masters in the next week (Zaman, 1992). Government of Bangladesh's ephemeral administrative and other policies associated with the Jute cultivation, jute goods manufacturing and international marketing destroyed the basic fabric of the whole system. The nations main cash and foreign exchange earning crop got victimized first under misguided socialization and then by syndicalism. Such a lack of strong national jute policy have ruined the crop and its growers.

The Two Year Plan (1978-80)

Major objectives of the Two Year Plan (TYP) were related to attaining an annual growth of GDP by 5.6% and 2.8% in per capita income, greater self-reliance through mobilization of domestic resources for financing development program, moving towards self-sufficiency in foodgrains, arresting the faster rate of population growth, improving provision of basic needs such as food, clothing, drinking water, etc. and creating employment opportunities equal to the number of new entrants to the labour force (Government of Bangladesh, 1980). The specific target in relation to agriculture in the TYP were as follows (Zaman, 1992) :

To accelerate the rate of growth of agriculture to 4.1% a year.
To attain a foodgrain (rice and wheat) production target of 144 lakh tons by 1979-80 with an annual rate of increase of 4.7% to reduce dependence on import from an annual average of 17 lakh tons during the First Plan to 13 lakh tons during the TYP.
To attain an output level of 75 lakh bales of jute by 1979-80 as against 54 lakh bales in 1977-78.
To increase per capita availability of basic consumption items : food grains, 346 ounces to 353 ounces; edible oils, 4.08 to 4.30 lbs.; cotton textiles, 6.03 yds. to 7.40 yds.; sugar, 3.88 lbs. to 3.97 lbs.. etc. from 1977-78 to 1979-80.

There has been considerable shortfall in the realization of targets set in the TYP. Economic growth during the period was largely conditioned by the preponderance of the ongoing schemes and unfafourable weather conditions. As a result of drought condition in consecutive two years, foodgrain import rose up to 2.92 million tons in 1979-80 which

was 1.55 million tons in 1969-70. It may be mentioned here that actual foodgrain output by the end of FFYP (1977-78) was 13.11 million tons which was 15% less than the target.

It must be appreciated in interpreting the above facts that Bangladesh with its traditional agriculture is prone to many natural vagaries like drought, flood, hailstorm and pest attacks. As a result, gain in one year may be wiped out by nature in the following year. Food and other agricultural output in fact show the weakness of existing agriculture and inadequate investment program. Important indicators of the weakness are that in 1979-80 only around 12% of land were under mechanized irrigation system and only 56 lbs. of chemical fertilizer were used per acre of cultivated land. Between 1973-74 and 1979-80, distribution of fertilizer increased at annual rate of 14.4% against 16.3% before independence (1960-61 to 1969-70). It was further projected that an area of 49.20 lakh acres constituting 22% of the total cultivable land would be covered by irrigation facilities by the terminal year of the First Plan. As against this, an area of 28.75 lakh acres was irrigated. During the First Plan period, the distribution of seeds suffered mainly because of bottlenecks in the procurement and delivery system (Government of Bangladesh, 1980)

Further, it must be recognized that like FFYP no marked change was observed in the investment policies of the government in the TYP The proportion allocated to the agricultural sector was still below 30%. Only 13% was allocated to agriculture proper and 27.7% to the rural sector as a whole in the Annual Development Plan of 1978-79 (Ahmed, 1984). This indicates that the allocation of public funds for agriculture has been proportionately less in all the periods, and this has been mainly due to overall development strategy which has mainly growth, and also the industrial strategy chosen to achieve the desired rate of growth.

The Second Five Year Plan (1980-85)

The desired technological transformation of the agrarian economy of Bangladesh could not make much progress due to lack of resources and organizational limitations The investment targets had to be revised downward during the FFYP, TYP and the SFYP due to external and internal resource constraints; even then they remained partly unrealized.

One important feature of development planning is that all the three plans remained overwhelmingly dependent on foreign aid. Share of external aid was 71.9% in the First Plan; and in the Two Year Plan it was 76.8% and 67.8% respectively. In general, the economy was characterized by two types of external dependencies - dependence on foreign aid and dependence on nature and both grew adverse to the steady growth of the economy (Govt. of Bangladesh, 1985).

Table-2.8 Plan Size and Outlay in FFYP, TYP and SFYP

(Tk. in crore)

Plans	Plan size	Actual Outlay	Gross Aid Inflow
First Plan (1973-78)	4455	2074	1491
Two Year Plan (1978-80)	3861	3359	2581
Second Plan (1980-85)	17200	14174	9614

Source : Govt. of Bangladesh, 1985.

Like the preceding plans, the SFYP's objectives were determined by the socio-economic imperatives of endemic poverty, unemployment and malnutrition, alarming growth of population, illiteracy and above all, dependence on foreign aid. The main strategy of the Plan to accelerate growth was the particular emphasis on agriculture to meet food gap and harness its growth potential through water resources development. However, because of the severe resource constraints the output and physical targets were scaled down in the midway of the Plan implementation.

During the SFYP, a number of significant development took place in the areas of Agriculture and Water Resources. First, a Medium Term Food Production Plan (MTFPP) was adopted to achieve a production target of 20.7 million tons in 1984-85. The target was reduced to 17.5 million tons because of resource constraint. The main focus of this program was on development of quick yielding minor irrigation projects, expansion of fertilizer distribution, more use of High Yielding Variety (HYV) and Local Improved Variety (LIV) seeds, expansion of agricultural credit, etc. The input programs consisted of targets for distribution of 1.6 million tons of fertilizer and 20.5 thousand maunds of HYV rice and wheat seeds through official channel and irrigation of 7.21 million acres of land in 1984/85. Food production however, failed to reach the target by 1.4 million tons though it grew significantly from 13.4 million tons in 1979/80 to 15.8 million tons in 1984/85 The annual growth rate of food output was 3.8% (Govt. of Bangladesh, 1985).

A number of factors contributed to the shortfall. There were more frequent floods and droughts during the Plan period, causing extensive crop losses. The physical targets of extending irrigation facilities and distribution of fertilizer could not also be achieved However, one important development was in the area of agricultural credit from institutional sources. It increased from Tk. 272 crore in 1979-80 to Tk. 1150 crore in 1984-85 giving a growth rate of 33.5% a year. In spite of this growth however the proportion of such institutional credit to the gross value of all agricultural output (TK.15169 crore) was only 7.6% (Govt. of Bangladesh, 1985).

Finally, it is to recognize that there had been significant shortfall in many crop production programs. Amongst all, Jute the main cash crop, gives a deplorable picture. Jute production suffered an absolute decline from approximately 6 million bales in 1979-80 to

4.6 million bales in 1984-85, though no change in the output level was assumed in the Plan (Table- 2.9).

Table-2.9 Target and Actual Output of Major Agricultural Products in the SFYP

Agricultural Products	1979/80	1984/85	
	Actual Output	Target	Actual Output
Foodgrain (mil ton)	13.4	17.5	15 8
Jute (mil. bales)	6.0	6.0	4.6
Tea (mil. lbs.)	80.7	95.0	96.8
Sugarcane (lakh tons)	70.0	77.6	70.0
Cotton (000 bales)	4.0	56.0	12.0
Tobacco (000 tons)	38.9	57.7	54 0

Source : Govt. of Bangladesh, 1985.

The situation with respect to key nutritional foods has been disappointing. For example pulses, which are a significant source of proteins especially for the poor, have exhibited a downward trend in production reveling decline in daily per capita availability from about 8 gms. in 1973-74 to about 5.5 gms. in 1984-85. The per capita availability of vegetables has also dropped from about 58 gms. per day in 1969 to about 36 gms. in 1983. The picture is similar with respect to oil seeds (Govt. of Bangladesh, 1990). While these crops are less significant in terms of their contributions to GDP, they are important for providing a balanced nutritional diet for the people.

The Third Five Year Plan (1980-85)

Agricultural development program during the Third Five Year Plan (TFYP) was drawn up with a view to achieving the following main objectives:

attaining of self-sufficiency in foodgrain production, and
expansion of employment opportunities.

The strategies to achieve these objectives during the TFYP emphasized the expansion of HYV technology along with rain-fed crop development and appropriate crop diversification programs. The production program was designed to be backed by appropriate input package, extension work, incentive prices and agricultural support institutions. In the case of inputs, water and fertilizer were identified to be the two critical elements. Other inputs and supportive services development programs included provision of improved seeds, plant protection services, agricultural extension, research and

education, credit, food and fertilizer storage facilities and marketing (Govt. of Bangladesh, 1990).

The TFYP target for foodgrain production during 1989-90 was 20.60 million tons against which 18.47 million tons was achieved. The failure to achieve the production target of foodgrain is associated with a number of factors like floods and other natural calamities, drought in early aus and late aman seasons, decrease in aus and wheat areas and yields, declining rate of growth of HYV yields and stagnating cropping intensity. There was also a temporary slowdown in the use of irrigation facilities and fertilizer. The slow growth rate also appears to be due to deficiencies in certain soil nutrients, especially sulphur and zinc. There is also evidence of decreasing seed quality for some HYVs (Govt. of Bangladesh, 1990).

There has also been a number of factors contributing to the slower diffusion of the technologies associated with HYVs; the most significant appears to be the declining rate of profitability, particularly of the winter cereals. Profitability of Boro rice is not increasing either, but still remains more attractive than pulses, oilseeds and many other non-cereal crops (Govt. of Bangladesh, 1990). This also explains why the targets of crop diversification program could not be achieved during the TFYP. Among non-cereal crops only potato registered a rising trend of per capita production while most other crops e.g pulses, oilseeds, sugarcane and vegetables revealed declining trends.

During the first 3 years of the TFYP, the agriculture sector stagnated. Foodgrain growth rate was less than 1% per year while the uncontrollable disastrous floods of 1987 and 1988 contributed to this situation, slow expansion of minor irrigation and other important inputs were equally limiting factors. The results of the last two years of the TFYP period have been decisive and gratifying. There have been record boro harvest, the aman crop has rebounded and a significant increase in the growth of irrigation. Besides expansion of irrigation, urea fertilizer prices fallen and it was much more readily available throughout the country which resulted in 25% increase of fertilizer sale (Govt. of Bangladesh, 1990).

During 1988-89, the Government made a number of important policy and program changes in order to stimulate agricultural growth. The biggest and most immediate impact on agricultural growth resulted from policy changes that led to increased sales of minor irrigation equipment. These policy changes opened the door to genuine private sales of minor irrigation equipment. Private traders were allowed to import diesel engines without taxes or restrictions. During 1989, prices of STW declined as private traders increased imports from lower cost sources, mostly from China. Other policy changes included . removal of all import duties and standardization restrictions from power tillers resulting in the importation of over 10,000 machines in 1989; elimination of many restrictions on pesticide importation; and decontrolling of fertilizer distribution and sales by allowing dealers to purchase directly from the factories (Govt. of Bangladesh, 1990).

'The Fourth Five Year Plan (1990-95)

Major Objectives of The Fourth Five Year Plan in relation to agriculture were to:

- Attain self-sufficiency in foodgrain along with increased production of other nutritional crops.
- Ensure sustained agricultural growth through more efficient and balanced utilization of country's land, water and other natural resources.
- Diversify agricultural production especially along nutritional line.

The agricultural development strategy during Fourth FYP would emphasize the following:

(i) Changing the nature of Bangladesh agriculture from one of high risk, monsoon - dependence to one with a lower risk, irrigated agriculture.
(ii) Stimulating crop diversification.
(iii) Relying more on competitive markets.

The key step needed to stimulate the development of modern, irrigated, risk - reduced agriculture is to ensure the adequate supply of critical inputs to farmers. It was hoped that the private sector could fulfill this role.

In the allocation of resources, the share of the agricultural sector declined from 34% during he Second Plan, to 28% during the Third Plan and only 26% in the Fourth Plan (Table-2.9). The performance is even worse if one assumes the situation with respect to the realized investment, because the realization of the investment target for agriculture has always been lower than other sectors of the economy (Table-2.9). Actual public sector investment for agriculture was 30% during the Second Plan, which came down to 21% during the Third Plan (Hossain,1991). Such treatment of the agricultural sector is inconsistent with the objectives of agricultural development in Bangladesh.

Table-2.10 Allocation and Realization of Public Sector Investment in Five Year Plans

(Crore Tk. at 1989-90 prices)

Sector	Second Five Year Plan			Third Five Year Plan			Fourth Plan Allocation
	Target	Actual	Achied rate(%)	Target	Actual	Achied Rate(%)	
Agriculture & Rural Development	10014 (34.3)	7553	75	10652 (28.2)	5444	51	11021 (26.3)
Industry	3661 (12.5)	2283	62	3923 (10.4)	3084	79	4180 (10.0)
Energy & Natural resources	5405 (18.5)	5572	103	8562 (22.7)	6001	70	8850 (21.1)
Transport & Communication	4014 (13.7)	3790	94	4564	3318	73	7473 (17.8)
Physical Planning and Housing	1502 (5.1)	1358	90	830 (2.2)	954	115	1241
Education, STR	1506 (5.2)	1230	75	1931	944	49	2477 (5.9)
Health & Population Control	1575 (5.4)	1305	83	2142 (5.7)	1273	59	2777
Socio-economic Infrastructure	532	421	79	463	267	58	585
Others	1017	1945	191	4651	4558	98	3326
Total	29236 (100%)	25357	87	337718 (100%)	25843	69	41930 (100%)

Source : Hossain (1991), P.40.

CHAPTER - III

RESEARCH AND EXTENSION FOR AGRICULTURAL DEVELOPMENT

Agricultural Research

The Research System

Agricultural research in Bangladesh was begun during the British Rule in 1880 when the Department of Agriculture was established (Hossain, 1991). In 1909, agricultural research laboratories were established within the 650-acre Dhaka farm now called Sher-E-Bangla Nagar. The laboratories are initiated with a very limited scientific and support staff to serve the province of undivided Bengal and Assam. The staff strength as of 1925 were three Economic Botanists and one Agricultural Chemist with their limited scientific and support staff (Islam,1988).

The nuclear research laboratories underwent various changes and enlargement. At the time of partition of India in 1947, the following research disciplines existed without any coordination among themselves (Islam, 1988):

- Cereal and Fiber Botany
- Agricultural Chemistry
- Mycology
- Agricultural Engineering
- Entomology and
- Horticulture.

In 1950's mono-crop research institutes : Jute Research Institute and Sugarcane Research Institute were established to provide special thrust on these two cash earning crops, and were put under the management of the then central government of Pakistan. Then as per recommendation of Food and Agriculture Commission in 1960, East Pakistan Agricultural Research Institute (EPARI) was established in 1962. The Accelerated Rice Research Scheme was enlarged and converted into the then East Pakistan Accelerated Rice Research Institute and housed in the 165 acres of land taken from the then EPARI at Joydebpur (Islam,1988). Not many months later this became the autonomous Bangladesh Rice Research Institute (BRRI).

However, the agricultural research capability in Bangladesh today, including the physical plant and professional competence, has been established after liberation in 1971. Serious attempts to restructure the research capacity began in about 1973, and meaningful research work did not begin until around 1975 (Wennergren, 1983). The present National Agricultural Research System (NARS) consists of the following research institutes:

Bangladesh Agricultural Research Institute (BARI)
Bangladesh Rice Research Institute (BRRI)
Bangladesh Jute Research Institute (BJRI)
Bangladesh Livestock Research Institute (BLRI)
Fisheries Research Institute (FRI)
Bangladesh Forest Research Institute (BFRI)
Bangladesh Institute of Nuclear Agriculture (BINA)
Sugarcane Research and Training Institute (SRTI)
Bangladesh Tea Research Institute (BTRI)
Soil Resource Development Institute (SRDI)

Although Bangladesh Agricultural University (BAU) plays an important role in agricultural research, the University is not under NARS. Besides institutes under NARS as well as BAU; Dhaka University, Chittagong University, Rajshahi University, Bangladesh University of Engineering and Technology, Bangladesh Institute of Development Studies, Bangladesh Academy for Rural Development, Rural Development Academy and some other Non-Government Organizations (NGOs) also conduct research in the field of agriculture.

Since 1973, research under NARS has been coordinated by the Bangladesh Agricultural Research Council (BARC). BARC is technically under the jurisdiction of the Ministry of Agriculture (MOA), but its governing council and review committees come from representatives of the agricultural research institutes. BARC has the responsibility for planning, integration and effective implementation of agricultural research through improved method of coordination, monitoring and evaluation of research activities (Karim, 1988). Currently, there are 21 research institutes which are involved in agricultural research under the overall supervision of the BARC.

The Major Agricultural Research Institutes

Bangladesh Agricultural Research Institute (BARI) - Among the agricultural research institutes, BARI is the largest and most diversified. BARI became an autonomous institute in 1976 with responsibility for crops not under the jurisdiction of the several monocrop institutes. In addition to the central station at Joydebpur, BARI has 22 Regional Stations and Sub-stations situated in different agro-ecological zones (Karim, 1988).

In 1990, the number of scientists worked at BARI was 467 out of which 58 had Ph.D. degree and 299 had Master of Science degree and 110 had Bachelor Degree in science (Table - 3.1). A study by USAID, Dhaka (Wennnergren, 1983) showed that the physical facilities at the Joydebpur location were adequate for the research program, but in regional and sub-regional stations, laboratories and equipment, housing, and machinery were judged inadequate or nil in about 60% of the cases.

Bangladesh Rice Research Institute (BRRI) - BRRI was established in 1970 as an autonomous institute. It was the first autonomous research institute in Bangladesh. Its total mandate is to accelerate the pace of development of rice crop. BRRI has 5 regional stations and in 1990 it had 210 scientists of which 36 had Ph.D. degree and 125 had Master of Science degree (Table - 3.1).

