

STATUS OF COTTON IN BANGLADESH

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1 Introduction

Bangladesh have a glorious history in textile production. The finest cotton fabric- Moslin once produced in medieval Bengal was famous through out the world. However, the production and trading of Moslin gradually declined during the British rule ultimately resulting to closure of the industry by early nineteenth century. During Pakistan era, there had been limited effort to introduce cotton in this part (East Pakistan) with little support for research and development of the crop and as a consequence cotton remained confined to laboratory until early seventies. Importance of producing cotton domestically strongly soon after the liberation of the country in 1971 when the supply of raw cotton was suspended from Pakistan.

Cotton is one of the important cash crops in Bangladesh. It is the main raw materials of textile industry. Annual requirement of raw cotton for textile industry of Bangladesh is estimated around 2.5 million bales. Local production is only about 0.1 million bales. Around 4-5% of the national requirement is fulfilled through the local production, remaining 95-96% is fulfilled by importing raw cotton from USA (40%), CIS (35%), Australia, Pakistan, South Africa and other country producing countries (25%) (BTMA, March, 2002). Though cotton is an important cash crop and an important raw material but the relative weightage of cotton within the cropping systems scenario is rather marginal. The area under cotton cultivation ranges only between 0.08 percent (1987-88) and 0.27 percent (1996-97) of the total cropped area respectively (BBS, 2000Statistical Year book of Bangladesh).

In Bangladesh Garments Industries contribute 27% of GDP, due to low labour costs and quota free export to the European market. The Garments industry has been flourishing in Bangladesh, Ready made garments (RMG) accounts for about 75% of the total export earning. But cotton production did not increase as expected due to several constrains.

The highest domestic cotton production was 93,000 bales in 1997-98 against the total requirement of 1,20,000 bales for the year 2001-2002 (CDB, 2002 and BTMA, 2002). Cotton Development Board was targeted 50000 ha cultivation and expected production of 94000 bales lint in the year of 2007-08. This amount of domestic production of the total could cater only negligible proportion of the total requirement of the country's textile industry. The textile industry therefore predominantly depends on imported cotton.

2 Geography and Climate

Latitude: Bangladesh is a South Asian country lying between 20°34' and 26°38' North latitude and between 88°01' and 92°41' East Longitude.

Climatic variations: The climate of Bangladesh is tropical monsoon marked by sweltering temperature and high humidity. Bangladesh has mainly four seasons. Summer (March-May), Monsoon (June-September), Autumn (October-November) and Winter (December-February).

Rainfall: Total rainfall occurs during monsoon ranges from 1194 mm to 3445 mm. Average annual temperature is 26° c and while rainfall is 2540 mm.

Humidity: Highest 99% (July), lowest 36% (December & January).

3 Economy

Bangladesh has an agrarian economy, although the shear of Agriculture has been decreasing over the last five years. Yet it dominates the economy accommodating major labour force living in the rural areas. From the marketing point of view, Bangladesh has been following a mixed economy that operates on free market principles.

Some macro economic indicators of Bangladesh in the fiscal year 2006 as follows

Total GDP (in constant price): 42.44 billion US\$

Total GNI (in constant price): 66.03 billion US\$

GDP growth rate: 6.63 %.

Sectoral Share of GDP (%):

Agriculture: 19.61

Industry: 27.91

Service: 52.48

Growth rate in Agriculture: 2.95%

Per capita income: 476 US\$.

Total consumption: 49.43 billion US\$

Private: 45.99 billion US\$

Public: 3.44 billion US\$

Total Investment: 15.28 billion US\$

Private: 11.55 billion US\$

Public: 3.71 billion US\$

Total National Savings: 17.14 billion US\$

4 Agriculture

Agriculture is the driven force of our national economy, 48.1% of the total population are directly involve with the agriculture. Agriculture sector comprises crops & horticulture, Animal farming/livestock, Forest & related service and fishing/fisheries. All of them crop sector alone contribute 11.72% to the GDP of the country. There are many public & private sector organizations are involved in Agricultural development in the country. Rice is the main staple food of Bangladesh and its production is about 26530 thousand metric tones. Other major crops are wheat, Maize, Potato and Jute. Some basic information on agriculture of Bangladesh is as follows.

