

THE PAST AND PRESENT FISHERIES SITUATION IN BEEL DAKATIA AREA

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ABSTRACT

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The area where Beel Dakatia is situated is a part of the deltaic Bengal plains and it is in the northern part of Khulna district and southern part of Jessore district. Over many years, saline water was used to intrude into beels through the rivers and streams draining the area and caused severe damage to the crops. The embankment and flood control structures were built in the mid 60's for providing protection against tidal and catastrophic-river flooding generated water logging problem and intrusion of saline water. Actually, these protection embankments did not give an effective solution rather created water logging problem because of lack of sincere maintenance of sluice gates, causing prolonged inundation of the homestead lands. The number of fish and fish species in the open water bodies in the Beel Dakatia area has declined since water logging became an acute problem. The study was undertaken to investigate the past and present fisheries situation in Beel Dakatia area. The effect of water logging on Beel Dakatia fisheries, the adaptability of people in terms of occupation with the new situation arisen and present culture condition of Galda (*Macrobrachium rosenbergii*) in Beel Dakatia were surveyed and discussed.

Keywords: Fisheries condition, water log, technical solution

INTRODUCTION

Beel Dakatia is one of the very large saucers like water bodies of the coastal area of Bangladesh. It is located in the southwestern region of the country, covering a gross area of 11,609 hectare. Before 1960 this Beel area used to drain out through the Humkura and Upper Solmari rivers. The majority of the Beel area was under cultivation (IBS, 1997). However, the area was susceptible to flooding through monsoon rain and intrusion of tidal saline water through these rivers. Different types of local fish species are abundantly found during the monsoon-flooding season. Brackish water fishes are also found in Beel Dakatia and comprise approximately 15% of the total catch (ADB, 1996).

Until the 80s, Beel Dakatia was a place of green peace with its flourishing Agro-based economy and colorful socio-cultural enrichment. All around the year with crops in the field and fish in the adjacent canals and ponds and overall steady assurance of wage, people of Beel Dakatia wear a look of satisfaction. But unfortunately their good days did not last long.

In the early 1960s in order to protect the coastal areas including these Beels from intrusion of saline water, the then government conceived a Coastal Embankment Project (CEP) as a part of green revolution program. The then Water and Power Development Authority (WAPDA) constructed a network of embankments forming polders that provided protection from daily tidal inundation by saline water and from peak seasonal or storm flood level. This project allowed the coastal land to be more intensively developed for agriculture purposes and agricultural protection increase significantly for 10 to 15 years. Crops were so plentiful that the area came to be known locally as the "granary of Khulna".

However, the drainage became a problem because of elevation of the river gradient due to heavy siltation on the downstream. The drainage outlets as well as the sluice gates have been gradually blocked by siltation due to reduce volume of upstream water and decrease the speed of water flow in the adjacent rivers as the constructed embankment obstructed the tidal volume flowing in and out of the polder areas.

The accumulated rainwater of the catchment area of the Beel Dakatia could not get the outlet. On the other hand, the early monsoon rain aided in increasing the extent of inundation. Therefore, water logging spreaded gradually; the area under permanent flooding has been increasing remarkably since early 1980s. Local people suffered for a decade and waited for the government to find some solutions for them. The prolonged flooding and the continued deterioration in the quality of the stagnant water trapped in the polder particularly frustrated them.

The numbers of fish and fish species in the open water bodies in the Beel Dakatia area have declined since water logging became an acute problem. Agriculture suddenly stopped. Most people have changed their main occupation and turned into fishermen. Men and women from wealthy families started fishing in the Beel with its limited fish stock. The shrubs and bushes were the breeding grounds of fish. With the intrusion of saline water, these have been destroyed. Therefore, the fish stock has not increased, but more people have now become fishermen. So more fishes are caught reducing the fish stock. In addition, the quality of water in the Beel has been deteriorated recently. Diseases, sometimes leading to epidemics have attacked fish (R. Atiur, 1995). In recent years, shrimp culture is introduced in the Beel Dakatia area and the practice of the culture is increasing day by day in the area. Now (2000) this area is prominently in favour of shrimp culture and it has emerged as dominant income of the local people of the area.

Though it is a characteristic for the coastal area that there can be flooding by over flowing water during high tide or by excess rainfall but those water can be drained out after sometime. This general rule is not applicable in eight unions of Khulna and Jessore districts in the Beel Dakatia area. The cultivated lands remain under water for nine months of the year. As a result, the opportunities of crop production are very limited. So the man made environment problem of this vast locality has turned into

a human catastrophe of a great magnitude. This study is aimed at emphasizing a basic and explanatory research on “The Past and Present Fisheries Situation in Beel Dakatia area”. This research paper aims to investigate the changes in past and present fisheries conditions due to water logging in the study area and to detect the trend of changes through time, to identify the effects of water logging on Beel Dakatia fisheries resources, to find out the actual causes of water logging and to assess the impacts of water logging on the people of Beel Dakatia in general, to study the adaptability of the people in terms of occupation with the new situation arisen, to recommend some technical solutions about the overall problems.