The physical facilities at the 5 stations do not match the adequacy of those at the central station in Joydebpur. Laboratories are considered adequate at only two stations and laboratory equipment is judged inadequate in all five stations (Navin & Khalil, 1988). Overall, the physical plant at most substations is insufficient for quality research, which makes it difficult to attract quality scientists to live and work in the rural areas (Wennnergren, 1983).

Bangladesh Jute Research Institute (BJRI) - BJRI was established in 1951 and in 1973 it was given semi-autonomous status. The institute has 6 research stations having the central facility at Dhaka. The institute has two seed farms, and twenty four sub-centers located in the various jute producing regions.

In 1990, the number of scientists employed at BJRI was 147 of which 18 held Ph. D. and 79 held Master of Science degrees (Table - 3.1). Research at BJRI mostly concentrates on varietal improvement, seed production and textile development. Unlike many of the other research facilities, those of the BJRI are generally considered adequate, excepting the Rangpur station. Even the seed farms have adequate facilities except for the laboratory facilities (Wennnergren, 1983).

Livestock Research - Research on livestock in Bangladesh is spreaded among many organizations. Teaching staff of the Faculty of Animal Husbandry at Bangladesh Agricultural University are engaged in animal health and breeding research. In addition to the Livestock Research Institute at Savar, Dhaka, the total program includes an animal husbandry facility at Comilla, one for veterinary research at Dhaka, a cattle breeding station at Savar and a poultry breeding farm near Dhaka. Besides these, a small research unit at Baghabarighat at Pabna undertakes veterinary research programs (Karim, 1988). At BLRI, bull production, artificial insemination work, vaccine production and dairy studies have been undertaken for several years. The BLRI has been established as an autonomous organization since 1982.

In 1988, throughout the country 149 scientists were engaged. In 1990, BLRI had 37 scientists of which 9 had Ph. D. degree (Table - 3.1). The livestock research programs have been highly fragmented and provide no significant information for the livestock industry. Most of the effort has been given to improved breeding stock. The facilities for traditional types of livestock research are inadequate. Furthermore, the national planning process and the research direction given to animal research are deficient as pointed out by Wennnergren (1983).

Fisheries Research - Fisheries research is still in its early stage in Bangladesh. Fisheries research is conducted by the Fisheries Faculty at BAU, the Dhaka University, Chittagong University and Rajshahi University, and the Directorate of Fisheries. The Freshwater Fisheries Research Station at Chandpur began operating in 1964; the Aquaculture Experimental Station at Mymensingh started experimental work in 1982. The Fisheries Research Institute (FRI) on BAU campus at Mymensingh was established in 1982. The institute is making a good progress in consolidating and expanding research in various aspects of fish culture. The scientific manpower employed in 1990 at FRI totaled 82 professionals of which 8 held Ph.D. degree and 51 held Master of Science degree (Table -3.1).

Bangladesh Forest Research Institute - Bangladesh Forest Research Institute (BFRI) Chittagong was initially concerned with forest products rather than forest management. In 1972 the institute took over responsibility for all forestry research. The institute's field program is carried out at 17 stations. Major national concerns, over reforestation and management of the Sunderban's forest are reflected in the research strategy of the Institute.

Forestry research under the NARS focused on management of tree plantations and industrial use of wood and wood products. Nursery and plantation techniques for several spices of eucalyptus and acacias have developed in an attempt to encourage planting of these fast growing exotic species to meet demand for fuel wood (Abdullah, et. al. 1995). In 1990, the staff consisted of 64 scientists of which 6 had Ph. D. degree and 48 had Master of Science degree (Table- 3.1).

Bangladesh Institute of Nuclear Agriculture (BINA) - The application to agriculture of radio - isotope and ionizing radiation technology began in Bangladesh in 1961 at the Atomic Energy Agricultural Research Center (Wennnergren, 1983). BINA was established in 1973 at Mymensingh on the BAU campus. The institute has given emphasis to mutation breeding of new crop varieties and efficiency of fertilizer use (Karim, 1988). Crop focus has been on cereals, fibbers, legumes, and oilseed crops. Development of early maturing varieties of rice has been a major research effort. Another has been the classification of soils in Bangladesh for both micro and macro elements (Karim, 1988).

The Faculty at BINA in 1990 consisted of 51 scientists of which 10 held Ph.D. degree and 32 held Masters degree (Table - 3.1). The manpower situation at BINA has been a problem almost from its inception. BINA personnel have experienced difficulty in securing higher studies. Overall the institute has not achieved its initial promise.

Sugarcane Research and Training Institute - The sugarcane research institute was established in 1951 to service the research needs of the sugarcane industry. In 1980, the institute expanded its outreach activities by establishing a Training and Communications

Division to better communicate research findings to producers and to provide training in sugar production methods at all levels from sugar factory supervisors to growers. Both extension and in-service training are part of the program.

Program facilities are located only at Ishurdi. There are no other substations. The professional staff totals 79 scientists (in 1990) of which 5 had Ph.D. degree and 35 had Masters degree.

Bangladesh Tea Research Institute (BTRI) - There are three substations associated with the main research establishment at Srimangal. The research program services about 100,000 acres under tea production on approximately 150 tea estates (Islam, 1988). Most of the estates are privately owned. The staff of the institute in 1990 was composed of 21 scientists of which 18 had Master degree and only 2 had a Ph.D.

The physical facilities at the research stations are considered adequate, including an experimental tea factory which became operative in late 1978. The program encompasses a fairly broad and traditional scope of agronomic research. A major activity of the institute is the extension type, advisory service provided to the tea estates which included short courses plus visits to the estates (Islam, 1988).

In the NARS, in 1990 around 1337 scientists were engaged in research and one-fourth of the scientists had only B Sc. degree. The bulk of the NARS scientists have M. Sc.. degree (61%) and only 13% have Ph. D. degree (Abdullah, et.al, 1995).

Table-3.1 Agricultural Graduates Employed in Different Research/Educational Organizations in 1990

Employer	Education Level			
	Ph. D.	M.Sc.	B.Sc.	Total
BARC	25	54	19	102
BARD*	1	9	0	10
BARI	58	299	110	467
BINA	10	32	9	51
BJRI	18	79	50	147
BRRI	36	125	49	210
FRI	8	51	23	82
BFRI	6	48	10	64
BLRI	9	16	12	37
SRTI	5	35	39	79
BAI*	3	49	6	58
BAU**	217	178		395
IPSA*	12	12	2	26

*Refers to 1988,** refers to 1994 situation and others for 1990.

Sources : Navin, Jr. and Khalil, P.132,1988, Abdullah, et al. 1995 and BAU,1995.

Almost all the central research centers are located in and around Dhaka and although in most cases these are well equipped, field research stations are ignored both in terms of physical facilities and efficient researchers. Unless field stations are provided with modern amenities and unless both the Bangladeshi scientists and expatriates are prepared to move to outlying research stations in sufficiently large numbers so as to adapt the results of plant breeding and other research activities to local conditions and become aware of the conditions under which peasants can drive benefit from research, agricultural modernization will not be achieved (Like Minded Group, 1990).

Effectiveness of the Research System

The effectiveness of the Bangladesh agricultural research system can be described as promising. Gill (1983) estimated return from agricultural research during the 1970s. Under most pessimistic assumptions he showed that the returns were twice as much as the costs. Using optimistic assumptions the returns were shown to be 20 times more than the costs.

The NARS has delivered some meaningful success. Over the last two decades the various institutions of NARS have introduced 35 varieties of rice, 15 of wheat, 25 of jute 7 of sugarcane, 9 in tea, 4 of mustard, 5 of groundnut, 10 in pulse and 3 each of tomato table and sweet potatoes (Abdullah, et. al. , 1995).

BRRI has been able to develop 15 high yielding potential varieties in their research period of 15 years. BRRI has also marketed 25 local improved varieties for the farmers' field. The varieties developed at BRRI possess more registance to insect - pests and diseases (Hossain, 1991). Over the first 11 years, BRRI improved varieties have made an excess production valued at Tk. 7100 million and their costs during this period have been Tk. 185.7 million (Hossain,1991).

The BRRI soil chemists and agronomists have determined the optimum fertilizer requirement for different rice crops. They have also found out the necessity of applying sulphur and zinc, the minor plant nutrients, on certain land areas to increase the crop yield (Hossain, 1991).

The dramatic increase in wheat production was possible due to HYV wheat varieties developed by the Bangladeshi scientists. The BARI scientists developed, by selecting from advanced varieties, five varieties of wheat called Balaka, Ananda, Kanchan, Akbar and Barkat by 1983. BARI during the first 6 years of experimentation has been able to increase wheat production by 50% per annum. The net value stood at Tk. 1300 million and the cost for wheat research projects came to only 0.3% of the net value (Hossain, 1991).

Likewise, the expansion in mustard production has benefited from two improved varieties, SS-75 and TS-72, developed by the Bangladeshi scientists (Wennergren, 1983) Soya has been initially introduced with two HYVs based on domestic work. HYV varieties of sesame and groundnuts have also been developed by the Bangladeshi researchers. Besides these, summer pulse varieties, HYV *mung* beans and black grams developed by BARI scientists have gained popularity due, in large part, to the shorter maturity (55 to 65 days) which is about one-half the time needed for winter pulse variety (Hossain, 1991).

Further, the Potato Research Center has been involved in research activities since 1977 and has been able to increase the production over 60%. Seven varieties with high yielding potential, disease resistance and low rate of degeneration were recommended to the farmers after selection and variety trials of the exotic varieties (Hossain, 1991). Additionally, the nuclear research at BINA has released early maturing, higher yielding rice, chickpea, and jute mutants. HYVs of sugarcane has also been developed by the SRTI, but they tend to be degenerate with long use.

Recent discovery of green jute as a substitute for forest based products to produce pulp for the paper industry seems to have some potential for improving the fortunes of jute growers and the economics of the paper industry. The potential of green jute, as to its economics and ecological implications needs careful study before any conclusion can be drawn about its sustainability as an alternative source of raw material for the pulp industry (Abdullah, et. al. , 1995).

Some of the new varieties of crops, vegetables and fruits which have been developed by the Bangladesh Agricultural Research System during 1966 to 1987; and which have gained popularity among the farmers are listed below :

Rice (HYV)	:	IR8, BR3, BR4, BR10, BR11, BR14 and Pajam.
(LIV)	:	Latisail, Nizarshail, Rajashail and Hashikalmi.
Wheat (HYV)	:	Sonalika, Balaka, Akbar, Kanchan, Barkat and Ananda.
Potato	:	Cardinal, Kufri Sendurl, Lalima.
Vegetables	:	Hybrid radish (Tasaki San Mula), Uttara Variety of brinjal (egg plant), Manik and Ratan (Tomato), Provati (Cabbage) and three leafy vegetable varieties.
Fruits	:	Kazi peyara (Guava) and seedless lemon.

Source : *Strategic Plan for NARS to the Year*, 2000, BARC (1990), P. 16

However, as mentioned by the Like Minded Group (1990) there are some problems in the research organizations which are affecting research activities. They have mentioned that the senior agricultural scientists in the country have had to devote much of their time to administration, thus their investment in actual research work has not been very marked Abdullah, et al (1995) has also pointed out that, NARS scientists, apart from their research work are involved in training, transfer of technologies, administration and different types of work. Their estimates show that a Chief Scientific Officer (CSO) of the national agricultural research institute, on an average, spent only 42% of their time in research work, a Principal Scientific Officer (PSO) 54%, Senior Scientific Officer (SSO) 56% and a Scientific Officer 79%. Senior cadres among the NARS scientists spent quite a substantial part of their time in administrative tasks and the scientists working at BARC spent even more time on administrative matter (Abdullah, et. al. , 1995). Therefore, a lack of leadership has meant that researchers also have lacked commitment and a clear sense of direction.

The Like Minded Group (1990) has mentioned that in research, emphasis has been on varietal development, so that rural socio-economic conditions which govern technological transformation have been ignored somewhat by the investigators. However, Abdullah, et. al. (1995) have shown that in terms of area of activities the largest investment was made for research in developing cultural practices followed by work on varietal improvement and a considerable proportion was also spent for socio-economic research. However, problems which are likely to be encountered when applying new knowledge outside the research stations and laboratories are not being given sufficient attention. In addition, government budgetary constraints not only have prevented absorption of required manpower but also have made it difficult for researchers to obtain necessary funds for experimentation and for meeting traveling costs and other expenses.

The Like Minded Group (1990) has also mentioned that the bureaucratic process related to recruitment, promotion and training has been the greatest bottleneck to research

development. Although the Research institutions are autonomous on paper, they must observe traditional government procedures which causes frustration among the bright young scientists who are capable of undertaking quality research. More aid funds have to be diverted so as to meet the operational expenses of the institutes / agencies. Further, research and other facilities at field level stations should be developed to make an environment of attracting good researchers to work there (Like Minded Group, 1990).

Financial Support for Agricultural Research

A number of donors assist the government with agricultural research, financing physical facilities, training and technical assistance. The annual contribution by the donors for research is between $ 15 and $ 20 million (Like Minded Group, 1990). The aid agencies which provide support for agricultural research in Bangladesh are : USAID, World Bank, CIDA, Japan, ADP, SIDA, Australia, West Germany, Holland, U.K. and also India. Among these, USAID, World Bank and CIDA are the most important. Foreign Foundations and technical assistance agencies such as UNDP, Ford Foundation, Winrock International, IDRC and the International Agricultural Research Centers under CGIAR also have been involved in strengthening research efforts.

The contribution made by agricultural production is about 40% to the economy of Bangladesh, yet only about 0.25% of this value (agricultural GDP) is spent on research for agriculture (Table-3.2). This was much lower in 1970s (only about .02%) when foreign assistance for agricultural research was low. A comparison of agricultural research investment in some Asian countries (Table-3.2) shows that the richer countries are spending larger proportion of their agricultural GDP on agricultural research. In contrast, Bangladesh invests less than 0.3% of agricultural GDP in such research. Some recent calculations suggest that IRR to investment in agriculture sector in Bangladesh is about 90% (Task Force, 1991). This calls for expansion of agricultural research in Bangladesh .

Table-3.2 Agricultural Research Investment as Percent of Agricultural GDP in Selected Countries

Country	Year	Research Expenditure as % of Agr. GDP
Bangladesh	1989	0.25
India	1986	1.60
Nepal	1981	0.23
Pakistan	1985	0.34
Sri Lanka	1982	1.50
Indonesia	1983	0.27
Malaysia	1986	1.90
Philippines	1986	0.49
Thailand	1985	1.59

Source : Task Force (1991), Vol. 2, P. 142.

The trends in budgetary support to agricultural research since 1976 to 1985 have been impressive (Table-3.3). Donor assistance to agriculture comes from several nations and agencies. Much of this total assistance by donors provides for physical facility development, training, or involves expatriate scientists assigned in Bangladesh to assist a specific research focus. Very little donor assistance is given for meeting recurrent operating expenses of the research system (Table- 3.3).

Despite the favourable increases in funding, the level of support appears insufficient to underwrite the quality research structure that is needed for a progressive agriculture sector. In 1985, the total support amounted to only 0.11% of the nation's GDP and only 0.22% of the agricultural GDP. Even within the agricultural budget itself, the share of research in 1985 represented only 5.5% of the ADP for agriculture (Table-3.3) The situation did not improve even in 1989 when only 0.25 % of agricultural GDP was spent on agricultural research.

There is now serious shortage of research fund particularly after the withdrawal of USAID PL-480 fund. Referring to an evaluation report (The E & R Project -II Evaluation), Abdullah, et al. (1995) have mentioned that in 1992 for NARS, on an average, only 24% of the budget was available for research work and in BARI where 35% of the NARS scientists were working, only 7% of their budget was available for actual research activities. The fund available for travel and transport was so small (1.36%) that on-farm research had to be severely curtailed.

Perhaps the more meaningful comparisons are those based on the level of operational expenditures per scientist since these funds represent the resource commitments for accomplishing the annual research program. Once basic capital investments are made, it

is the operational funds which have the greatest impact on program progress. In 1985, budget per scientist on an average was TK. 3,55,000 (Table-3.3) which is likely below the necessary norm. Abdullah, et. al. (1995) has shown that in 1991-92 the average cost of experiment conducted by BARI was only Tk. 12,868. In recent years, the foreign assistance for conducting research has drastically reduced which is severely affecting research system in Bangladesh.

Among the nine Research Organizations as shown in Table- 3.4, BARC expended 35% of the 1985 funds followed by BARI (23%). Over the period of 1976 to 1985, the annual compound growth rate of expenditure for BARC was 77.8%. The allocation for BJRI has also increased to a considerable proportion, 47.8% per year. The annual growth rate in expenditures of the nine major institutes since 1976 to 1985 was 28% (Table- 3.4). Instead of giving detailed information on research expenditure throughout 1976 to 1985 (for details see Navin, Jr. And Khalil, 1988), data for the years 1976, 1980 and 1985 are presented to have some indications of research expenditures over the years (Table-3.4).

According to Wennergren (1983), the research system in general shows symptoms of insufficient operating funds. Daily operating budgets are administered as a residual to such fixed obligations as salaries and capital improvements and, as such, bear the full impact of decreases or shortfalls in day-to-day budgeting. Scientists and facilities are rendered inoperative and programs curtailed due to deficient operating budgets and inflexibility in allocations. Funding levels for recurrent and operational costs are too low to allow the level of uninterrupted programming which characterizes a high quality research system.