1.	Total cropped area	:	14.11 million hectare
4.	Cultivated area	:	7.98 million hectare
3.	Forest area	:	2.60 million hectare
5.	Cultivable waste	:	0.27 million hectare
6.	Current fellow	:	0.47 million hectare
7.	Cropping intensity	:	180%
8.	Single cropped area	:	2.87 million hectare
9.	Double cropped area	:	4.13 million hectare
10.	Triple cropped area	:	1.03 million hectare
11.	Growth rate of Agriculture sector	:	2.95%
12.	Total annual food production	:	26.13 million metric tons
13.	Total requirement of food crops	:	23.85 million metric tons
	Annual egg production	:	4,780 million
15.	Annual fish production	:	1.99 million metric tons

5 Industry

In the total population 35.8 % are involve in the industrial sector in the country. Textile & Readymade Garments alone employed about 5.2 % of the total population. The major Industrial products are Cotton textile, Jute textile, Garments, Paper, Fertilizer, Irons & Steel, Cement, Petroleum products, Cigarettes, Matches, Drugs, Pharmaceuticals, Tea, Salt, Edible Oil etc.

Some basic fact of Industrial sectors of Bangladesh is as follows-

Share of Industrial sector in GDP(%): 27.91

Contribution of Garments industries in GDP: 27%

RMG contributes 7.5% of total export
 Production of Cotton textile: 17530
 Yarn: 13838 metric ton
 Cloth: 3692 thousand meter
 Production of Jute textile: 22313

5.1 Finance

National finance is comprises with tax revenue and non-tax revenue.

Total revenue: 66.89 million US\$
 Tax revenue: 53.93 US\$
 Non-tax revenue: 12.96 US\$

5.2 Environment

Water and Air pollution are two major concern of Bangladesh environment at the present moment. A World Bank report of 2000 states that the diesel vehicles are accountable for 44% particulate matter and 85% particulate nitrogen oxide pollution of Air in Dhaka city.

5.3 Investment medium

Bangladesh consist low waged and available labour force and manpower resources. There are huge scope to invest in the sector of cotton & Jute Textile, Readymade garments, Frozen Foods, Processed Foods, Agro-based industries and Small & Cottage Industries.

6 Cotton Sector

6.1 Cotton Production

In Bangladesh, cotton is generally grown as a rain fed crop. Two types of cotton are grown in Bangladesh namely- i) Upland cotton (*Gossypium hirsutum*) & ii) Hill cotton (*Gossypium arboreum*). American cotton is cultivated in the South western region, Northern region and Central region covering more than 32 districts out of 61 plain districts of Bangladesh. The course type Hill cotton, on the other hand is grown in three hill districts. Hill cotton is an indigenous variety and cultivated in Jhum system. Jhum is a mixed crop cultivated mainly in hill slopes where more than two crops are seeded in a pit and harvested sequentially. The crops mainly cultivated in Jhum are Aus rice, Sesame, cotton, Maize, Marpha, Chili, Pumpkin etc. Hill cotton is used for handloom cloths as well as grown for export. With a total land area suitable for cotton cultivation estimated 2.42 lakh hectares cotton production is taking place in 35 districts out of 64 districts in Bangladesh. After functioning of CDB the crop year 1997-98 saw the area devoted to cotton production peaked at a total of 54,429 hectares, or a utilization rate of 22.5% as a result of gradual expansion of coverage over the past 25 years. During the following crop year 1998-99, however, cotton areas shrank by 17.6% (11,789 ha) to 42,640 ha due to floods, low price, degeneration of yield capacity of existing varieties and lack of modern technologies. In crop year 2001-02 nevertheless, cotton areas reportedly started to increase again. American cotton hectareage, for instance, rose from 29,120 ha to 37,950 ha or an increase of 8,830 ha and ultimately reached at 41975 ha in the crop year 2006-07, an overall increase of 4,025 ha. One of the reasons for the limited increase in hectareage is the shift of farmers from cotton production to other crops. This is because of the declining economic prospect in cotton compared to the profits derived from growing vegetables, spices, tobacco, flowers, banana and other crops.