Table-3.3 Agricultural Research Funding and Personnel, Bangladesh FY 78 - FY 85

(million of Taka)

Item \ FY	1976	1977	1978	1979	1980	1982	1983	1984	1985
Total agr. research (current price)	103.5	99.8	164.5	192.6	379.9	297.7	351.3	422.1	461.7
Domestic sources	63.9	78.7	97.7	125.4	233.5				
Foreign assistance	39.6	21.1	66.8	67.2	146.4				
Capital	83.1	73.3	131.0	146.5	296.9	178.0	201.1	251.3	264.6
Recurring	20.4	26.5	33.5	46.1	83.0	119.7	150.2	170.9	197.1
Total agr. research (const. priceb)	103.5	89.7	131.7	135.0	242.0				
Domestic sources	63.9	70.7	78,2	87.9	148.7				
Foreign assistance	39.6	19.0	53.5	47.1	93.3				
Capital	83.1	65.9	104.9	102.6	189.1				
Recurring	20.4	23.8	26.8	32.3	52.9				
Total agr. research (current price)									
As % GDP	0.10	0.09	0.13	0.14	0.24	0.11	0.12	0.12	0.11
As % of agr. GDP	0.18	0.19	0.23	0.25	0.40	0.24	0.26	0.25	0.22
As % of ag. budget	3.35	3.07	4.54	3.98	5.56	8.58	7.70	8.02	11.63
Scientists engaged in agr. research :	943	984	1234	1281	1302				1373
National	921	952	1190	1230	1256				1300
Expatriate	22	32	44	51	46				73
Budget/National Scientist (000Tk.)	112	105	138	157	302				355

a. Except Fy81 for non-availability of data.

b. At 1975-76 constant prices

Source: Navin, Jr. and Khalil (1988), P.133.

Table-3.4 Expenditure by Major Agricultural Research Institute, Bangladesh, FY 85 and Annual Compound Growth Rate during 1976 to 1985

(in million taka)

Institution \ FY	Year of Establishment	Expenditure in			Annual compound growth rate (1976-1985)
		1976	1980	1985	
BARC	1973	1.48	10.58	163.50	77.8
BARI	1909	-	129.23	105.81	15.6
BJRI	1950	3.47	10.99	83.38	47.6
BRRI	1970	17.55	39.87	63.48	12.7
FRI	1954	4.86	15.19	14.72	9.9
BINA	1972	9.44	4.00	9.27	1.3
SRI	1973	3.38	13.59	16.68	21.8
BTRI	1957	4.30	5.11	1.73	0.6
BAU	1961	-	-	3.51	14.9
Total	-			461.72	28.0

Source: Navin, Jr. and Khalil (1988), P. 134.

Agricultural Extension

The Agricultural Extension System

Agricultural extension services can be said to have begun in Bengal with the East India Company which introduced crop varieties of commercial importance and provided financial support to increase production of exportable crops. However, the origin of governmental extension services can be traced back to 1870 when the Department of Agriculture was created as a part of the Department of revenue to help rehabilitate farmers after the devastating effects of natural disasters (Hassanullah, 1991). The Department of Agriculture became independent in 1906.

In 1939, the Jute Regulation Department (JRD) was created to regulate jute growing and stabilizing jute prices at union level and in 1951, JRD was amalgamated with the Directorate of Agriculture. The regulators of jute cultivation without required training became educators and extension workers. Parallel to agricultural extension, a new extension organization called Village Agricultural and Industrial Development (V-AID) was established by the USAID in 1953. This was also abolished in 1961 and merged with agricultural extension organization (Hassanullah, 1991).

In 1970, the Directorate of Agricultural Extension and Management (DAEM) was established as a result of the bifurcation of the Directorate of Agriculture which had

included agricultural extension, research and education. The separation of the three functions was seen as a means of intensifying the extension effort.

The expectations for extension were blunted by the creation of large numbers of monocrop research and extension - related institutions following independence. The crop development boards such as for cotton, tobacco and horticultural plus the several directorates for plant protection, jute, and others, also were given outreach responsibilities. Justification for fragmentation of the extension function was founded in the specialized needs of the monocrop focus. Thus specialization was introduced despite the fact that, in most cases, the extension contacts were duplicated as each individual extension unit dealt with the same farmers (Wennergren, 1983).

In the early eighties it was realized that narrower specialization escalated the cost of services with little effectiveness in results which became a national concern. The World Bank highlighted the problem and made it mandatory to merge at least six crop extension organizations namely : the Directorate of Agriculture (Extension and Management), the Directorate of Plant Protection, the Directorate of Agriculture (Jute Production), the Tobacco Development Board, the Directorate of Land and Water Use and the Horticulture Development Board as a partial and first step towards reorganization. What should be the level of specialization within an extension system is still a controversial issue (Hassanullah, 1991).

The fragmentation of extension function has expanded to the point where about twenty separate institutions have mandates to provide extension services within the agricultural sector. Nonetheless, the DAEM is the largest of all extension-oriented institutions and is recognized as the National Extension Services (NES). DAEM employs about 50% of all extension personnel in Bangladesh and operates in geographical area which encompass about 85% of total cropped area in Bangladesh (Wennergren, 1983).

Besides, DAEM other important organizations / agencies which are involved in extension activities are Jute Extension Service (JES), Bangladesh Rural Development Board (BRDB), Plant Protection Directorate (PPD), BARI, BRRI, Water Development Board, etc. Besides these, research institutes for tea, tobacco and sugar are also involved in extension activities. Moreover, Bangladesh Agricultural University is also involved in extension activities but its activities are restricted to the region surrounding Mymensingh Besides government organizations, some NGOs like RDRS, CARITAS, PROSHIKA, BRAC, etc. are also involved in some form of extension services.

To overcome the problem of coordination of the different government institutions involved in agricultural extension, Integrated Rural Development Program emerged (Hassanullah, 1991). The program eventually became an independent organization providing inputs, credit and rural cooperative network. Its educational role, however remained highly inadequate as its educational program consisted of one day training in a

fortnight for one model farmer in each cooperative society. The assumption was that the model farmer would educate other members of the society (Hassanullah, 1991).

Effectiveness of Extension Services

Directorate of Agricultural Extension has been functioning for many decades. But the officers responsible for agricultural work and the Union Agricultural Assistants (UAA), the field level staff, have not achieved significant results because they have lacked adequate training, proper work environment and facilities, and the necessary motivation (Like Minded Group, 1991).

Field level extension work is the responsibility of the Block Extension Supervisors who were formerly known as Village Extension Agents. In 1991, there were more than 15000 field level extension workers in Bangladesh (Like Minded Group, 1991). Quite a few of them have been trained in the 13 Agricultural Extension Training Institutes (AETIs) which are operating in various regions of the country. The World Bank has provided assistance for AETIs. However, many Block Extension Supervisors are untrained or have received inadequate training before joining their posts. They are recruited from among the UAAs or jute supervisors and many of them are unaware of the modern agricultural practices required by the new seed-based technology. With the assistance from Japan, however, the Center for Extension Resource Development Institute (CERDI) has recently been established to provide in-service training for extension workers. Apart from CERDI, in-service facilities are also available at the various agricultural research institutes and the large number of agricultural research stations located all over the country (Like Minded Group, 1991).

Extension workers are still not used to obtaining feedback from farmers and thus are not able to perform their tasks adequately because they also lack sufficient and up-to-date training concerning not only cultivation of HYV rice and other crops but also allied activities. Most of the government's spending as well as aid have been directed to training specialists at graduate and post-graduate levels rather than the field staff who are the only ones through whom the peasants ultimately get their knowledge (Like Minded Group, 1991).

Formerly there were 2000 farmers for every extension agent. Currently, the ratio is about 800 : 1 (Task Force Report, 1991). This means that extension workers are of responsibility has been brought down to manageable limits. In order to improve the effectiveness of field extension activities, the Training and Visit (T &V) system was first introduced in the North West region in 1978-79, and subsequently expanded to other regions in 1982. The system comprises the formulation of location specific impact points, dissemination of information through contact farmers, and monitoring of field extension activities. It is estimated that extension massages reach about 0.9 million contact farmers

and approximately one million other farmers out of 10 million farm households in the country (Task Force Report, 1991).

Available information, however, suggest that the T & V extension system is not functioning satisfactorily. Studies indicate that majority of the farmers have never been in receipt of massages of agricultural extension workers delivered through contact farmers and that the Block Supervisors show bias in their work in favour of large farmers (Task Force Report, 1991).

Wennergren (1983) in his report has mentioned some causes of poor performance of the extension services. According to him, poorly trained agents, duplication of efforts between DAEM and other extension units, insufficient use of personnel, and the absence of individual incentives to encourage quality work are some of the important causes of poor performance of the extension services. Additionally, lack of extendible technology, inappropriate national price policies, and untimely and inadequate agricultural credit also have imposed constraints on the extension efforts. Finally, funding shortage have created inordinate restrictions within the system. Travel, which is the life blood of extension, is curtailed by budget shortfalls. Resources for gasoline, per diem, and other materials are deficient, which often leave village agents bound to office work instead of making contacts with farmers. Thus, supervision, job perceptions, and other interpersonal and administrative relations suffer. These are exacerbated by inadequate employment conditions such as low salaries and minimal opportunities for advancement, plus assignments to small rural communities that often require agents to live in substandard housing and, in many cases, to be separated from their families for lack of adequate education and housing (Wennergren,1983).

Both infrastructure and funding are lacking and the number and capability of the personnel are in question. However, there have been pockets of successful extension assistance. The help in encouraging STW adoption in Bogra, extension's role in assisting the diffusion of new CIMMYT wheat varieties, and the historic influence of extension in the Comilla area are examples. But, overall, the picture for effective extension is discouraging and the linkage between research and extension are judged to be generally weak and inadequate (Wennergren, 1983).

To improve the quality of extension, there is no alternative to improving the quality of extension workers, which can only be done by employing more qualified extension workers and by paying more and providing better facilities, in particular for travel (Task Force Report, 1991).

Investment in Extension Services

Financial support for DAEM extension programs has shown continued growth since 1973. Expenditure in 1981 totaled about Tk. 102 million and growth since 1973 has

been 16% annually (Table -3.5). Both are considerably lower than the allocations to research. The level of total support (both current budget and ADP budget) has generally been considered inadequate to meet the expansive needs of the service. Based on an estimated 6900 extension personnel employed in 1981 and the Tk. 86.3 million current expenditures, the outlay per extensionist by the DAEM was about tk. 12,600 for the year. This seems quite low even if salaries for most Village Extension Agents (VEA) were in the range of Tk. 500 to Tk. 700 per month (Wennergren, 1983).

Table-3.5 Expenditure by Directorate of Agriculture, Extension and Management : Bangladesh, 1973-81

(Thousand Taka)

Fiscal Year	Current Budget	ADP Budget	Total
1973	19508	19999	39507
1974	20956	14753	35709
1975	26446	1667	28113
1976	41534	4922	46456
1977	41441	13036	54477
1978	46378	18417	64795
1979	44511	35871	80382
1980	46652	40339	86991
1981	86329	15716	102045
Annual compound growth (%)	17.2	17.2	16.0

Source : Wennergren (1983), P.355.

CHAPTER - IV

DISTRIBUTION OF INPUTS AND CREDIT FOR AGRICULTURAL DEVELOPMENT

Input Distribution

Involvement of Public and Private Sectors and Use of Modern Input

Until recently, BADC was in charge of almost the entire tasks of procurement and delivery of modern agricultural inputs in Bangladesh. Along with BADC, the two other public organizations - Directorate of Agriculture (Extension and Management) and the Bangladesh Water Development Board (BWDB) were involved in agricultural development activities. However, the Directorate of Agriculture was mainly involved with agricultural extension work and had minor role in actual input delivery system. On the other hand, the BWDB had a very important role in the delivery of at least one major agricultural development input, namely, modern irrigation. In fact BWDB is almost solely responsible for gravity - flow surface water canal irrigation. Besides, BADC and BWDB, BRDB also plays an important role in agricultural development. The main function of BRDB is to provide institutional credit to the farmers.

Within this broad demarcation, there are however many instances of overlap. Thus although BWDB generally confines its activities to gravity flow surface water canal irrigation, BWDB is also responsible for flood control and drainage and also to some extent Deep Tubewell irrigation. It is also found to engage in the delivery of some agricultural inputs. Similarly, apart from agricultural extension work, Directorate of Agriculture is also sometimes found to expand its activities to other areas of input delivery as well. However, it is the BADC which was until recently was mainly in charge of delivery of modern inputs like HYV seed, fertilizers, small scale irrigation equipment and pesticides (Islam, 1991). A major shift occurred favouring privatization of the delivery of agricultural inputs after 1975 At present except seed to some extent, distribution of all other inputs have gone to the private sector. In the following sections, the past as well as the present role of public and private sectors in distributing modern inputs are discussed.

HYV Seeds - A number of public agencies are involved in the process of production, multiplication, procurement, processing, supply and distribution of modern varieties of seeds. Varieties developed in the breeding stations of BARI and BRRI are released by National Seed Board (NSB) after examination / evaluation to BADC for multiplication as foundation seed. The foundation seeds are multiplied as certified seeds at Seed Multiplication (S.M.) Farms and Contact Growers' (C.G.) Zones of BADC The Corporation is also responsible for procurement, processing, storing and distributing certified seeds to the farmers. Improved seeds are also procured from abroad to meet the

gap between demand and supply of seeds. Distribution at farmers' level is carried out by BADC through a network of sales centers located at *Thana* level (Annual Report, BADC, 1985).

The production and sale of HYV seeds have been the responsibility of BADC, while BRRI and BARI are responsible for their introduction. To date, the introduction of HYVs has been primarily for rice, wheat, potatoes, and very limited amounts of oilseeds and pulses. Some HYVs are imported for selected vegetables and a limited amount of corn, but the amounts are minimal and procurement is handled by the private sector.

During the 1970s, large quantities of HYV seeds were imported from the International Rice Research Institute (IRRI) in the Philippines and from India. By 1983, BRRI had developed 16 short duration modern varieties (Hossain,1989). The newer varieties have yield rates similar to the earlier ones, but are superior in disease registance and grain quality. The new rice varieties have been introduced in all the three seasons : *Aus*, *Aman* and *Boro*. In addition, a number of improved wheat varieties have been imported from the Centro Internacional de Mejoramiento de Maiz y Trigo (CIMMYT) in Mexico and from India and have been propagated on the seed multiplication farms of the BADC for distribution among farmers. The most popular wheat variety is Sonalika, which was bred in India with materials from CIMMYT and its predecessors based on Mexican material (Hossain, 1991).

By 1985 nearly one-third of the cereal area had been covered by the new seeds. For rice, the coverage was about 78% for Boro season, 16% for *Aus* season and 20% for the *Aman* season. A major constraint to expansion of the HYV area during the *Aman* season is that more than two-thirds of the area remains under deep water throughout the season and is not suitable for growing the dwarf HYVs (Hossain, 1991).

The distribution of HYV rice seed by BADC has shown a definite decline since 1973. In 1982, only 51,867 maunds of HYV rice seed were distributed as opposed to 443,550 in 1973 (Wennergren, 1983). The reduction is not due to a decrease in use of HYV rice by Bangladeshi farmers but because individual growers save their own seed after the initial planting and do not require annual replacements from seed provided by BADC. It is estimated that at present, 97% of the HYV rice seed planted each year is from the growers' own stock (Bhuiyan, et.al., 1993).

In the case of wheat also, normally farmers use their own seed (Approximately 80%). Contact farmers of BADC for certified seed production collect seed from BADC. Other farmers who do not have enough seed for sowing purchase seed from BADC or from local market. Such supply from BADC can meet from 12 to 15% of total requirement (Bhuiyan, et.al., 1993). By 1988, most of the *Boro* paddy and all wheat areas were covered by HYVs and about 14% of the mustard area was also covered by HYV (Ahmed, 1988).

Fertilizers - Chemical fertilizer, an important farm input for raising crop production, was introduced in Bangladesh as early as 1951. Directorate of Agriculture (presently known as DAE - Department of Agriculture Extension) was entrusted with the responsibility of procurement and distribution of fertilizer throughout the country. But in July 1962, as per recommendation of Food and Agriculture Commission, the responsibility of making fertilizer available to the farmers was handed over to EPADC (now BADC), while DAE's functions were limited to extension and motivation activities.

Under the old system, BADC used to procure fertilizer from local plants and from abroad, made arrangements for transportation from factories / ports by rail, road, waterways to the godowns for deliveries to dealers, who sold it to the farmers. Therefore, BADC had to shoulder the responsibilities of procurement, storage and distribution of chemical fertilizer. The distribution network included 423 *Thana* Sales Centers (TSC) that sold fertilizers to private dealers and agricultural cooperatives at the village level for retail sale to farmers. Attempts to include competition among retail dealers were made between 1975 and 1977 by increasing the number of licensed dealers from 3 or 4 to 15 per *Union* (Zohir, 1995). The gradual shift of fertilizer distribution system from public to private sector has been described by Zohir (1995) as follows :

With a USAID project grant, a new marketing order was introduced in sequence from 1978 through 1983. BADC withdrew its wholesaling from the Thana levels and concentrated wholesale distribution at 97 primary distribution point (PDP). The licensing process for wholesalers was effectively abolished; and restrictions on fertilizer movement and trading were removed. Since 1984, prices at the (private) wholesale and retail levels were deregulated. The second phase of the process of liberalization, initiated in 1987, involved further expansion of private trade to the factory gate and to imports. As a first step, private distributors lifted larger lots of fertilizer at discount prices from a few BADC centers. Later, from March 1989, the national level distributors were allowed to lift directly from factories. Initially there were quotas, which were later withdrawn. The private sector was also allowed to purchase TSP and MP from BADC at port locations. And, later, the Import Policy Order 1991-93, allowed private import of all fertilizer.