6.2 Variety

The sowing period for upland cotton is from July to February. Harvesting is generally completed by late February. Main varieties of American cotton grown in Bangladesh are CB-1 (Deltapine-90), CB-3(Deltapine-50), CB-5(a cross between Deltapine and indigenous variety), CB-9(Developed from SI

/91/646)) and CB-10(developed from BC-0397). Of these, CB-5 and CB-9 has some tolerance to Jassids, CB-9 is the most commonly grown variety covering 60% of the total area under American cotton and CB-10 is considered as short duration variety.

Table 1 Acreage, production and yield of Upland Cotton (*Gossypium arboreum*) in Bangladesh (1995-2007)

Year	Area(ha)	Production(metric ton)		Yield(kg/ha)	
		Seed cotton	Lint	Seed cotton	Lint
1995-96	38967	44554	16040	1143	411
1996-97	39024	46264	16665	1186	425
1997-98	40745	47247	17005	1160	417
1998-1999	29120(flood)	28893	10401	992	357
1999-2000	34744	38478	14237	1107	410
2000-2001	15956(flood)	17275	6392(flood)	1082	400
2001-2002	37950	38515	14250	1015	375
2002-2003	33500	35956	13304	1075	397
2003-2004	34600	37445	13855	1085	400
2004-5005	29410(flood)	33270	12309	1135	418
2005-2006	35100	37400	71500	1066	812
2006-2007	28100	30905	64885	1097	916

Table 2 Acreage, production and yield of Hill Cotton (*Gossypium arboreum*) in Bangladesh (1995-2007)

Year	Area(ha)	Production(metric ton)		Yield(kg/ha)	
		Seed cotton	Lint	Seed cotton	Lint
1995-96	10227	2412	964	236	95
1996-97	12396	1952	781	157	64
1997-98	13719	2366	947	172	69
1998-1999	13520	2730	1092	202	81
1999-2000	13280	2500	1000	188	75
2000-2001	12138	2465	985	188	75
2001-2002	13236	2500	1000	189	76
2002-2003	14140	2550	1020	180	72
2003-2004	14518	2750	1100	190	76
2004-2005	14190	2525	1010	178	73
2005-2006	14670	2488	5500	189	147
2006-2007	13800	2550	5645	185	163

Table 3 Performance of American cotton Varieties available in Bangladesh.

Name of variety	Days to first flower	Days to first boll split	No. of boll per plant	Boll wt (gm)	Plant height at harvest (cm)	Seed cotton yield (t/ha)	Dura - tion	GOT (%)	Fibre length (2.5%) inch	Fineness of fibre (micro.)	Stre-ngth (PSI)
CB-1 (DL-90)	58-60	111	16-20	4.4	115	2.1	170-180	38	1.12	4.6	84
CB-3 DPL-50	50-55	115	20-25	5.0	90	2.3	150-165	37	1.14	4.3	86
CB-5 (JA/92B)	50-60	122	18-22	4.6	110	2.0	180-195	38	1.10	4.5	86
CB-9 (SI-91/646)	50-60	122	20-22	5.8	110	2.7	180-195	35	1.07	4.2	85
CB-10 (BC-0397)	46-52	108	35-45	5.31	116	1.8	150-160	35	1.09	4.0	84

Table 4 Performance of Hill cotton Varieties available in Bangladesh.