Therefore, the fertilizer distribution system is now completely in the private sector. Under the private distribution system, there are instances of fertilizer price increase for which oligopoly activities of the private traders and corruption and inefficiency in fertilizer plants are responsible.

In 1960-61 consumption of fertilizer was almost negligible at less than 1 Kg. of nutrient per acre of sown area. By the end of 1960s, consumption had increased to over 4 Kgs. per acre and it tripled within the next decade to about 13 Kg. in 1979-80 (Hossain, 1989). After a brief stagnation during 1979-83 and in 1985-86, consumption picked up

from 1987 to 1992 (Table - 4.1). Sale in 1991-92 reached 2.12 million metric tons of fertilizers (Table -4.1).

Chemical fertilizers involve three major nutrients, nitrogen (Urea), phosphorus (TSP) and potash (MP). The application of nitrogen constituted about 72% of the total while phosphorus represented about 21% in 1991/92.

Table-4.1 Distribution of Fertilizer by Type from 1965-66 to 1991-92

(Thousand tons)

Year	Urea	TSP	MP/DAP	HP	Total
1965/66	83.33	20.88	3.81	-	108.02
1966/67	120.88	34.47	8.81	-	163.65
1967/68	151.95	48.14	11.50	-	211.59
1968/69	159.93	52.94	12.43	-	225.30
1969/70	196.47	65.54	15.10	-	277.11
1070/71	212.34	74.88	17.08	-	304.30
1971/72	169.71	60.13	13.92	-	249.82
1972/73	275.64	88.91	18.47	-	384.02
1973/74	267.67	93.82	18.39	-	379.83
1974/75	176.06	76.08	17.62	11.42	281.20
1975/76	311.96	110.06	21.74	4.36	448.12
1976/77	349.26	125.59	22.38	4.03	501.26
1977/78	477.45	191.33	41.00	3.27	713.05
1978/79	470.56	177.65	47.50	3.33	699.04
1979/80	535.98	206.19	88.24	3.11	833.52
1980/81	560.53	214.97	85.73	2.75	863.98
1981/82	518.77	208.48	93.35	0.38	820.98
1982/83	619.12	202.74	121.62	0.07	943.48
1983/84	708.0	260.7	157.1	0.30	1126.7
1984/85	831.8	345.6	69.6	0.30	1247.3
1985/86	794.9	297.4	59.9	0.20	1152.4
1986/87	915.0	335.7	65.9	-	1316.6
1987/88	1029.1	390.2	86.1	-	1505.4
1988/89	1135.0	416.0	94.0	-	1645.0
1989/90	1367.7	480.6	118.9	-	1967.2
1990/91	1322.9	513.7	146.9	-	1983.5
1991/92	1531.5	456.8	136.3	-	2124.6

Source : BBS (1983, 1989 & 1993).

Fertilizer adoption is fairly widespread among producers of most crops. The 1978 Land Occupancy Survey found that about two thirds of those producing cereal crops in Bangladesh used chemical fertilizers. Specially, the results showed that 69% of wheat growers, and 68% of the Boro, 62% of Aus, and 61% of Aman rice producers applied fertilizers (Wennergren, 1983). Among jute producers, 56% used chemical fertilizers. Among the rice crops application of fertilizer for Boro is much more than that of Aus and Aman.

The view that Bangladesh's fertilizer consumption is among the World's lowest is somewhat misleading. While Bangladesh's fertilizer consumption per hectare is considerably lower than that in many developed countries, it is higher than average consumption of a large number of developing countries. On the basis of 1981-82 fertilizer consumption per hectare of arable land and under permanent crops, Bangladesh ranks 42 nd. among the 113 developing countries for which data were readily available (IFRI / BIDS, 1987). Again, among the 34 developing countries of Asia, Bangladesh ranks 15 th. Among countries in South and Southeast Asia, Bangladesh's fertilizer consumption per hectare is lower than that of Singapore, Malaysia, Sri Lanka, Indonesia and Pakistan. But it is higher than Nepal, Burma, Thailand , the Philippines, and a few others

At the initial stage of fertilizer introduction, it was heavily subsidized and the subsidy has gradually reduced. In 1968-69 average rate of subsidy was 58% for the two major types of fertilizers, Urea and TSP. Even as late as in 1975-76, the budgetary rate of subsidy for Urea was 52%, but it fell to mere 11% in 1983/84 (Osmani & Quasem, 1990). Reduction of subsidy has also taken place for other types of fertilizers, although to a somewhat lesser extent. On the average, the overall rate of subsidy on all kinds of fertilizers has dropped 57% in 1975-76 to 25% in 1983-84. However, due to rapid increase in fertilizer use, the absolute amount of subsidy has increased over time. For example, although the rate of subsidy has become down drastically, total amount of budgetary subsidy has risen from Tk. 854 mi. in 1975/76 to Tk. 1426 mil. in 1984/85 (Osmani & Quasem, 1990). At present there is no subsidy on fertilizer.

Irrigation - Until about the late 1950's, irrigation in Bangladesh was basically through traditional methods that is; use of swing baskets, doons and small gravity irrigation system. Through these traditional methods, an estimated amount of about 1.7 illion acres (0 69 mil. hectares) were irrigated in 1961 (David, 1994). Realizing the importance of dry season irrigation for producing a rice crop that is free from flood hazards, the Department of Agriculture (now MOA) introduced Low Lift Pumps (LLPs) for irrigating haor (depressed) areas in the late 1950s. Early in 1960s, the BADC's responsibilities in the irrigation subsector were for the supply, installation, operation, repair and maintenance of LLPs only. In 1968, these activities were expanded to include Deep Tubewells (DTWs), and from 1971, Shallow Tubewells (STWs) as well.

During the 1962 to 1974 period, several large scale major irrigation projects were completed. These included the first phase of the Ganges Kobadak (G-K), Dhaka-Narayangonj-Demra (DND) and Chandpur Irrigation Projects. These three projects had a total service area of about 250,000 acres (David, 1994).

The promotion of ground water development started late, beginning in 1967-68. The BWDB pioneered the installation of DTWs in the Northwest region of the country. With financial assistance from West Germany, the BWDB drilled 365 DTWs in Thakurgaon during the period from 1962 to 1966. On the other hand, BADC starting with installation of 105 DTWs in the Comilla area in 1966 and 1967, it had drilled 1069 DTWs by 1971 (David, 1994). Initially the DTWs were rented to farmers' cooperatives. Beginning in 1978-79, the government started selling DTWs to groups and private individuals at a subsidy of about 70-80 per cent. On the other hand, up to 1979-80, LLPs were available only on rental basis. In 1980-81, the BADC started selling LLPs.

During the period 1975-82, there was a steady increase in DTW population as the government with the financial assistance from the donor community, tried to promote DTWs on efficiency and equity grounds. However, expansion of irrigated area through installation of DTWs has been almost stagnated due to recent government policy of selling of DTWs without subsidy (at a cost of Tk. 7,00,000). After years of being heavily subsidized and mostly owned and provided inputs and services by the public sector, DTWs in Bangladesh are now very much out on their own. The subsidies and services have been dropped and many of those units which had been installed in areas ideal for STWs have found themselves out-competed for command area by the rapid recent development of the smaller, more flexible technology (Jaim, et. al., 1995). There were 34,000 DTWs in 1992-93 of which 8,286 (24%) were out of operation for various technical, economic and social problems (Jaim, 1993).

Rapid expansion of irrigated area began in mid - 1970s with the promotion of STWs. From the beginning, these were sold to the farmers almost at full cost, but most of the purchases were financed by loans from the Bangladesh Krishi Bank (BKB), a large portion of which were not repaid. The rapid increase in the STW command area (C.A.) in the early 1980's was due mainly to the privatization of the trade in irrigation equipment and the government financial assistance to private importers and distributors of STW units. The decline in the sale of STW in 1985-86 was primarily due to government ban on the import of small diesel engines in its import policy of 1985-86. In addition to this there was restriction on the siting of STWs under the Ground water Management Ordinance and Rules of 1985 and the limitation of trade in diesel engine by the private sector to a few so-called standardized brands. In 1988-89, the government withdrew the tubewell siting restrictions, removed all import duties on small diesel engines and abolished its standardization requirement. As a result, the STW irrigation command area nearly doubled during the six-year period from 1986-87 through 1991-92 (David, 1994).

The history of post independence (after 1971) minor irrigation development was divided into the following four phases according to the draft report of the *Fourth Five Year Plan of Bangladesh* (1990) :

- In the first phase, until 1979, public sector LLPs and then DTWs provided most of the increase in irrigated area.
- In the second phase, from 1979 to 1984, there was a liberalized expansion of minor irrigation with STW in the private sector.
- In the third phase, from 1984 to 1987 the rate of minor irrigation development standardization of engine brands, imposing spacing restrictions for tubewell
- The fourth phase began in 1987 with removal of the import ban on diesel engines new policies to remove duties and standardization restrictions on imports of small diesel engines encouraged further rapid expansion of private sales of

As a result of the above policy changes, sale of STW increased from 159,000 in 1987 to 349,000 in 1993 and the area irrigated by STW in 1993 was 1.4 million hectares (Mandal and Parker, 1995). In 1993, STW alone covered a little more than half (52%) of the total irrigated area of Bangladesh (Table - 4.2). Number of LLPs in 1993 rose up to 52,000 covering an area of 496,000 hectares while the number of DTW was about 26,000 covering an area of 437 thousand hectares (Table - 4.3). By 1993 DTW, STW and LLP covered 2.3 million hectares which was 26% of the nation's net cropped area, 34% of potential irrigable land and 82% of actual irrigated land (Mandal and Parker, 1995). Growth of irrigated area and irrigation equipment population over the years are presented in Tables 4.2 and 4.3 respectively.

Table-4.2 Number of Minor Irrigation Equipment Operated and Total Area Irrigated in Bangladesh : 1992-93

Irrigation Technology	No. of Equipment Operated	Area Irrigated (ha.)	% of Total Area Irrigated by Minor Irrigation
STW	338,281	1,349,839	50.5
DSSTW	10,594	42,359	1.6
STW Total	348,875	1,392,198	52.1
LLP (< 1 CFS)	12,338	44,139	1.7
LLP (1 CFS)	15,429	105,961	4.0
LLP (2 CFS)	24,084	336,065	12.5
LLP (3-5 CFS)	366	9,843	0.4
LLP Total	52,217	496,008	18.6
DTW Total	25,714	436,857	16.4
Treadle Pump	114,421	19,448	0.70
Rower Pump	8,307	975	0.04
Hand Tubewell	11,990	1,990	0.07
Total MOP	134,718	22,413	0.08
Artesian / Traditional	713,660	323,034	12.1
Total Minor Irrigation	1,275,184	2,670,510	100.0 (of minor irrigation)
In addition			% of all irrigated area
Canal Irrigation		172,805	6.0
National Total		2,843,315	100.0

Source : Mandal and Parker (1995), P. 22.

Note : DSSTW = Deep-set STW

MOP = Manually Operated Pump

Table-4.3 Irrigated Areas in Thousand Acres and Annual Growth Rates in Irrigated Area in Percent, 1981-82 to 1990-91

Irrigation Mode	1981 -82	1982 -83	1983 -84	1984 -85	1985 -86	1986 -87	1987 -88	1988 -89	1989 -90	1990 -91
Irrigated Area (000 acres)										
Ground Wells										
a) STW						1288	2146	2222	2582	2794
b) DTW						1051	1370	1407	1467	1521
c) HTW						87	108	105	91	89
Sub-total	670	1018	1648	2171	2379	2426	3624	3734	4140	4404
SurfaceWater Schemes										
a) LLP	1740	1845	1647	1681	1504	1630	1303	1625	1624	1667
b) Traditional	1379	1508	1112	904	895	994	589	985	1055	980
c) Canal	403	396	331	364	403	384	285	419	436	427
Sub-total	3522	3549	3090	2949	2802	3008	2177	3029	3115	307
TOTAL	4192	4567	4737	5120	5181	5434	5801	6763	7255	7428
Annual growth rate of irrigated area, %										
a) Ground Water wells		51.9	61.9	31.7	9.5	2.0	49.4	3.0	10.9	6.4
b) Surface Water schemes		0.8	-12.9	- 4.6	-5.0	7.1	-27.4	39.1	2.8	-1.3
c) Total irrigation area		8.9	3.7	8.1	1.2	4.9	6.8	16.6	7.3	3.1

Compound growth rate of total irrigated area : 6.6%

Source: David (1994), P. 14.

Table-4.4 Irrigation Equipment Population from 1982-83 to 1992-93

(in hundred thousand)

Year	STW	DTW	LLP	Manual TWs
1982/83	93.1	13.8	35.5	
1983/84	120.3	15.5	36.0	
1984/85	147.0	16.9	37.0	
1985/86	147.0	16.9	37.5	
1986/87	160.3	18.7	40.6	
1987/88	188.7	20.3	42.3	
1988/89	235.9	22.4	50.8	
1989/90	260.0	22.6	51.0	
1990/91	270.3	21.5	51.6	108.1
1991/92	309.3	25.5	50.3	
1992/93	348.9	25.7	52.1	134.7

Source : David (1994), P. 15.

Pesticides - Of the four major improved inputs of significance to agricultural development in Bangladesh, farm chemicals have received the least attention from Bangladesh Government programs, despite the fact that insects, diseases, and pests (birds and rats) can cause extensive crop damage. Use of pesticides, herbicides, and similar farm chemicals is not widespread in the sector and, with few exceptions, is not incorporated into the production sequence as a regular management practice. Applications most often are made when infestations become significant and are well advanced. Levels of chemicals applied are often less than recommended for effective control (Wennergren, 1983).

In Bangladesh the use of pesticides started in 1957 with the importation and free distribution of 3 tons of DDT and BHC by the newly established Plant Protection Department (Islam, 1990). It increased up to about 11,000 tons in 1973. But with the imposition of Government embargo on free distribution and 50% selling price on pesticides, their use dropped down to only 2000 tons in 1974. The pesticides are being sold at regular price from 1979. But the quantity of insecticide use has remained almost static at 3000 - 3500 tons per year from 1976 (Table-4.5). It is, therefore, obvious that the volume of insecticide use in Bangladesh is very limited.

For the most part, pesticides are used in rice production. Some limited usage is found for wheat and mustard. In most cases, the use of pesticides is on HYV varieties. In 1979, a Ministry of Agriculture Survey found that 93% of the growers treated Boro HYV rice, while 48% and 47% of Aus and Aman producers, respectively, applied pesticides. Local rice varieties were treated by about 15% of the producers for Aus and Aman. Only 13% of the wheat producers used pesticides (Wennergren, 1983). Aside from rice, pesticide is most regularly used in tobacco and tea crops Quality control is more demanding for these crops, particularly for that portion of production entering export

markets. In recent years, increased pesticide use has been noted in mustard production. Some limited use also is found among potato producers using HYVs (Wennergren, 1983).

Table-4.5 Distribution of Pesticides in Bangladesh from 1971 to 1985

(Metric tons)

Year	Total Use
1971	2391
1972	3747
1973	10445
1974	3634
1975	4942
1977	3161
1978	2696
1979	1513
1980	2106
1981	2297
1982	1829
1983	2547
1984	2954
1985	3041

Sources : Islam (1990), P.121 and Navin, Jr. (1988), P. 69.

With the expansion of irrigation facilities and gradual increase in the area under continuous rice-croppings, the insecticide use has been greatly increased in the irrigated rice fields. Many of these irrigated uplands some way or other get linked-up with adjacent ponds, canals and marshy lands that are wide spread in the country. However, no data is available on the quantum of pollution that has been caused to our environment by the insecticide alone or in combination with other pollutants. There are, however, circumstantial evidences which indicate that the use of insecticides has reduced the natural population of fish, bird, pollinators, etc. (Islam, 1990).

Agricultural Credit Distribution

Institutional Credit for Agricultural Development

Institutional credit in Bangladesh hardly meets 20% of the credit needs of the farmers. The Bangladesh Bank exercises control over the agricultural credit system as the nation s central bank. Agricultural credit programs are administered and implemented by a set of subsidiaries including the Bangladesh Krishi Bank (BKB); the Nationalized Commercial Banks (NCBs); the Bangladesh Samabaya Bank Limited (BSBL); plus

affiliated cooperatives. Additionally, the BRDB cooperatives which operate independently are refinanced by the Sonali Bank

The first institutional credit which is known as *Taccavi* loan started operating as early as 1885, authorized by the Agricultural Loan Act of 1885. These loans are basically distress loan and were looked upon by the borrowers as relief payments not to be repaid. In 1904 the British began to introduce village level credit cooperatives aimed at substituting informal lenders. By 1947 there were 26,664 rural credit cooperatives in the country which provided almost all the formal financial services in rural areas until the late 1950's. The depression of 1930, the World War II and partition of India in 1947 affected the performance of the credit system. This disrupted the normal activities of the financial markets thereby making the repayment problem severe (Ahmed, 1983).

The need for full fledged credit delivery system with micro-level units came to be recognized soon afterwards. In 1948 a 3 tier cooperative system was organized which came to be known as East Pakistan Provincial Cooperative Bank (EPPCB). This system consisted of (a) an apex Bank at the national level presently known as BSBL, (b) 62 Central Cooperative Banks at the Thana level and (c) 4000 Union Cooperative Multi-purpose Societies (UCMPS) at the Union level. Membership in these institutions up to 1983 is reportedly associated with 30,000 village type primary cooperatives throughout Bangladesh (Wennergren, 1983). The activities of this system tried to reach the village level through the farmers cooperative known as Krishi Samabaya Samity (KSS) which extended its services to farmers, fishermen and other rural producers.

During Pakistan period, the institutional rural credit market was further supplemented by the formation of Agricultural Development Finance Corporation in 1957 and the Agricultural Bank of Pakistan, which later on merged to form the Agricultural Development Bank. Later, in 1973, a new bank known as Bangladesh Krishi Bank (BKB) emerged out of the Agricultural Development Bank of Pakistan (Ahmed, 1983).

During Pakistan period, like budget allocation, disparity in agricultural credit distribution existed between East and West Pakistan. As for the period between 1960-61 to 1967-68, the average per capita disbursement in West Pakistan was 432% higher than that in East Pakistan (Ali, 1990). A comparative view of per capita disbursement of agricultural credit from FY 1961 to FY 1968 in East and West Pakistan is presented in Table-4.6. It can be seen from the Table that per capita disbursement of agricultural credit during 1961 to 1968 ranged between Rs. 382 to 1300 in East Pakistan while in West Pakistan the corresponding range was between Rs. 2017 to 5817.

Table-4.6 Per Capita Disbursement of Agricultural Credit from FY 1961 to FY 1968 in East and West Pakistan

(In Rupees)

Fiscal Year (FY)	Per capita amount disbursed in East Pakistan	Per capita amount disbursed in West Pakistan
1961	382.20	2017.35
1962	422.60	2774.80
1963	416.25	3089.20
1964	477.02	3347.67
1965	545.74	5816.86
1966	769.65	5209.73
1967	940 33	2077.75
1968	1300.16	4115.41
Average	**604.40**	**3217.20**

Source : Ali (1990), Annex-iv.

Contribution of agriculture to GDP and employment has not been reflected in allocation of credit for agricultural production even in Bangladesh period. Share of agricultural credit to bank credit was only 10% in 1980-81 which reached to a maximum of 15% in 1983-84 and then gradually declined to less than 5% in 1987-88 (Table -4.8).

Table-4.7 Share of Agricultural Credit to Total Bank Credit since 1980-81 to 1989-90

(Tk. in crore)

Year	Total Bank Credit Disbursed	Total Agriculture Credit Disbursed	% of Agriculture Credit to Total Bank Credit
1980/81	3599.58	352.28	9.78
1981/82	4473.66	423.84	9.40
1982/83	5209.97	676.41	12.90
1983/84	6673.73	1007.12	15.00
1984/85	8984.80	1149.84	13.55
1985/86	10763.40	631.72	5.87
1986/87	11723.70	667.28	5.69
1987/88	13838.00	656.31	4.74

Source : Jaim (1990), P. 192.

Again, simply from monetary figures it seems that supply of agricultural credit has increased to a large extent. However, the supply of credit in real terms is not so much. For example, since liberation, maximum institutional agricultural credit was supplied in 1984-85 (Tk. 1149.84 crore) and the amount was about 38 times higher compared to that of 1973-74. But in real terms (at 1972-73 price), the increase was only 10 times (Jaim, 1990).

Again, in real terms, supply of agricultural credit during the periods from 1985-86 to 1987-88 was less than that supplied in 1977-78. Therefore, share of agricultural credit of the total bank credit which is already low has further declined in recent years and on the other hand, amount of agricultural credit in real terms has also been decreased (Table-4 8).

Table - 4.8 Disbursement of Agricultural Credit in Bangladesh in Real Terms from 1973 - 74 to 1988 - 89 (at 1972 - 73 constant price)

(Tk. in crore)

Year	Agricultural credit disbursed in monetary terms	Index Number (Base Year 1973/74)	Disbursement in real terms
1973/74	30.70	100	21.77
1974/75	37 70	123	15.71
1975/76	46 10	150	25.21
1976/77	86.40	281	48.84
1977/78	156 90	511	107.59
1978/79	170.73	556	65 41
1979/80	268.39	874	137.85
1980/81	252.28	822	168.19
1981/82	412.81	1345	178.13
1982/83	670.76	2185	212.26
1983/84	1007.12	3281	208.33
1984/85	1149.84	3745	222.84
1985/86	564.62	1839	86.61
1986/87	667.28	2174	88.54
1987/88	656.31	2138	77.21
1988/89	807.62	2631	n.c.

Note: n.c. = not calculated due to lack of information on national deflecting factor for the year 1988/89.

Source : Jaim (1990), P. 193.

Low disbursement of agricultural credit in recent years (Table- 4.8) is not due to low demand for institutional credit, rather due to variety of other reasons as identified by Jaim and Rahman (1993) as follows :

(i) Government's program to disburse credit is imposed on credit institutions which sometimes goes beyond their capacity in relation to their manpower.

(ii) The over disbursement program within a specific time in relation to manpower also leads to disbursement of credit to wrong persons for which many bank officials were charged later on. This has created a psychological inhibition among rural bank managers against prompt disbursement of credit.

(iii) Slow disbursement of agricultural credit may be the effect of cumbersome and time consuming administrative procedures.

(iv) Pressure of donor agencies to the Bangladesh Government to recover huge amount of outstanding credit has also affected disbursement of agricultural credit.

(v) Sometimes, institutional credit becomes expensive to the farmers when they have to pay 10-30% of the loan amount to the bank officials to get loan.

Table 4.9 shows disbursement and recovery of agricultural credit from 1980-81 to 1993-94. It shows that although the volume of agricultural credit has increased substantially over the years, the percentage of loan recovered decreased gradually particularly after the introduction of Special Agricultural Credit Program in 1977. It may be mentioned here that agricultural credit operations are carried out under two separate : Normal Program (NP), in which all credit agencies are involved and Special Agricultural Credit Program (SACP), in which only BKB and NCBs are involved. The Table 4.9 shows that the recovery percentage of agricultural credit in Bangladesh has dropped from 49% in 1980-81 to only 15% in 1990-91 and then slightly increased to 19% in 1993-94. Despite the very low recovery situation, agricultural credit disbursement in recent years has again shown an increasing trend.

Several factors are responsible for the poor recovery of agricultural credit. The factors as identified by Jaim and Rahman (1993) are : (i) negative attitudes of the local elites to repay loan; (ii) damage of crops due to flood; (iii) unproductive use of loan by the farmers; (iv) shortage of credit personnel to evaluate credit worthiness of the borrowers, identification of the real borrowers, and supervision and recovery of loan; (v) lack of legal action by the banks against defaulters; (vi) corruption of some bank employees (bribes, etc); (vii) inability of the farmers to repay loan; (viii) Government policy to forgive loans on political ground; (ix) accessibility to alternative credit institutions in the case of default of loan; etc.

Table-4.9 Disbursement and Recovery Rate of Agricultural Credit in Bangladesh from 1980-81 to 1993-94

(Tk. in million)

Year	Disburse-ment	Amount due for recovery	Amount recovered	Arrears	Overdue	Recovery over amount due
1980/81	3734	4524	2214	5785	2349	49%
1981/82	4238	6483	3143	8399	3243	48%
1982/83	6786	8173	4423	13515	4566	42%
1983/84	10053	12402	5176	20771	7557	42%
1984/85	11498	15150	5839	30342	11589	39%
1985/86	6317	23752	6072	35143	17788	26%
1986/87	6673	26835	11076	32944	15760	41%
1987/88	6563	25282	5960	83635	19324	24%
1988/89	8076	21177	5780	47117	23557	27%
1989/90	6868	39863	7019	53813	39863	18%
1990/91	5956	41282	6253	57035	39338	15%
1991/92	7946	41702	6621	53696	35723	16%
1992-93	8419	47199	8692	55675	38544	18%
1993/94	11007	51419	9791	51419	42037	19%

Source : Larson and Ali (1995), P. 273.

CHAPTER - V

PUBLIC AND PRIVATE SECTORS IN AGRICULTURAL MARKETING

The General Marketing System

In Bangladesh, the marketing system comprises of basically three types : (i) Primary or village markets, (ii) Secondary or town market and (iii) Terminal markets. Primary markets are the principal center of exchange for agricultural commodities in rural areas. Primary village markets are held on regular days. There are an estimated 6500 primary markets and additional 2000 smaller village markets called 'hats' which conduct small scale trading (Wennergren, 1983). Secondary markets serve as wholesale outlets which operate as assembly centers for production regions and as distribution points in the consuming areas. Some 450 such markets are highly specialized and serve as the major contact point between rural and urban markets. Terminal markets collect and assemble products from both secondary and primary sources which are subsequently redistributed to urban outlets. In some cases, terminal markets also facilitate handling and distribution in the export market (Wennergren, 1983).

Agricultural Marketing Policy of the Government

The basic agricultural marketing policy of the Government of Bangladesh has been seeking to promote free play of the market forces in determining the prices, remove controls and regulations, and encourage larger participation of the private sector and provide reasonable facilities for its proper performance in recent years (Majiruddin, 1991). With private sector, the government operates public sector agencies with the following policies and objectives as stated by Majiruddin (1991) :

i) operating price support measures in respect of selected crops to ensure fair returns to the farmers to sustain the tempo of increased production;

ii) maintaining security food reserve and buffer stock of foodgrains / fertilizers to stabilize the price;

iii) operating Public Sector Food Distribution System (PFDS) to maintain the foodgrain prices within the reach of the common man;

iv) operating relief and social welfare measures for generation of income and alleviation of poverty;

v) providing market infrastructures like market, transportation, communication, storage and processing facilities;

vi) improving bargaining power of the growers through provision of credit and warehousing, promotion of cooperatives, provision of market information, regulation of malpractices, etc. and

vii) adopting appropriate tariff and fiscal measures to ensure markets for the local crops and promote export of the surplus crops.

Operation of the market forces is thus subject to government interventions through the above policies and programs. In Bangladesh there are in all 38 government departments and agencies engaged in some kind of marketing functions in respect of agricultural inputs and output including forest, fisheries and livestock products (Majiruddin ,1991).

Marketing System of Major Crops

Paddy / Rice - Despite the fact that a large portion of total rice availability is consumed directly on farms, an estimated 20% of local production plus all imports enter the market system (Wennergren, 1983) and about 1% is sold to the government procurement centers (Majiruddin, 1991). Including rice and wheat about 2% of the total production is internally procured as can be seen in Table-5.1.

The current foodgrain distribution system had its origin in 1943 as an aftermath of the extensive famine which was worsened by the British war strategy in India. Following the famine, the British (and later Pakistan) intervened on a large scale to rearrange the food distribution system. With these initiatives, governmental control of foodgrain prices, movement, procurement, and consumer rationing were established. Since that period, the government has assumed the role of custodian for foodgrains with a special concern for the urban populace (Wennergren, 1983).

Table-5.1 Internal Procurement of Paddy/Rice and Wheat by Government during 3 Years : 1983-84 to 1985-86

during 3 years ; Crop	Average annual production ('000' tons)	Average annual procurement ('000' tons)	Procurement as % of total production
Rice*	14774	170	1.15
Wheat	1239	155	12.51
Total	16013	325	2.03

*Production and procurement are in clean rice.
Source : Majiruddin (1991), P.169.

The PFDS which was introduced in Bengal in 1943 had the sole objective of guaranteeing a minimum quantity of foodgrains at controlled prices to urban consumers. Similarly, while urban consumers remained the main objective, the PFDS tried to address itself to the rural poor, financing infrastructural development and stabilizing foodgrain prices. The institutional arrangement or distribution channels through which food is distributed to the public broadly fall into two groups : monetized channel and non-

monetized channel. The monetized channels consist of Statutory Rationing, Modified Rationing, Essential Priorities, Other Priorities, Large Employers, Flour Mills, Open Market Sales, Marketing Operation and Free Sale. There are five non-monitized channels - Food for Work, Vulnerable Group Development, Canal Digging, Gratuitous Relief and Test Relief. The monetized channels are managed by the Ministry of Food, while the non-monetized channels are under the control of the Ministry of Relief and Rehabilitation (Ghafur, 1990).

Distribution through PFDS averaged around 2.02 million metric tons over 1980-85, compared to 1.83 m. tons in 1970-75 and 1975-80. The figure reached all-time high of 2.56 m. tons in 1984 - a period witnessing severe floods. In 1986-87, the total amount distributed was 2.12 m. tons, which can be considered 'normal' by recent standards (Murshid, 1992).

To stabilize market prices, one of the most powerful tools in the hands of the government is open market operations. Under 'normal' conditions these operations tend to be small. Over the 1980-85 period this formed about 6% of total PFDS off takes (Murshid, 1992). Even in 1984-85, distribution under open market sales was 8.2% of total off take.

Food Department (FD) which operates PFDS purchases paddy / rice / wheat in permanent and temporary procurement centers numbering about 800 set up all over the country at the price fixed by the government in each season. The procurement price established by the government serve as a minimum, guaranteed 'floor' price to local producers. The government however, still continue to announce procurement prices only before the procurement season, and not before planting season. The earlier practice of procuring from the farmers had been replaced by millgate contracting that involved purchase from the millers. This was however abolished in 1992 because of alleged failure of the system to benefit the farmers, and on account of the huge budgetary losses involved. Procurement through open tendering and directly from farmers was introduced (Zahir, 1995).

Foodgrains are stored in the local and central depots and distributed through different channels to different clients. Total storage facilities with FD are estimated at about 2 million tons up to Thana level (Majiruddin, 1991). The supplies acquired by the government are used primarily to ration card holders at subsidized prices. Distribution of government foodgrains to consumers is effected not through FD retail establishments but through appointed ration shops / retail outlets which are owned, financed and operated by the private sector. More recently, however, these supplies have also been used to support 'open market sales' of foodgrains as a means of reducing the level of market retail prices.

A major policy decision with regard to PFDS was the suspension of "Polli Rationing" (Rural Rationing - RR) in December 1991, following reports of leakages at rates between 70% and 100%. Yet RR provided the outlet for half of all government rice stocks;

the final abolition of RR in April 1992 is considered to be an important factor behind the government's inability to engage in regular procurement during 1992 (Zohir,1995).

Jute - The marketing system for jute is a combination of central government and private sector investment. The annual production is marketed through the general system - from village markets to 'Kutcha' bailing centers or secondary markets to its final destination. For the portion exported, the fiber are 'Pucca' bailed and dispatched through the terminal export market.

At the time of independence, the jute export trade was nationalized. Bangladesh Jute Mills Corporation (BJMC) had a monopoly in domestic procurement and a monopoly in jute manufacture; Jute Marketing Corporation (JMC) and Jute Trading Corporation (JTC) were the main buyers of raw jute. Subsequently, the government released its total monopoly, and today (since 1976) private sector shippers are allowed to export jute in their own name and with individual company marks and brands. The BJEC also engages in export on behalf of the Government of Bangladesh. However, all private exporters are licensed by the Bangladesh Government. Now almost all raw jute exports and about half the export of jute goods are handled in the private sector (Majiruddin,1991).

The jute market system appears to operate in a competitive way. Statuary Minimum Price of jute fixed under the Jute Act from sixties was suspended from 1980-81. Prices are freely determined and entry by market functionaries at any level appears to be reasonably free. The direct intervention of government in establishing 'floor price' is rendered ineffective as a price support mechanism by the lack of adequate funds to engage in significant open market operations. As a result, price declines can not be checked and jute producers are left with essentially no guarantees (Wennergren, 1983).

Sugarcane - Governmental intervention into sugarcane marketing virtually controls the entire production / marketing sequence. Prices are announced annually by the Bangladesh Sugar and Food Industries Corporation (BSFIC) which serves as the Bangladesh Government central control authority for sugar production and development. The government fixes the procurement price of sugarcane to be supplied to sugar mills which are in the public sector. The mills supply inputs to their contract growers on credit which is realized from the price of the cane supplied to the mills. The government imposes restriction on the alternative use of cane in mill zones for making molasses to ensure supply of cane to the mills. All refined sugar is marketed by the Bangladesh Sugar Mill Corporation. Imports of sugar are permitted with governmental approval to fill domestic shortfalls.

The processing mills are not modern. The newest plant at Faridpur began operating in 1977. Six other plants came into production between 1966-71. The rest are pre 1959 vintage, three of which began producing in the 1930s. The outdated factories and low

sugarextraction rates are the major factors accounting for unusually high production cost (Wennergren, 1983).

The most important cost factor, however, is the high price guaranteed to producers which often leads to prices as much as three times above the world price (Wennergren, 1983). Grower response has been significant and Bangladesh has reached a level of domestic sugar production which approaches self-sufficiency. However, it leads to a critical misallocation of resources where the price is fixed so far above the world price. The resource cost of sugar to Bangladesh would be much less if sugar were imported. In fact, net benefits might result if sugar were imported and the released land utilized for rice and other food crops (Wennergren, 1983).

Tobacco - Tobacco production and marketing have a minimum of Bangladesh Government intervention. Minimum grower / processor prices are fixed by the Bangladesh Government, but prices are free to respond to supply and demand above the minimum level, and payments to growers occasionally exceed the minimum price, particularly for quality production. Prices paid to growers do not normally exceed world price The Bangladesh Government does not engage in tobacco procurement to maintain prices in good production years.

The processing segment of tobacco industry is composed of 17 factories, 16 of which are privately owned. The other, the Bangladesh Tobacco Company (BTC), the largest of the group, is jointly held by the Bangladesh Government and British Tobacco Company. The BTC utilizes forward contracting arrangements whereby growers are registered with the company and produce only for BTC. The growers are given guaranteed markets, extension assistance, and fertilizer and seeds on credit against the upcoming crop. No price guarantees are made except the minimum levels announced by the Bangladesh Government (Wennergren, 1983).