Name of variety	Days to first flower	Days to first boll split	No. of boll per plant	Single boll wt. (gm).	Plant height at harvest (cm)	Seed cotton yield (t/ha)	Du ratio n	GO T (%)	Fibre length (2.5%) inch	Fineness of fibre (micro.)	Strength PSI
Hill cotton-1	70-75	118-135	16-20	2.5-3	120-160	1.8 in plain land 0.50-0.70 kg in Jhum	180 - 190	40-42	0.83	6.8	74.90
Hill cotton-2	69-75	125-140	20-25	2.8-3.5	140-180	1.6	180 - 190	40-42	0.79	6.8	74.52

NB: Hill cotton-1 is White in color; Hill cotton-2 is Khaki in color

6.3 Intercropping

To make the cotton cultivation profitable and to provide additional income to the farmers, the introduction of inter and relay cropping with well experienced management practices have open up a new hope of better competitiveness of cotton crop in cotton cultivation. So, much emphasis and stress have been given to inter and relay cropping of cotton for getting more total income from the same piece of land. This system of cotton cultivation has already gained popularity due to the rational and tireless efforts of CDB extension staff. Among the inter crops Amaranths sp. (Red amaranth, amaranth), radish (as leafy vegetables), onion, mungbean, chili, turmeric, ginger etc. have been successfully cultivated as inter and relay crops with cotton. Farmers are getting about 25% more net profit by growing different leafy vegetables and about 50% by growing turmeric/ginger with cotton. Sowing of wheat between cotton rows in November also revealed encouraging results. Inter cropping of ground nut with cotton was also reported to give more total income over the sole cotton.

6.4 Cost of production

Table 5 Per hectare cost of American cotton

Sl. No.	Items	Quantity/no.	Rate (Tk.)	Total cost
1.	Laborer	150	80/ day	12000.00
2.	Tillage	25	150/day	3750.00
3.	Fertilizers	As prescribed	Market price	6200.00
4.	Seed	15 kg	8.00/kg	120.00
5.	Insecticides	5600 ml		4500.00
6.	Irrigation	2 times	1200.00/time	2000.00
7.	Land rent	As required	9000.00/year	3700.00
8.	Interest on capital	50% on labour and 8% on input,land,irrigation		1200.00
9.	Total			33500.00 (US\$ 500)
10.	cost for the production per kg seed cotton			22.25

Table 6 Gross income (per hectare).

1.	Income from seed cotton (1800 kg /ha) Selling price Tk. 29/- per kg	52200.00
2.	Income from dried plant (3 ton/ha)	4800.00
3.	Total income	57000.00 (US\$ 840)
4.	Net income	23500.00 (US\$ 340)
Cost benefit ratio = 1:1.72		

6.5 Activities of The Cotton Development Board (CDB)

Cotton Development Board was established through a resolution in 1972, to boost up cotton production in the country under the Ministry of Agriculture, Government of the People's Republic of Bangladesh. The mandate of the Board was to introduce and promote cotton cultivation in Bangladesh.

But practically the work started in 1977 with the introduction of a new American variety (Deltapine-16) from USA.

At present all activities of cotton are being conducted by CDB such as

The activities of the CDB have four main focuses. These are the following.

- i) Research on cotton
- ii) Extension Service including technology transfer, training & demonstration
- iii) Seed Production & distribution and
- iv) Marketing and other institutional support.

1) Research. CDB has 03 Research Training and Seed multiplication farms and one germplasm preservation and evaluation centre for upland cotton. In addition a separate research station and other 3 substations located at three hill districts for research on hill cotton. CDB is conducting research on 5 disciplines viz., plant breeding,, agronomy, soil science, entomology and plant pathology although CDB's research is not up to the mark due to short of qualified and adequate number of scientists.