Cotton - The Government also fixes the procurement prices of locally produced American upland seed cotton in order to promote local production to reduce import. Public sector agencies, namely, Cotton Development Board and Bangladesh Textile Mills Corporation as well as private mills procure the seed cotton. Enforcement of the prices primarily depends on the world price and the policy support by government for promoting the use of local cotton (Majiruddin, 1991).

Other Agricultural Products - All other agricultural commodities are free of Bangladesh Government intervention. Among the important crops for local consumption are potato, pulses, spices, fruits and vegetables. No special government price or marketing - assisted programs are in place, although the Bangladesh Government has encouraged investment in cold storage by the private sector through credit programs. Much of this capacity has been used for potatoes. Tea is the other relatively important crop. Despite the fact that sales occur in both domestic and international markets, tea sales and prices are

market - determined. Tea is the only crop sold through a cooperative auction located in Chittagong. Both export and domestic traders obtain their supplies competitively through this channel (Wennergren, 1983)

CHAPTER - VI

SOME REMARKABLE DEVELOPMENT PERFORMANCE

Foodgrain Production

The crop sector, which accounts for about 70% of the agricultural value added, achieved a growth rate of about 2.5% per annum during the 1973-87 period. However, the progress has been entirely due to cereal crops, more particularly to wheat and irrigated Boro rice. Table - 6.1 presents production of foodgrain in Bangladesh from 1961 to 1991. The Table clearly shows that the production of foodgrain in Bangladesh has been doubled during 30 years time since 1961. Due to higher production in foodgrain, its import has also reduced (Table -6.2) although it varies from year to year mainly due to weather factor However, although production has substantially increased, per capita availability has not improved much (Table - 6.2) because population has also increased at the same time.

The production of cereals increased at about 2.8% per annum during the 1973-87 period, due to 6% per annum growth in Boro rice and 20% in wheat (Hossain, 1989). In recent years, the production of wheat has begun to stagnate. For example, during 1979-80 to 1989-90, the annual growth rate of wheat production was only 0.19% as against 26.47% during the period of 1973-74 to 1983-84 (Mahmud, 1993). Growth in overall rice yield is almost entirely explained by the shift of area from local rice to HYVs. There has been in fact a significant decline in the yield rates of rainfed (Aus and Aman) HYVs, particularly in the earlier period. Some improvements in the yields seem to taken place only in the case of local Aus and transplant Aman rice in the eighties (Mahmud, 1993).

Table-6.1 Production of Food grains in Bangladesh from 1961 to 1991

(in '000 metric tons)

Fiscal Year	All Rice	Wheat	All Grains
1961	9672	33	9704
1962	9617	40	9657
1963	8870	45	8915
1964	10624	35	10659
1965	10500	35	10535
1966	10501	36	10537
1967	9575	59	9634
1968	11172	59	9634
1969	11344	94	11438
1970	12006	105	12111
1971	11143	112	11255
1972	9931	115	10046
1973	10089	91	10181
1974	11909	111	12020
1975	11287	117	11404
1976	12763	219	12981
1977	11753	259	12012
1978	12963	355	13324
1979	12849	494	13563
1980	12740	823	13563
1981	13882	1092	14598
1982	13630	967	14598
1983	14216	1095	15311
1984	14508	1211	15311
1985	14623	1464	16087
1986	15037	1042	16079
1987	15406	1091	16497
1988	15544	1384	19928
1989	17856	1463	19319
1990	17852	1480	19332
1991	18251	1420	19671

Sources : Navin, Jr. & khalil (1988) and BBS (1994).

Table-6.2 Per Capita Availability and Net Production of Foodgrains

Year	Rice prod. ('000 tons)	Net food grain prod. (kg/ca)	Availa-bility (kg/ca)	Net prod. as % of availability	Import as % of availability
1980/81	13882	147.9	156.8	94.4	7.7
1981/82	13631	145.3	166.7	87.2	7.6
1982/83	14215	145.7	163.0	89.4	12.2
1983/84	14508	147.9	162.8	90.8	13.3
1984/85	14622	147.0	161.2	91.2	16.6
1985/86	15041	150.3	170.2	88.3	7.1
1986/87	15456	147.3	161.3	91.3	10.9
1987/88	15661	145.8	152.9	95.4	18.5
1988/89	15794	143.4	165.5	86.6	12.2
1989/90	17462	157.3	172.2	91.3	8.2
1990/91	17852	152.8	167.6	91.2	6.7
1991/92	18252	154.1	164.8	93.5	8.4
1992/93	18495	151.9	159.7	95.1	4.5

Source : Zohir (1995) P.105.

Within rice crops, the increase in area under HYV *Boro* rice has been accompanied by an almost equal decline in the area under local *Aus* and broadcast *Aman* rice (taken together). This is mostly explained by the fact that the growing seasons of the latter two crops partly overlap with that of *Boro* rice.

Increased adoption of modern varieties of rice and expansion in the *Boro* (dry season rice) area raised total rice productivity in Bangladesh from a mere 0.50 metric tons of rice per acre in 1978-79 to 0.72 metric tons per acre in 1991-92 (Zohir, 1995). It may also be noted that Bangladesh's rice yield growth during the 1980s is quite satisfactory by international standard. During the eight years, from 1981-88, Bangladesh's rice yield trend growth rates have been close to China's and higher than in several important rice-producing Asian countries, like Indonesia, South Korea and Philippines (Table- 6.3).

Table-6.3 Comparative Growth Rates for Rice Yield of Bangladesh and Other Asian Countries during 1972 to 1988

(% per year)

Period	Bangla desh	China	India	Korea Rep.	Myan mar	Pakis tan	Phili ppines	Sri Lanka	Thai land	Viet nam	Indo nesia
1972/ 1988	2.12	3.58	2.41	1.42	4.47	0.48	3.61	3.43	0.87	2.36	3.69
1972/ 1980	2.04	3.04	1.81	3.21	5.65	0.86	4.68	3.06	-0.15	-0.91	3.40
1981/ 1988	2.47	2.55	3.29	1.39	0.18	-0.68	2.01	1.53	1.05	3.60	2.38

Source : Chowdhury (1994), P.33.

Much of the growth in foodgrain has been due to increased adoption of HYV in all three rice crops (Table - 6.4). Such adoption was facilitated by expansion of the area under mechanized irrigation and provision of chemical fertilizer at reasonable prices. One can hardly dispute the contention that import liberalization and withdrawal of 'standardization' in the case of irrigation equipment had a positive impact on the area under irrigation (Zohir, 1995).

Table-6.4 Share of Modern Variety in Rice Area

Year	*Aus*	*Aman*	*Boro*
1980/81	15.6 (28.5)	15.9 (55.4)	64.4 (10.6)
1986/87	18.7 (26.2)	20.6 (54.6)	79.8 (13.9)
1987/88	17.9 (25.5)	21.4 (51.2)	77.5 (17.8)
1988/89	17.9 (24.9)	27.3 (47.3)	87.4 (22.6)
1992/93	21.5 (15.8)	39.9 (53.4)	88.6 (25.0)*

Note : figures in parentheses are shares of total area under rice and the rest are,under wheat.

* Percentage of MV in total Boro area is for 1991/92.

Source : Zahir (1995), P. 108.

In the case of fertilizer, subsidies on all types of fertilizers continued up to 1991-92 (Table - 6.5). It is quite possible that low fertilizer/paddy price ratios favoured increased cultivation of fertilizer-intensive HYV rice (Zahir, 1995). With the withdrawal of subsidies (along with decline in rice prices), farm level private prices of fertilizer have increased substantially (Table - 6.6) which is again likely to have adverse effect on foodgrain production.

Table-6.5 Rates of Economic Subsidy on Fertilizer in Bangladesh

(Percentage)

Year	Urea	TSP	MP
1984/85	30.1	29.8	31.0
1985/86	29.7	27.4	26.1
1986/87	10.9	16.4	9.4
1987/88	14.6	28.1	15.3
1988/89	18.9	42.2	30.1
1989/90	28.8	39.0	36.4
1991	31.0	46.8	50.5

Source : Zahir (1995), P. 108

Table-6.6 Changes in Fertilizer Prices and Fertilizer/paddy price ratios

Year	% change in farmers' price			Fertilizer/paddy ratio		
	Urea	TSP	MP	Urea	TSP	MP
1987/88	0	3.15	-0.35	1.12	1.17	1.00
1988/89	0.03	-1.96	0.09	0.95	0.98	0.85
1989/90	-7.94	-2.95	-3.39	0 88	0.96	0.83
1990/91	4.96	5.40	-0.98	0.85	0.93	0.75
1991/92	5.71	22.86	28.51	0.81	1.03	0.87
1992/93	10.63	22.99	28.54	1.42	2.00	1.77

Surce : Zahir (1995), P.109.

Crop Diversification

Crops overwhelmingly dominate the value added in Bangladesh agriculture, with a share of more than 75% over the last decade (Abdullah, et. al., 1995). Within the crop sector, foodgrain, particularly rice, dominate both acreage and production accounting for a share of 75% and 71% respectively in the early nineties. The next in importance are pulses, jute and oilseeds, with an acreage share of around 5%, 4% and 3% respectively in recent years (Table-6.7).

Table- 6.7 Share of Different Crops in Total Acreage and Gross Value of Production (at 1984/85 constant prices) in Bangladesh

Crops	1984/85 - 1993/94		1990/91 - 1993/94	
	Acreage	Gross value of production	Acreage	Gross value of production
1. Foodgrains	78.71	72.96	79.46	73.82
Rice	74.40	70.27	75.00	71.30
Wheat	4 31	2.69	4.45	2.51
2. Non-foodgrain crops	21.29	27.04	20.54	26.18
Jute	4.52	6.88	3.95	5.80
Pulses	5.24	1.78	5.23	1.65
Oilseeds	3.65	0.72	3.36	0.62
Potato	0.83	1.67	0.94	1.73
Vegetables	1.16	1.55	1.29	1.61
Sugarcane	1.27	2.21	1.37	2.15
Fruits	1.19	4.55	1.26	4.24
Spices	1 02	3.93	1.02	4.14
Tea	0.34	0.67	0.35	0.69
Other crops	2.06	3.07	1.78	3.55
All Crops	100.00	100.00	100.00	100.00

Abdullah, et.al., (1995).

The growth in cereal production has been achieved partly at the expense of minor food crops like pulses, oilseeds, sugarcane and spices. Even, the major cash crop, jute acreage as well as production have been affected due to expansion of HYV *Boro*. Although remarkable progress in foodgrain production has been possible in recent years, except for potatoes and vegetables, the production of other non-cereal food crops increased more slowly than the population, and for pulses and spices the growth was negative (Table- 6.8). Since HYV *Boro* is more profitable than its competitive crops, it has displaced a large number of enterprises, particularly non-cereal crops. Estimates of correlation coefficients of area under HYV *Boro* and its competitive crops showed negative coefficients for a large number of minor crops including some major crops like jute and local *Aus* (Table - 6.9).

Table-6.8 Trends in Production and Productivity of Major Crops of Bangladesh : 1973-87

Crops	Area under the crop as % of total cropped land, 1986/87	Trend Rate of Growth 1973-87 (% per annum)		
		Production	Area	Yield
Rice:	78.4	2.2	0.5	1.7
(*Aus*)	(21.5)	(0.0)	(-0.8)	(0.8)
(*Aman*)	(44.7)	(1.8)	(0.5)	(1.3)
(*Boro*)	(12.2)	(5.7)	(3.7)	(2.0)
Wheat	4.3	19.7	14.5	5.2
Pulses	1.9	-1.5	-1.5	0.0
Mustard seed	1.3	1.4	-0.3	1.1
Potato	0.8	3.3	2.3	1.0
Sugarcane	1.2	0.8	1 2	-0.4
Chili	0.5	-0.9	-0 7	-0.2
Jute	5.7	1.9	0 6	1.3
Tobacco	0.4	1.8	0.5	1.3
Tea	0.3	2.9	0.4	2.5

Source : Hossain (1989), P. 55.

Table-6.9 Correlation Coefficients of Area Under HYV *Boro* and Its Competitive Crops of Bangladesh : 1973-74 to 1984-85

Areas of the crops considered	Correlation coefficient (Value of r)	t - value
HYV *Boro* and Local *Boro*	-.48	1.73
HYV *Boro* and HYV *Aus*	.54	2.04***
HYV *Boro* and Local *Aus*	-.68	2.94*
HYV *Boro* and HYV Wheat	74	3.49**
HYV *Boro* and Local Wheat	-.45	1 75
HYV *Boro* and Jute	-.35	1.22
HYV *Boro* and Pulses	- 69	3.03***
HYV *Boro* and Gram	-.84	4.88**
HYV *Boro* and *Masur*	-.17	0.55
HYV *Boro* and *Mung*	-.02	0.06
HYV *Boro* and *Motor*	-.87	5.60**
HYV *Boro* and *Mashkalai*	-.92	7.43**
HYV *Boro* and *Khesari*	-.43	1.67
HYV *Boro* and Mustard	-.18	0.59
HYV *Boro* and Winter *Til*	-.64	2.63
HYV *Boro* and Spices	-.09	0.30
HYV *Boro* and Chilies	-.31	1 03
HYV *Boro* and Onion	.65	2.77*
HYV *Boro* and Garlic	.62	3.18**
HYV *Boro* and Coriander seeds	-.01	0.03

*Significant at 5% level.

** Significant at 1% level.

*** Significant at 10% level.

Source : Yasmin and Jaim (1989), P. 56.

In spite of government special programs for crop diversification, although area for other minor crops has increased, yet rice (mostly HYV Boro) has proved to be a dominant irrigated crop even than before as can be seen in Table - 6.10. The table shows that in 1992-93, 85.7% of the total irrigated area of all minor irrigation system was under rice crop while 7.4% under wheat and only 6.9% was under other crops. The proportion of land under irrigation, particularly for rice has increased during the period from 1979-80 to 1992-93 while this has decreased for other crops (Table-6.10) although in absolute term the area for other crops has also been increased. This indicates that farmers will continue to emphasize growing rice than other crops due to various advantages of rice production as opposed to other crops including wheat (Jaim, 1995).

Table-6.10 Percentage of Irrigated Areas Planted to Major Crops in Bangladesh : 1979-80 to 1992-93

Crops	1979/80	1983/84	1986/87	1989/90	1992/93
Rice	78.9	78.2	78.0	82.0	85.7
Wheat	11.0	11.2	12.0	9.5	7.4
Other Crops	10.7	10.6	10.0	8.5	6.9

Source : David (1994).

Mahmud, et.al. (1994) stated that there is an apparent paradox as to why land under modern irrigation is almost exclusively devoted to rice cultivation even though the production of many high-value non-cereal crops under irrigated conditions is potentially much more profitable. In their opinion, the answer may lie in a combination of technical and economic factors. On the other hand, there are very high price risks associated with the marketing of most of these crops. The average annual variability of harvest prices around the estimated trend is found to be as high as 15 to 25 percent for most fruits and vegetables including potato and 20 to 40% for spices, compared to only 5 to 6% for foodgrains (Mahmud, et.al.,1994).

On the other hand, the existing irrigation and on-farm water management systems do not allow rice and non-rice crops to be planted in the same service units. Growing non-rice crops under modern irrigation would therefore often require the farmer to allocate his entire land (or most of it) to these crops - hardly a preferable option to a risk-averse farmer. The current practiced cropping patterns evidently offer little scope for crop diversification through expansion of modern irrigation. Again, there is very little scope for crop diversification in non-irrigated areas (Mahmud, et. al.,1994).

Like others, Ghafur (1990) has remarked that to achieve self-sufficiency in foodgrains, Bangladesh has developed a structure of incentives which favours foodgrains but often at the cost of other crops which are good sources of proteins, minerals and vitamins. Thus where rice/wheat competes in production with other crops, pricing (support price) and crop loan policy favour rice/wheat. Compared to foodgrains, development and dissemination of HYV seeds and provision for extension services for the non-foodgrain crops have been slow and remain inadequate. As a result, the relative profitability per acre of production of rice/wheat has continued to outstrip, as a rule of competing crops (Ghafur,1990).

Among non-cereal crops, the HYV technology is well-established only in potato cultivation. It is only recent that HYVs with very high yield potentials have become available for some vegetables and fruits like tomato, beans, watermelon and banana.

Improved technologies are also now available for pulses, mustard, jute, sugarcane, maize, sweet potato and some country vegetables. However, the technical and socio-economic constraints to the diffusion of improved technologies in the case of non-cereal crops are still little understood (Mahmud, et al., 1994).

CHAPTER - VII

VULNERABILITY AND RESILIENCE OF AGRICULTURE TO NATURAL CALAMITIES

Natural Disasters in Bangladesh

There has been fivefold increase in the frequency of disasters, from the 1960s to 1980s, with increased economic and human losses (Haque, 1992). Disasters due to natural and other causes continue to affect several countries of the Southeast Asia region, particularly Bangladesh, India and Indonesia as shown in Table - 7.1. Disaster impact in the Southeast Asia Region (SEAR) would indicate both death and economic loss. Evidence in Table -7.2 indicates that disaster propensity is greater in Bangladesh than amongst the other countries of the region.

Table-7.1 Countries with Highest Prevalence of Disasters, by Ten-year Periods, 1960-69 to 1980-89

Country	1960-1969	1970-1979	1980-89
Bangladesh	18	37	77
India	34	102	172
Indonesia	20	46	88
Myanmar	10	10	24
Nepal	7	8	19
Sri Lanka	5	8	25
Thailand	4	5	25

Source : Haque (1992), P. 28.

Table-7.2 Disaster Impact in Some Southeast Asia Region Countries : 1964-1986

Country	No. of events	Affected population	No. of deaths	Estimated loss ('000 US $)
Bangladesh	80	141,327,727	418,861	2,535,579
India	143	746,437,482	71,627	5,811,187
Indonesia	96	8,212,827	16,274	687,278
Myanmar	27	2,469,162	1,816	143,804
Nepal	19	4,913,524	2,531	266,913
Sri Lanka	25	10,847,070	1,903	220,312
Thailand	17	7,847,070	748	519,400

Source : Haque (1992), P. 29.

Some of the indicators of vulnerability due to natural calamities in Bangladesh in recent years are presented below :

- 20 percent of total land experiences annual flooding
- 50 percent of total land periodically experiences high flooding
- 46 percent of total land was covered by flood water in 1988
- 14 percent of main summer crop was lost by 1988 flood
- Almost a similar proportion of land suffers from drought in the dry season in northern part of Bangladesh
- Cyclones, though periodic, can be deadly.
- Eleven million people, living along the coast, are potential victims.During 1960 to 1991, 39 cyclones hit Bangladesh with a loss of life of more than 1,000,000. The latest one (1991) caused up to an upper estimate of 200,000 deaths plus damaged up to an estimated US $4 billion worth of property
- One million people are affected every year by riverbank erosion

Source : Rahman (1992), P. 354.

Natural Disaster in Agriculture

Flood, Cyclone and Hailstorm - In Bangladesh, flooding is very much a part of the normal cycle of the season. Each year, about 26,000 sq. km. i.e., 18% of the country is flooded. During severe floods, the affected area may exceed 52,000 sq. km. i.e., 36% of the country and nearly 60% of the net cultivable area (Task Force, 1991).

In recent years, for two consecutive years, 1987 and 1988, Bangladesh experienced exceptionally severe floods. Devastating effects of 1988 flood were enormous. It inundated more than 90,000 sq km. of land area affecting nearly half of 110 million population, with 2300 deaths. Damage to the standing monsoon rice crop was about 1.6 million tons. Many schools; houses, livestock, telecommunications, roads, railways and bridges were damaged and destroyed. Production in much of the country came to standstill. Lines of communication were disrupted for over a month. Capital stock losses were well over US $ 1 billion and GDP growth was setback severely (Task Force, 1991). Again, flood in the northern region at the end of October, 1995 caused severe damage to crops, houses, communication, etc. The loss in the northern region by this flood has been estimated more than the damages in1988 flood.

The coastal regions are subjected to damaging cyclones almost every year. A comparative study of monthly frequency of tropical cyclone for the period 1891-1960 against subsequent 14 year period (1961-74) clearly indicate that in every month, the frequency of tropical cyclone during the latter period (i.e., 1961-1970) is significantly greater than that of pre-satellite period. Records show that world's most pronounced storm surge disasters are observed in the Bay of Bengal. The impact of the cyclone of November

1970 was particularly severe. A wave up to 9 m high was produced by this cyclone and is thought to have killed over 300,000 people (Task Force, 1991). Like Cyclone, damage by the tornado is also severe. For example, tornado on 26 April 1989 affected 6 thanas of Manikgonj, Dhaka and Tangail districts and left over 100,000 people homeless, more than 10,000 people injured and 800 dead (Task Force, 1991).

Acreage and yield of various crops are strongly influenced by a number of weather factors, of which the extent, timing and variation of rainfall is the most important Flood and drought are recurrent features, often leading to large-scale damage to crops and livestock Apart from rainfall, other factors include hail-storms and cyclonic tidal waves Each of these weather factors tend to be associated with specific seasons and months (Murshid, 1987).

Almost all the districts in Bangladesh are affected by the annual phenomenon of floods, though the intensity of flooding and extent of damages varies from region to region and in a given region from year to year (Shahabuddin, 1989). It can be observed from Table -7.3 that over 16 year period from 1962 to 1977, although floods damaged crops every year, the extent of crop damage was much heavier in some years, than in others In 1970 and 1973, crop damages worsened as the areas along the coastal belt of Barisal and Patuakhali districts were hit by devastating tidal bores and cyclone. During this 16 year period, on an average, 13.18 lakh acres of cropped land, i.e. roughly 4.3% of the total cropped area in Bangladesh was damaged completely due to floods and cyclones The year to year variability of crop damages also appear to be quite high ranging from 1.68 lakh acres to 31.65 lakh acres in 1974 (Shahabuddin, 1989).

Among the crops, rice is mostly affected by natural calamities like flood, hail storm, cyclone and heavy rainfall. Among other crops, jute is mostly affected. Again, of the three rice crops, Boro is least affected by weather variables. Boro is affected mostly due to early flood in April. On the other hand, the Aus and Aman crops suffer frequent damages due to natural calamities. Estimates of loss of foodgrain production due to natural calamities from 1972 to 1988 is given in Table -7.4 Estimates of loss for the three types of rice are also given separately. The table shows that severe damage of foodgrain occurred during the years, 1974, 1984, 1987 and 1988; the highest being in 1988 when 23,51,581 metric tons of foodgrain was damaged due to natural calamities

Further, in Table -7.5 loss of major non-foodgrain crops due to natural calamities during the period of 1983 to 1988 is given. The table shows that among non-food grain crops, jute is frequently damaged followed by sugarcane.

Table-7.3 Area Damaged by Floods and Cyclones in Bangladesh : 1962 to 1977

Year	Acres
1962	28.13
1963	3.22
1964	7.84
1965	2.69
1966	13.45
1967	1.68
1968	24.84
1969	4.85
1970	31.01
1971	8.98
1972	6.66
1973	21.32
1974	31.65
1975	1.81
1976	14.85
1977	7.97

Source : Shahbuddin (1989), P. 30-32.

Table-7.4 Loss of Foodgrain Production due to Flood and Cyclones from 1972 to 1988

Year	*Aus*	*Aman*	*Boro*	Total Rice
1972	73,395	1,71,425	-	2,44,820
1973	1,99,090	6,96,055	-	8,95,145
1974	6,13,040	5,61,740	1,86,850	13,61,630
1975	67,623	25,097	-	92,720
1976	3,51,390	2,63,553	66,908	6,81,851
1977	4,085	166	3,30,644	3,34,895
1978	65,154	32,298	33,332	1,30,784
1979	13,159	46,978	345	60,482
1980	29,732	2,52,079	-	2,81,811
1981	53,695	20,675	84,520	1,58,890
1982	42,733	71,921	48,839	1,63,493
1983	42,784	1,84,911	92,593	3,21,288
1984	5,04,357	3,79,295	3,73,825	12,57,477
1985	12,821	21,318	24,829	58,968
1986	197	412	1,39,914	1,40,523
1987	2,54,185	10,73,184	-	13,27,369
1988	2,65,814	20,59,820	28,947	23,51,581

Source: Hamid (1991), P.7-10.

Table-7.5 Loss of Major Non-foodgrain Crops due to FloodandCyclones: 1983 to 1988

(in M. tons / bales)

Year	Jute (bales)	Tobacco (mt.)	Rabi chillies (mt.)	Sweet Potato (mt.)	Sugar-cane (mt.)	Vege-tables (mt.)
1983	8631	5	738	878	-	-
1984	1055846	-	-	-	-	-
1985	33632	-	599	-	8383	-
1986	652	-	-	-	-	-
1987	142817	-	-	-	202072	-
1988	144644	-	-	-	375170	71092

Source : BBS (1994).

Drought - Drought is an important, although less frequent factor affecting crop output in Bangladesh. In fact for South Asia as a whole almost all famines were preceded by drought leading to a crop failure. During the 10 year period of 1969-70 to 1979-80, drought occurred thrice : in 1971-72, the Aus crop was affected, and between 1978-79 to 1979-80, the *Boro*, *Aus* and *Aman* crops suffered damage (Murshid, 1987). Bangladesh also experienced severe drought conditions in 1951,1958,1961,1979, 1981,1982, 1989 and 1989 (Task Force, 1991).

The consequences of drought can be far reaching and disastrous as the effect of major flood. Murshed (1987) compared production and yields of the drought-affected crops with respect to their corresponding 'normal' levels (Table -7. 6). Although both area and yields were affected, the impact on the latter dominated changes in *Aman* and *Boro* paddy output, while for *Aus*, significant acreage-effects were observed as sowing of *Aus* mostly depends on timely rainfall.

Table-7.6 An Estimate of the Impact of Drought on *Boro*, *Aus* and *Aman*: 1978-79 to 1979-80

(Yield in mds/acre; output in '000 tons)

Period	*Boro*		*Aus*		*Aman*	
	Yield	Output	Yield	Output	Yield	Output
1978/79 to 1979/80	19.8	1929	10.2	2809	13.5	7303
1977/78	22.6	2239	11.2	3288	14.1	7429
% change (over1977/78)	-12.4	-13.8	-8.9	-14.6	-4.3	-1.7

Note : First row refers to the drought-period. The second row shows 'normal' performance.

Source : Murshid (1987), P.37.

According to Task Force Report (1991), yield reduction under very severe drought condition ranges between 50 to 70%. On the other hand, in severely drought affected areas, mainly due to relatively favourable soil moisture situation, yield reduction varies from 30 to 70% depending on crop and time of planting. In moderately drought prone area, depending on topography, type of crop grown and soil characteristics, yield reduction varies from 20 to 60%. The area under less moderate class though have on average few days of less than 40 degree centrigade temperature but because of low moisture holding capacity of the soils of hills and char lands suffers from water stress affecting yield to the tune of 10-50% (Task Force, 1991).

Resilience of Agriculture to Natural Calamities

Over the years Bangladesh has faced several natural calamities with severe losses to the economy. Due to repeated frequent natural disasters, the people of Bangladesh anyway has learnt to cope with the natural calamities, particularly with flood. Referring to the severity of natural disasters in the last decade Hossain (1992) has mentioned the coping mechanism as follows:

The 1980s has been a decade of several natural disasters in Bangladesh. Droughts, after the monsoons in 1982 and 1983, were followed by a major cyclone in the Noakhali coast in 1984 and a severe flood all over the country in 1985. The economy was again ravaged by two consecutive devastating floods in 1987 and 1988, the latter was termed as the "flood of the century" - so severe was its magnitude. The Khulna area, which escaped the 1988 flood, was hit by a cyclone in November 1988, which totally destroyed the Aman paddy about to be harvested. Finally, the cyclone in April 1991, devastated the Chittagong, Noakhali and Barisal Coast - taking a heavy toll of human lives, cattle, assets and infrastructure.

What has surprised many at home and abroad is the quick recovery of the economy from these external shocks, demonstrating tremendous resilience in coping with natural calamities. Predictions about dire economic consequences in the national and international press have been proved wrong, as human suffering in the aftermath was minimized. Particularly impressive was the performance of the agricultural sector, as bumper harvests followed every natural calamity and foodgrain prices remained stable (Hossain, 1992).

Hossain (1992) mentioned that the most important factors determining the capacity of the government to handle the emergency situation arising out of natural disasters are : (a) availability of resources to procure food and other relief materials, (b) communication mechanism to interact between the center and the locality for effective monitoring of the situation, and (c) the state of development of the soft and hardware infrastructure for effective delivery of relief materials and supporting reconstruction activities.

The capacity of government to finance emergency imports has increased in recent years. For example, foreign currency reserve increased from US $0.28 billion in 1980-81 to US $0.91 in 1990-91, equivalent to about three months' import bill. In the late seventies, the government used to maintain stocks in the range of 0.6 to 0.8 million tons, which increased to over 1.2 million tons since 1987, due to excessive imports of foodgrains under commercial channels. Maintaining a large stocks has imposed an additional burden on the government budget, but has been very helpful in coping with emergency situation (Hossain, 1992).

The communication system in Bangladesh has also improved in recent years which helps quick delivery of relief materials to the affected areas. Further, development of infrastructural facilities in *Upazilas* (now *Thana*) during 1980s, have contributed to a substantial improvement in service delivery in areas affected by natural calamities (Hossain, 1992).

Further, the expansion of irrigation facilities and the availability of HYVs has opened up opportunities of increasing production throughout the year. So, the farmers have no longer had to wait for the whole year to recover production and income losses. Lastly, the growth of the rural non-farm sector has created opportunities for the landless and marginal landowners. It is relatively less difficult, now, for the rural poor to adjust to the loss in employment in foodgrain production activities, than it was about a decade ago (Hossain, 1992).

CHAPTER - VIII

FOREIGN IMPACTS IN AGRICULTURAL DEVELOPMENT

Donor Particlpants

Since 1971, 16 DAC (Development Assistance Committee of Organization for Economic Cooperation and Development) countries, 6 OPEC (Organization for Petroleum Exporting Countries), 8 Former Socialist Countries, 11 international agencies and 12 other countries / agencies have given loan and grant assistance to Bangladesh. Foreign aid

Table-8.1 Foreign Aid Received by Bangladesh since 1971-72 to 1993-94

(In million dollar)

Year	Grant	Loan	Total
1971/72	245.1	25.7	270.8
1972/73	486.4	65.1	551.5
1973/74	218.5	242.7	461.2
1974/75	374.9	526.1	901.0
1975/76	233.8	566.7	800.5
1976/77	255.5	279.2	534.7
1977/78	392.8	441.1	833.9
1978/79	501.9	528.1	1033.0
1979/80	650.6	572.5	1223.1
1980/81	593.7	552.8	1146.5
1981/82	653.8	585.8	1239.6
1982/83	587.5	589.9	1177.4
1983/84	733.8	534.6	1268.4
1984/85	703.3	566.1	1269.4
1985/86	545.6	760.3	1305.9
1986/87	661.5	933.7	1595.2
1987/88	823.8	816.6	1668.5
1988/89	627.9	995.6	1668.5
1989/90	765.9	1043.7	1809.6
1990/91	831.5	901.1	1732.5
1991/92	817.3	794.1	1611.4
1992/93	818.3	856.7	1675.0
1993/94(Estim.)	659.8	1112.5	1772.3
Total	13228.2	14290.7	27518.9

Source : Economic Relation Division, Ministry of Finance, GOB.

received by Bangladesh up to 1993-94 since 1971-72 can be seen in Table - 8.1. Up to June 30, 1993 Bangladesh has received $25.75 billion of which 51% was loan and 49% was grant.

Since 1972 up to June 1986, DAC nation bilateral aid has accounted for 53% of the total assistance to Bangladesh and 64% of their assistance has been offered as grants. The major DAC donors have been the United States, Japan, Canada, Federal Republic of Germany and United Kingdom (Table -8.2). All the assistance from Germany, Canada, United Kingdom, Switzerland, Sweden, Finland and Belgium has been tendered as grants. Commonly, among these nations, assistance is initially negotiated as loans, but the funding is subsequently changed to grant status.

The multilateral agencies have supplied 33% of the total foreign assistance since 1972 to June 1986. IDA has been the largest multilateral donor and together with ADB, they have committed 60% of the total from international agencies. All IDA / ADB aid has been loan funded but on highly concessional terms which involve extended repayment periods and minimal service charge.

All the OPEC community assistance has come since 1977 and has mainly supported the Bangladesh Gas Project, the East West Power Transmission Interconnection, the Khulna Power Station and the Kurmitola International Airport. The nations of OPEC contributed 6% of total assistance to Bangladesh. The contribution of Socialistic countries as well as other countries / agencies altogether was about 8% of the total assistance to Bangladesh from 1972 to June 1986.

Multilateral Assistance for Agricultural Development

The World Bank / International Development Association (IDA)

IDA is the main segment of the World Bank operating in Bangladesh and, additionally, is the most important donor providing assistance to the country. Loans are made on highly concessionaire terms with ten years grace periods, fifty years maturity, and no interest. A 0.75% service charge is made on the disbursed portion of each credit annually (Wennergren, 1988).

Within the lending portfolio of IDA, Bangladesh assistance is among the highest provided to any country worldwide. Through 1986, IDA has supported 104 projects in Bangladesh since independence. The projects reflects wide variety of needs and support by IDA. Some of the important projects related to agricultural development are presented in Table- 8.3.