2) Extension. CDB has four regional Offices each having two to four zones to a total of 13 zones in the country and each zone is further divided into 10-18 units depending upon the intensity of cotton cultivation. Each unit is headed by a Cotton Unit Officer (CUO). In a number of units, the CUO is assisted by 1-2 Store cum field man (SCFM) and Assistant Cotton Unit Officer (ACUO). Based on the previous years target and achievement, and after consultation with local growers, the Cotton Unit Officers (COU) and Store Cum Field (SCFM) man fix the annual target for cotton acreage for their respective unit and channel this information via the cotton Development Officer (CDO) and Chief cotton development officer (CCDO) to the Deputy Director (DD) at regional office. The DD fixes up the final target for the specific units and forwards it to the Executive Director (ED) at the headquarter for the approval. CDB strives to achieve the annual target by under tacking several extension related activities that include the following:

3) Training. CDB arranges training for contact farmers at three of its Research, Training and Seed Multiplication Farms. Training for contract farmers is organized twice every crop season. There are fully residential training and duration is 5-7 days. CDB also conducted one day training for the general farmers at the farmer's field for 6 hours. CDB also organizes field days as motivational programme. Training for extension staff and Officers are also designed to communicate information about new technology on cotton production.

4) Seed production and distribution. One of the important extension activities of the CDB is the production and distribution of cotton seed. CDB ensures supply of 350 tons of certified seed annually to the farmers, fulfilling 60-70% of the national seed requirement. CDB produces breeder seed and foundation seed in 03 seed multiplication farms and certified level of seeds are produced also through contract farmers in selected seed blocks. CDB provides 50% inputs free of cost to the contract farmers for producing seed in the seed block.

5) Credit. CDB provides credit from its own fund to small and marginal farmers through inputs like seed, fertilizers and pesticides. Every farmer provides quality seed, fertilizers and pesticides. Credit money is recovered at the time of seed cotton procurement. There is a Memorandum of understanding (MOU) between CDB and BKB , RAKAB to provide credit to cotton farmers. Accordingly, Bangladesh Agriculture Bank (BKB) and Rajshahi Krishi Unnayan Bank(RAKAB) provide credit to the cotton farmers.

6) Other activities. Field level extension personnel of CDB are fully responsible for dissemination of technical information related to cotton production in the country. Core extension activities at the field level includes regular field visit by the grass-root level CDB staff, interaction with cotton farmers individually and in groups, establishment of demonstration plots, conducting farmer group meetings, field days etc. for the exposure to the farmers.

6.6 Cotton consumption

Medium staple cotton (Upland cotton) is primarily used by the textile Industry, which has an estimated annual installed capacity of about 2.5 million bales. But local production mitigates 4-5% of total requirements. On the other hand 50% of comilla cotton and a part of medium staple cotton are utilized by the cottage industry and individual farm family and rest 50% of the short staple cotton exported in England, Japan and other countries, cotton seeds are also used to extract edible oil in the oil industry. However, the use of cotton plant and its products include among other as fuel, as seed and fiber, as cotton seed cake, cotton seed oil, as yarn for textile, as rug and mattress etc.

6.7 Cotton Market

Cotton Development Board (CDB) and private ginners are the buyers of seed cotton produced in the country. CDB purchases seed cotton from the contact farmers for seed purpose. CDB also purchases seed cotton from general farmers in order to assist farmers in marketing of seed cotton and also to ensure reasonable price for the cotton farmers. Prices of seed cotton and lint are fixed by the government through a committee. The price of the seed cotton is fixed on the basis of current international market price of seed cotton.

Table7 Marketing functions and institutions are presented in table below.

Functions	Institutions involved
Primary sale at farm gate	Farmers, ginners , middleman(local traders)
Ginning	Ginners, middleman (local traders)
Spinning	Spinner, middleman(local traders)
Cloth making	Textile mills

6.7.1 Marketing and processing of cotton in the private sector. Cotton is a cash crop and involved in international trade. Therefore, its marketing system is relatively rather complex. The marketing and processing of cotton starts from the farm gate after harvest of cotton and goes through a process at various steps, which have been depicted.(Annex III). Involvement of different parties is shown in the cotton - marketing channel.