Table - 8.2 Foreign Aid Disbursement and Aid Sources by Country / Agency, Bangladesh : from 1972 to June 1986

(in million US$)

Donor country / Agency	Grant	Loans	Total	% of disbursement over commitment
DAC Countries :	4909.2	2542.3	7451.5	82.18
Australia	208.1	0.0	208.1	97.61
Belgium	5.9	34.6	40.5	76.85
Canada	964.5	16.0	980.5	79.15
Denmark	118.9	54.7	173.6	68.67
Finland	11.7	2.3	14.0	76.50
France	101.5	143.9	245.4	73.96
Germany	370.8	268.0	638.8	79.13
Italy	5.2	0.0	5.2	100.00
Japan	385.8	1114.7	1500.5	86.08
Netherlands	396.8	71.3	468.1	81.14
Norway	190.3	0.0	190.3	66.84
Sweden	273.5	6.5	280.0	82.64
Switzerland	24.3	10.0	34.3	90.03
New zeeland	3.2	0.0	3.2	100.00
United Kingdom	519.7	62.3	582.0	71.04
United States	1329.0	758.0	2087.0	89.05
International Agencies :	1504.5	3134.2	4638.7	60.38
EEC	383.5	48.0	431.5	84.79
UNICEF	162.6	0.0	162.6	71.44
UN System	842.8	0.0	842.8	82.14
IVA	106.0	0.0	106.0	100.00
ADB	0.0	595.5	595.5	32.20
IDA	0.0	2167.6	2167.6	62.21
IDB	0.0	140.6	140.6	79.61
IFAD	0.2	58.2	58.4	41.13
OPEC	0.0	122.0	122.0	81.93
IFC	0.0	2.3	2.3	100.00
Ford/Asia Foundaton	9.4	0.0	9.4	90.38

Cont. of Table -8.2				
Donor Country Agency	Grant	Loan	Total	% of Disbur. over Commit.
OPEC Countries :	499.7	331.6	831.3	72.01
Iran	0.0	12.5	12.5	100.00
Iraq	8.3	58.6	66.9	49.34
Kwait	0.0	118.5	118.5	74.20
Libya	1.0	0.0	1.0	100 00
Saudi Arabia	473.2	61.8	535.0	73.07
UAE	17.2	80.2	97.4	85.81
Socialist Countries	42.0	429.8	471.8	57.53
Bulgaria	1.9	0.5	2.4	72.73
China	2.2	77.9	80.1	52.35
Czechoslavakia	0.0	46.2	46.2	100.00
East Germany	1.9	8.1	10.0	100.00
Hungary	0.0	10.0	10.0	100.00
Poland	1.3	1.2	2.5	4.76
Romania	0.1	52.4	52.5	48.25
Soviet Union	34.6	233.5	268.1	81.45
Other Countries Agencies :	219.3	393.8	613.1	89.52
Australia	0.0	49.2	49.2	100.00
India	184.0	150.2	334.2	87.26
Japan	0.0	1.1	1.1	100.00
Pakistan	33.5	0.0	33.5	100.00
Thailand	0.1	0.0	0.1	100.00
Turkey	0.8	4.1	4.9	100.00
Yogoslavia	0.9	58.8	59.7	100.00
UK (GEC)	0.0	23.5	23.5	100.00
Moscow-Norodny Bank	0.0	15.4	15.4	100.00
UK (NGB)	0.0	1.4	1.4	100.00
BCCI	0.0	6.5	6.5	100.00
Suppliers Credit	0.0	83.6	83.6	78.42
GRANDTOTAL	7174.7	6831.7	14006.4	72.16

Source : Navin, Jr. and Khalil (1988), P

Table-8.3 **Agriculture Related Projects Supported by IDA Credit, Bangladesh : 1972 to FY 1986.**

Year	Project Description	Currency in million	Principal Amount
1972	Chandpur Irrigation	US $	13 1
1972	Northwest Region DTW	US $	14 0
1973	Irrigation Engineering	US $	0 4
1973	Food Storage	US $	23 5
1973	Cereal Seeds	US $	7.5
1975	Ashugonj Fertilizer	US $	33 0
1975	Barisal Irrigation	US $	27.0
1976	Karnafuli Irrigation	US $	22 4
1976	Agriculture & Rural Development	US $	12 0
1977	Deep Tubewell	US $	16 0
1977	Muhuri Irrigation	US $	21 0
1977	Extension and Research	US $	10 0
1978	Jute Research	US $	21 0
1978	Agricultural Research	US $	6 0
1978	Flood Control & Water Resources	US $	19 0
1978	Fisheries Development	US $	6 0
1979	Ashugonj Fertilizer	US $	29.0
1979	Fertilizer	US $	25 0
1980	Low Lift Pump	US $	37 0
1980	Small Scale Drainage	US $	25 0
1980	Offorestation	US $	11 0
1980	Jute Industries Rehabilitation	US $	20 0
1980	Fertilizer Industries Rehabilitation	US $	29 0
1980	Fertilizer Import	US $	25 0
1981	Fertilizer Transport	US $	25 0
1982	Agricultural Credit	SDR	32 6
1982	Chittogong Fertilizer	SDR	12.8
1982	Drainage / Flood Control	SDR	24 0
1982	Agricultural Extension & Research	SDR	23 2
1982	Second Deep Tubewell	SDR	60 5
1983	Second Agricultural Training	SDR	7 6
1983	Sugar Rehabilitation	SDR	21 4
1984	Second Agricultural Research	SDR	23 4
1984	Muhuri Irrigation	SDR	9 6
1984	Fertilizer Industry Rehabilitation	SDR	4 8
1985	Flood Control	SDR	50 1
1985	Forestry II Project	SDR	27 1
1986	Shrimp Culture Project	SDR	20 6

SDR = Special Drawing Right, 1 sdr = US $ 1.17757 as of June, 1986.
Source : Navin, Jr. & Khalil (1988), P. 116 & 117.

Asian Development Bank (ADB)

Bangladesh is among the largest recipients of the 22 nations assisted by ADB (Wennergren, 1983). From 1973 to December 1985, Bangladesh received $ 18 39 billion loan from ADB (Navin & Khalil, 1988). The loan activities of ADB involved 63 projects in Bangladesh from 1973 to 1985. The projects related to agriculture through this period are listed in Table - 8.4.

Table-8.4 Agricultural Related Projects Supported by ADB Credit, Bangladesh, June 1973 to December 1985

Year	Project Description	Million US$
1973	Fisheries Development	3.20
1974	Jute Seeds	9.55
1975	Ashugonj Fertilizer	30.00
1975	Agricultural Credit	9.43
1977	Agricultural Development	18.00
1977	Meghna Dhonagoda Irrigation	24.00
1978	Livestock Serv. Development & Training	12.40
1978	Pabna Irrigation and Rural Development	38.00
1978	LLP Maintenance Program	8.90
1979	Foodgrain Storage	9.00
1979	Ashugonj Fertilizer	25.00
1979	Fisheries Credit	10.80
1979	Crop Intensification Program	11.80
1080	Second Agricultural Credit	28.10
1980	Rubber Rehabilitation & Expansion	20.00
1980	Tubewell	50.00
1981	Second Crop Intensification Program	18.00
1981	Chittagong Urea Fertilizer	72.00
1981	Community Forestry	11.00
1981	Small Scale Irrigation Sector	50.00
1982	Bhola Irrigation	27.20
1982	Second Tubewell	56.50
1983	Third Crop Intensification Program	70.00
1985	Second Livestock Development	39.00
1985	Fourth Crop Intensification Program	39.00

Source : Navin, Jr. & Khalil (1988), P. 118.

Bilateral Assistance for Agricultural Development

United States (USAID)

U.S. bilateral assistance to Bangladesh dates back to 1953 and the period immediately following partition from Britain when the nation was the Eastern part of Pakistan. Support from 1953 to 1971 totaled an estimated $645 million and encompassed a broad range of developmental type projects. Included among the activities were the Karnaphuli Hydraulic Project, Coastal Embankment Projects, and support to Agricultural and Engineering Universities. Additionally, significant amounts of foodgrains, vegetable oils and fertilizer were imported as commodity assistance. Out of total US $645 million,

assistance under the heading of Agriculture and Natural Resources was $355 million during the period of 1953 to 1971 (Wennergren, 1983).

Agricultural programming since independence has been heavily oriented towards fertilizer issues. Substantial amounts of fertilizer were imported in 1974 and 1975. Smaller but continued imports have occurred from 1978 to 1981. In addition, funding was provided to assist construction of Zia fertilizer plant in Ashugonj. Also, support has been extended for construction of fertilizer storage and technical assistance to improve the fertilizer marketing system. In a fairly direct way, the total fertilizer program has been supportive of subsequent policy reforms which were directed towards private sector management (Wennergren, 1983).

U.S. support of agricultural research began in 1976. Major portions of the assistance are channeled through the BARC and BRRI. The assistance calls for expatriate scientists to collaborate in-country with those from the local institutes. Research activities are broad-based but emphasize crop varietal development, irrigation practices and water institutions, pest and rodent control, and development of appropriate management practices Support of the BRRI rice research effort is a multi-donor effort (Wennergren, 1983).

Irrigation and credit are also component parts of a strategy to test pilot projects which intended to improve agricultural input availability. A small-scale irrigation project, begun in 1976 with funding through 1982, has provided a $14.5 million loan to finance hand pump sales to small farmers. The Rural Finance Experimental Project, which ended in 1982, tested eight credit models which incorporate more realistic lending rates and credit loan procedures. The test study was carried out with nine Bangladesh credit institutions (Wennergren, 1983).

USAID has supported two infrastructural type, agricultural related projects. The Zilla Roads Maintenance project is expected to improve maintenance of rural market access roads. The project began in 1981 and terminated its first phase in 1984. USAID supported rural electrification program which began in 1977 has contributed lot in irrigation development.

An Agro-Climatic Environmental Monitoring Project, started in 1980. This was designed to upgrade the Bangladesh Government capability to obtain and analyze a wide variety of agroclimatic data related to agriculture, metrology, forestry, fisheries and the overall ecosystem as the basis for monitoring foodgrain production in Bangladesh (Wennergren, 1983).

Japan (JICA)

Japan is second to the United States in the amount of bilateral assistance given to Bangladesh. The foreign assistance program is administered by the Japan International

Cooperation Agency (JICA). Total assistance to Bangladesh has amounted to $1.7 billion since 1971 to 1985. About 75% of Japan's assistance has been in concessionary loans and the reminder in grants. The Japanese program is not highly structured or focused except for the heavy commitment to food aid and commodity assistance. The flexibility programming is indicative of the Japanese policy to provide assistance in any needed area, except military.

Among the agricultural-related projects, fertilizer imports, DTW equipment and foodgrain storage were important. Research and extension have received nominal support, mostly in the form of research equipment at BARI and for fisheries investigations plus some assistance in establishing Institute of Postgraduate Studies in Agriculture (IPSA) at Gazipur.

JICA has also supported research project on agricultural and rural development in Bangladesh, known as 'Joint Study on Agricultural and Rural Development' (JSARD) which started in June 1986 and continued for 4 years. After successful completion of the project the second phase of the project, known as 'Joint Study on Rural Development Experiment' (JSRDE) is running since 1992 which is scheduled to be completed by December 1995.

Generally speaking, assistance from Japan has been for capital transfers as opposed to technological transfers. The heavy dominance of commodity grants and loans plus the concentration of infrastructure, equipment purchases, and other construction are indicative of capital transfers. Still, JICA programs contain a fair amount of training activity, much of which is carried out under programs established in Japan to meet the special needs of Less Developed Country (LDC) personnel (Wennergren, 1983).

Federal Republic of Germany (FRG)

Activities by the FRG have been widespread beginning with assistance to the livestock sector in 1972 to improve the national herd through improved breeding stock and managerial techniques. Much of the artificial insemination development in Bangladesh has been FRG-assisted. In early 1970s, FRG also assisted activities in promoting DTW drillings and a related agricultural project at Cox's Bazar. Later, the FRG assisted in the financing of the Ashugonj (Zia) Fertilizer Factory. Since 1975, major support has been given to BADC to augment its capacity in seed production. Seed processing centers have been developed, technical assistance in field multiplication techniques provided, and in a few instances, foundation seed has been imported. Support has also been given to develop plant protection capability of the MOA directorate (Wennergren, 1983). Since mid 1985 for quite a few years, GTZ in collaboration with BRDB continued some on-farm research program mostly in Tangail area with the financial assistance from FRG.

Canada

Canadian assistance, through its international arm CIDA has been heavily oriented towards food assistance. Traditionally, about 50% of the total aid has been in food, which makes Canada the second largest food donor in Bangladesh. CIDA has focused more support on agriculture recently. Small scale water control structures to complement Food for Works Projects, foodgrain storage construction, and fertilizer commodity imports have been important components. Since 1977, CIDA has supported research work at both BRRI and BARI to develop new rice and wheat varieties..Support for physical plant construction also was given. CIDA has collaborated extensively with the World Bank Muhuri Irrigation Project in Chittagong. Technical assistance to the agricultural planning effort of Bangladesh has also been provided by CIDA (Wennergren, 1983). CIDA has also given support in Crop Diversification Program (CDP) in Bangladesh, the project which has just been completed in this year.

United Kingdom

Assistance by the U.K. has its roots in the Pakistan era, more so than for other donors and is heavily oriented towards commodity assistance (about 40%). Food assistance is minimal. Still, technical project assistance has been extensive in agricultural and infrastructural development. Between 1977-82, U.K. technicians have collaborated with BRRI to develop management schemes to improve yields of deep water rice. Additionally, continuing support has been given to improving the tea estates with a broad ranging program which included factory modernization, agronomic studies, personnel training, and estate improvements. Aid has also been given to rehabilitate foodgrain storage facilities, advise in cereal seed multiplication, development of livestock tissue culture vaccines, and the rehabilitation of unused fish culture tanks and ponds in Pabna, plus allied housing, laboratories, and buildings. A 1978 project with BRRI to reduce post-harvest losses has produced new designs for rice mill dryers. U. K. has also assisted DTW development (including pumps and engines) in North Bangladesh. Further, supports have been given to some agricultural related industries (Wennergren, 1983).

Others

Those offering lesser amounts of assistance identify smaller projects or multiply their contributions via collaborative efforts with IDA or ADB. For example, Sweden has supported the development of the Institute of Nuclear Agriculture (INA) as well as technical assistance on oil seed breeding.

Foreign Aid in the Water Sector

More than one thousand million US dollars has gone to water projects since 1972. The largest donors in Bangladesh water sector are the World Bank (IBRD / IDA) and ADB, which together contributed 74.55% of the total aid to this sector in the 1987/88 fiscal period, and 76.44% of aid during the Second Five Year Plan (1981-85). Other donors include the International Fund for Agricultural Development (IFAD), the Canadian International Agency (CIDA), the Government of Kuwait, the British Government's ODA, the Saudi Fund for Development (SFD), the Netherlands Government, the European Economic Community (EEC) and the UNDP (Linquist, 1989).

About US $1.2 billion has been spent in the water sector in Bangladesh in the ten years period from 1977 to 1987. The share of this expenditure was 42% for World Bank and 28% for ADB (Table- 8.5). Further, the foreign aid component of its budget from 1976-77 to 1987-88 amounted to about US $459.7 million plus 1.4 million metric tons of wheat (Linquist, 1989). The wheat came under the Food for Works Program to be used in building such physical works as embankments which ultimately helps in protecting agricultural land from floods.

Table-8.5 Donor Water Resources Development Assistance Commitments, Bangladesh, 1972 to 1987.

(in US $ million)

Donors	Grant	Loan	Total	Percent
IDA	-	425.91	425.91	42
ADB	-	289.52	289.51	28
IFAD	-	40.40	40.40	4
CIDA	39.21	-	39.21	4
Kuwait	-	36.36	36.36	4
U.K.	1.00	32.70	33.70	4
Saudi Fund	-	30.00	30.00	3
Netherlands	30.17	-	30.17	3
EEC	23.73	-	23.73	2
UNDP	19.17	-	19.17	2
USAID	-	14.00	14.00	1
SIDA	12.18	-	12.18	1
ISDB	-	10.00	10.00	1
W. Germany	7.07	0.77	7.84	1
Japan	3.80	0.33	4.13	-
DANIDA	4.11	-	4.11	-
France	-	1.38	1.38	-
USSR	-	1.21	1.21	-
Belgium	-	0.49	0.49	-
Total	140.44	883.07	1023.51	100

Note : This does not include Food Aid through Food for Works Program which provides on an annual basis about 100,000 tons of wheat to BWDB for construction and maintenance of embankments.

Source : Linquist (1989).

NGOs in Agricultural Development

According to the Ministry of Social Welfare up to 1992, there were 560 registered NGOs and some 14,000 voluntary organizations (Gauvreau & Mendis, 1992). However, according to daily newspaper ('Sangbad'), there are now (in 1995) about 900 registered NGOs and about 19,000 voluntary organizations working in Bangladesh. In the early 1970s main activity of the NGOs was to provide disaster relief assistance. Latter some of the NGOs were involved in developmental activities. Recently most of the NGOs are involved in poverty alleviation programs funded by different donors. A few of them has

attached agricultural development programs with their main activities of poverty alleviation programs which involve mostly non-farm activities.

The main emphasis of NGO activities in agricultural sector is to help the landless or near landless small farmers. There are numerous examples how NGOs have innovated to make techniques or programs more appropriate to the specific problems of the rural poor. For example, the Rangpur Dinajpur Rehabilitation Service (RDRS) and the Mennonite Central Committee (MCC) have developed simple, manual pumps (i.e. Treadle Pump) for irrigation. The NGOs like BRAC, PROSHIKA as well as Grameen Bank are also involved in operation and management of some irrigation projects. The ownership of irrigation equipment by the landless or marginal farmers has also been ensured by these NGOs. Some of the NGOs, like PROSHIKA are also providing training in various fields of agriculture such as, Organic Agriculture (i.e. use of organic materials instead of chemicals), Irrigation Project Management, Tree Plantation and Nursery, Winter Vegetable production, etc. BRAC also provides various types of training for agricultural development including training for tubewell / pump (DTW / STW / Pump) mechanics.

Though NGOs are commonly believed to target their efforts to the most needy, they too have found it most difficult to work with the unskilled landless. Those with access to a couple of acres of land, a little capital, or a skill have tended to be the principal beneficiaries. During mid 1980s, the Rangpur Dinajpur Rehabilitation Service (RDRS) concentrated its agricultural work on middle-sized contract farmers who were intended to act as role models but who reaped most benefits themselves. Similarly, 65% of past purchasers of the RDRS treadle pump owned more than 2.5 acres. The MCC also admits that its extension workers have dealt mostly with relatively well-off farmers. CARE has realized, in its promotion of dry-season vegetable production on the Kashimpur Estate, that small and landless farmers had only limited access to the project because bigger landholders tended to control the distribution of water from the Deep Tubewells used for irrigation (Like Minded Group, 1990).

The overall involvement and success of the NGOs in Bangladesh is difficult to ascertain. Their activities carry them into diverse types of assistance which are not easily summarized. There is also lack of coordination among the activities of different NGOs as well as Government Organizations (GOs) and NGOs. This results into misuse of funds and duplication of activities by different organizations. Effective coordination is needed between NGOs as well as GOs and NGOs for overall development of Bangladesh.

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