6.7.2 The place of cotton in foreign trade. Maximum portion of raw cotton requirement are met from the imported cotton. Local production can meet only 4%~5% of the requirement. Remaining 95-96% are imported from different countries including USA, Uzbekistan, Australia, Pakistan, India, Sudan, Uganda, Turkmenistan, Kazakhstan, Turkey, Egypt, China, Nigeria, South Africa, Cameroon etc.

6.8 Cotton seed industry

Private ginneries produce cotton crude oil. Some of them are used in soap industries and rest of the crude oil is refined by refine industry for edible purpose. The speller machine used by the ginneries for oil extraction, which can extract 10 to 12% crude oil from cotton seeds. Cotton oil refinery industry can produce 78 to 80 kg refined oil from 100kg crude oil. The oil cake is generally used for livestock feeding. Cotton oil cake has high demand in the market for multiple uses. Rural based ginning facilities and cotton oil processing plants is promoting rural industries and creates employment opportunity. This will have very significant social and economic impact both at the farmer level, regional level as well as macro level.

6.9 Ginning industry and capacity

CDB has nine ginning centers located at different farms and cotton growing areas. The ginning centers have a total of ten Lumus 40×12 inch saw- gins with a capacity of about 3 tons seed cotton per 8-hour shift each. Besides, these there are four local made ginning machines. CDB does provide ginning facilities to the cotton growers, there are large number of private ginners in the nearby locations of the cotton growing areas, who provide ginning facilities to the cotton growers. There are more than 50 private ginners in the country and they play important role for cotton production and marketing. They purchase

seed cotton from the farmers through competition. They sell lint to the spinning mills after ginning from their own ginning centers.

6.9.1 Fiber Industry

Total Spinning Mills: 237 Nos
 Total Spindles: 4858473 Nos
 Total Rotors: 100890 Nos
 Annual production of yarn: 500 million kg

6.9.2 Textile and Confection Industry

Total Oven Mills: 1343 Nos
 Annual production of Oven fabrics: 1000 million meters
 Total Knit & Knit dyeing Mills : 446 Nos
 Annual production of Knit fabrics: 1400 million meters
 Total Ready made Garments Unit: 3800 Nos
 Annual production of Ready made Garments: 215 million dozens
 Total Hand Looms: 148350 Nos
 Annual production of Hand Looms: 92 million meters

7 Problems Associated with Cotton Production in Bangladesh

The following are the major problems associated with cotton production in Bangladesh.

7.1 Underdeveloped research activities

Research section is considered the key of development. This section did not improved due to lack of trained manpower, laboratory facilities, adequate fund, collaborative project with foreign countries etc.

7.2 Low yield

Modern production technologies were not developed. Varieties are low yielding.

7.3 Long duration crop

Long duration crop needs 6-7 month for production. Commercial five varieties are grown in Bangladesh namely, CB-1, CB-3, CB-5, CB-9, and CB-10. Out of five varieties, only CB-5 and CB-9 are hairy varieties which are slightly tolerant to sucking pests and all the varieties are long duration and they need at least six months. Some of the private companies have been imported hybrid seeds for trial to see the yield performance but these are not performing better than open pollinated varieties developed by CDB in addition it needs high inputs for cultivation.

7.4 High input cost

High input cost, particularly fertilizer and pesticides. This is because of the heavy reliance on pesticides for cotton pest management.

7.5 Competition from other crops

At present cotton is highly competitive with other crops and in many cotton growing areas farmers find it more profitable to grow other crops such as rice, maize, vegetables, banana, flowers, tobacco etc. than cotton. That's why farmers are migrating to other crops.

7.6 Insect pests and Diseases of cotton

Similar to many countries, cotton in Bangladesh is major polluter crop due to the heavy and indiscriminate pesticide use, especially insecticides for Aphids, Jassids and cotton bollworms. The number of insecticide sprays exceeds 15-20 per season bringing the cost of insecticides to more than 40% of total input costs and triggering pest resurgence and secondary out breaks. Important insect pests of American cotton in Bangladesh include the chewing insect namely American bollworm, spotted bollworm and pink bollworms and the sucking insects namely the Jassids, aphids and whitefly. Sometime

Spodoptera is also become a serious pest in some areas of Bangladesh. The insect pest complex on Hill cotton is similar to American cotton.

7.7 Weed problem

During cotton cultivation, in Bangladesh high rainfall and high temperature prevail that enhance huge growth of upland weeds leads to increase cost of production.

7.8 Low market price for cotton

In Bangladesh, the price fixed by CDB for its procurement of seed cotton from its contact farmers also influences the general market price. The CDB rate itself is fixed by a committee. International market price is the main factor that is considered by fixing the cotton price in Bangladesh. So, cotton price is the important factor in determining future cotton production in Bangladesh.

8 Future Direction

8.1 Cotton based multiple cropping patterns

The land resource is very much limited in the country. Cropping intensity of Bangladesh is very high (about 180%). Farmers expect to have maximum total return from their land in a given time period. Many farmers show reluctance in cotton cultivation for its long maturation period of about 6 months. As such, a short duration variety of around 4.5 months combined with moderate yield is very much needed to satisfy the long felt demand of farmers. This type of variety may be accommodated very effectively in the cropping patterns of northern districts particularly where winter comes earlier than the other parts of country. More emphasis will be given on intercropping, relay cropping and cotton based sequential cropping.

8.2 Insect/Pest Issue

Sucking pest infestation at an early stage of crop growth is quite hazardous and very often escapes the notice of farmers causing heavy damages to the non-hairy cotton varieties under cultivation in the country. Cultivation hairy variety is most effective measure in controlling the infestation. Work on this dimension of research is going on since 1985. A highly tolerant variety to sucking to sucking pest attack associated with higher yield is yet to be found out. The newly evolved variety CB-9 is moderately tolerant Jassid. Research in this line would be strengthening to find out a Jassid tolerant cotton variety with high yield potential. Bollworm especially American bollworm is another virulent insect causes most of the damages to cotton crop. Hand picking of larvae followed by use of insecticides at economic injury level under the IPM concept is found to be very effective and economical in controlling the attack of this insect. However, farmers are not to be attentive in adopting this method. The farmers spraying insecticides, which is not very effective neither the practice is economic. The farmers needed training in this area as well as well as they are to be motivated for effective control of bollworm.

8.3 Variety Development

An exclusive attempt on exploitation of genetic resources in cotton is very much needed for developing a variety with wide desired variability. CDB has more than 400 germplasms in their gene bank. But due to short of adequate qualified personnel and other required other required facilities, this highly technical aspect of research has not taken up yet. CDB likes to be adequately strengthened with the required facilities to upgrade its capability to embark upon the vital research program for full exploitation of the potential genetic resources already available at our gene bank. Research on genetic resources will be initiated to utilize the broad genetic diversification of the crop especially development of hybrid and transgenic cotton (Bt) which is resistant for specific insect with high yielding capacity. Cotton varieties capable of tolerance to excess moisture and water logged condition of soil will also be considered in due attention

8. 4 Low cost management

Reduced cost is the basic way of profit. Cost may be reduced through reduced tillage, foliar application of nutrients, use of selective herbicides , IPM practice etc are being introduced.

8. 5 Education and training

Provision of higher education and training in all level of manpower in CDB to be qualified for research and extension have been planned. Cotton farmers will also o be trained.

9 Conclusion

In the verge of 4th meeting of ACRDN international communities may provide cooperation to develop status of cotton in Bangladesh. The area of cooperation may be-

1. Transfer of modern generated technologies to our country like Bt cotton, short duration variety, dwarf variety, selective herbicides, hybrid cotton etc.
2. Developing information net work related to cotton research and development.
3. Providing higher education and training to create qualified manpower for research and extension which is urgent need.
4. Providing Consultants for development of net work of cotton research, extension and training.
5. Considering Bangladesh while developing new collaborative project.

Annexure-1

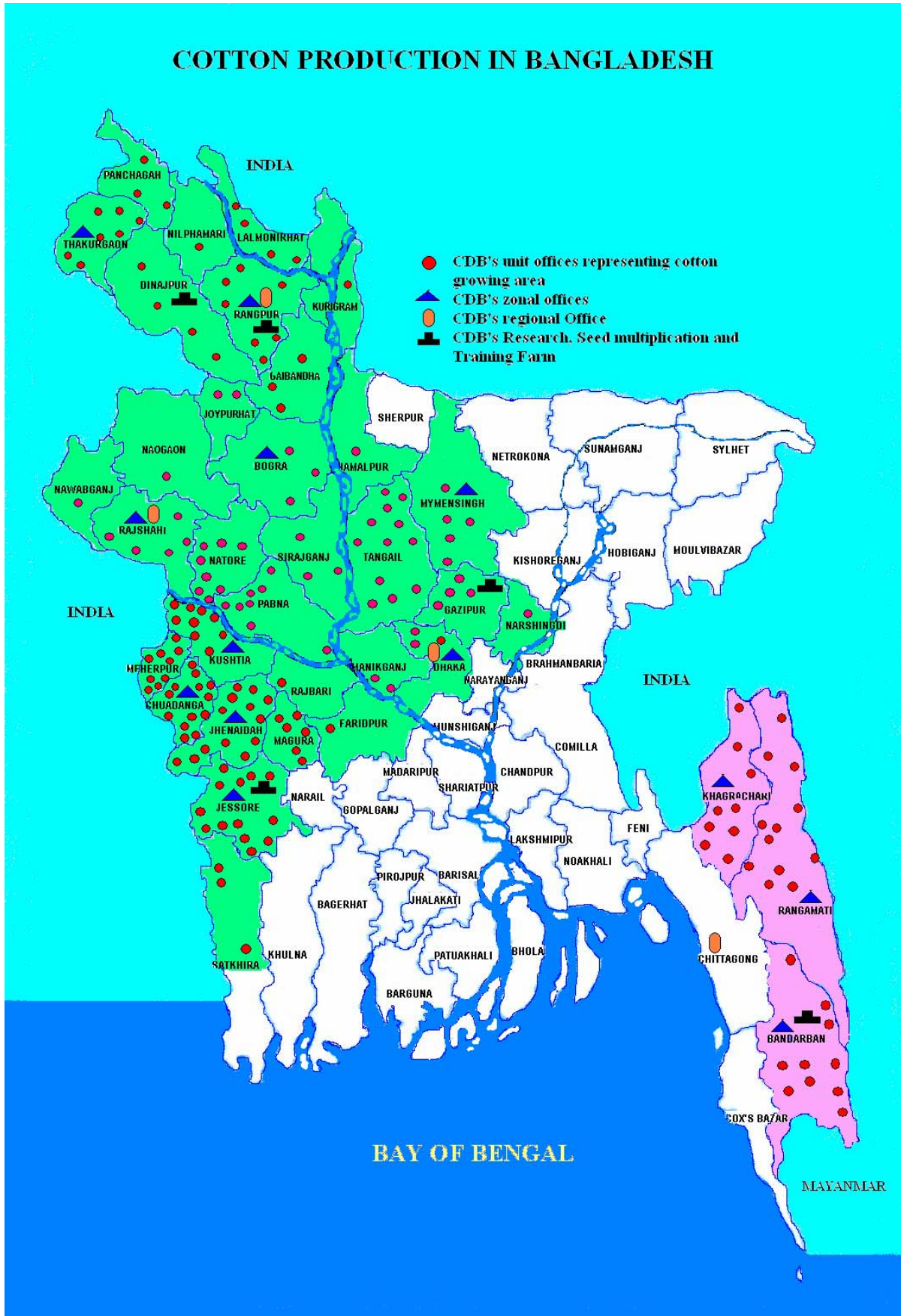


Figure - 1

(The Map showing American & Comilla cotton growing areas, Bangladesh)