METHODOLOGY OF THE STUDY

Selection of the study area

Beel Dakatia, literally meaning robber saucer located in polder 25 adjoining Khulna City. The headline area where local people came out in thousands to protest against the continued water logging created due to ineffective management of the coastal embankment constructed before. The stopping of natural flow of water was due to ineffective management. The agricultural production was seriously affected such as fisheries. This kind of area is suitable for research. Besides, proximity of the area made it easier to collect information from different sources and this area represents different degrees of physical and social aspects. So, the Beel Dakatia was selected here as the study area.

Data collection

The study drew heavily on both primarily and secondary data. Secondary data had been obtained from various studies and reports of studies already undertaken both by the government and by various private agencies. Primary data had been collected using both participatory approach and structured questionnaire methods. Participatory approach method was used for collecting the information that could not be otherwise collected through the structured questionnaires. In doing so, the researcher went to the study area for several days. During several days’ observations, the local people were interviewed to represent the past and present fisheries situation in Beel Dakatia area due to water logging phenomena.

Some secondary sources of information from organizations including Department of Fisheries (DOF), PRODIPAN, Coastal Development Partnership (CDP), KJDRP (Khulna Jessore Drainage Rehabilitation Project) and other published and unpublished reports were also used for this study.

A. Reconnaissance survey

First, a reconnaissance survey was conducted in Beel Dakatia. During the study, different problems related to physical and socio-economic aspects of Beel Dakatia were observed and noted down. In addition to this, informal discussions were held with the villagers.

B. Questionnaire survey

Through the reconnaissance survey and informal discussion, a model questionnaire was designed. The questionnaire was revised into final form through review and pre-testing.

The questionnaire was rearranged for the purpose of inclusion of relevant information, preparation of open and close format of questionnaire, consistency in the design of the questionnaire and pre-testing before finalizing the questionnaire.

At the starting point of this research, a draft questionnaire was prepared. Finally, the questionnaire was corrected with the actual situation prevailed in the area.

Data analysis

After collecting the data from primary and secondary sources, efforts were made for process the collected data. After sorting, all the data were categorized and interpreted according to the objectives of the study.

OBSERVATION AND DISCUSSION

Impacts of water logging on fisheries

The Beel Dakatia area was susceptible to flooding through monsoon rain and intrusion of tidal saline water through these rivers. Different types of local fish species are abundantly found during the monsoon-flooding season. Some of the areas are flooded by brackish water by tide and other areas have fresh water. Local people in the past used to make with their own initiative temporary embankments for eight months of the year for crop cultivation. These embankments were removed after each harvest allowing plot-use for fishing by browsing river species of fishes and crustaceans. Only local varieties of crops were chosen for cultivation but yearly harvest was not certain as the land was often flooded by tidal surges. Indigenous paddy cultivation and fishing were the people’s prime occupations (Amin, 1997).

According to the survey, after the water logging problem the people of the area changed their main occupation and turned into fishermen. Asian Development Bank (1996) reported the percentage of the total households around Beel Dakatia to be 58.5%, which is considered to be subsistence fishermen in 1996.

Cent percent of the respondents from the study area said that fewer fish are now available than before. Fishermen mainly used different types of net (Tana jal, Katta jal, Current jal, and Khepla jal) for fishing. They also used borshi, ghuni, charo

and koach. A fisherman was able to catch 10-15 kg fish per day. A little portion of the harvested fish used to take for consumption for his family and the rest were sold in the local market. At the beginning of winter, most fish were harvested than the other seasons.

Table 1. Lists of species of fish, which were used to be available before water logging in Beel Dakatia

SL. No.	Name of the species	Local name
1	<i>Channa striatus</i>	Shol
2	<i>Channa marulius</i>	Gazar
3	<i>Anabas testudineus</i>	Koi
4	<i>Heteropneustes fossilis</i>	Shing
5	<i>Clarius batrachus</i>	Magur
6	<i>Colisa fasciata</i>	Khalisha
7	<i>Wallago attu</i>	Boal
8	<i>Nandus nandus</i>	Roina, Meni, Bhada
9	<i>Puntius sarana</i>	Sorputi
10	<i>Puntius ticto</i>	Puti
11	<i>Channa punctatus</i>	Taki
12	<i>Mastacembalus armatus</i>	Baim
13	<i>Mystus vittatus</i>	Tengra
14	<i>Ompok pabda</i>	Pabda
15	<i>Glossogobius guiris</i>	Biala
16	<i>Pampus argentus</i>	Folichanda
17	<i>Metapenaeus spp.</i>	Chingri

Cent percent of the respondents from the study area said that bio-diversity in fish species has been seriously affected. Many of the local fish species have already been lost due either to over fishing or epidemic. According to the survey, there were fish epidemics during last six years.

When asked what caused the decline in fish production, 100 percent of the respondents opined that the intrusion of saline water into Beel Dakatia was the major cause of the thinning of fish in the area. Over-fishing by too many people has also reduced the fish stock. Other factors identified by the respondents were both frequent epidemics and the destruction of bushes, shrubs and other vegetation in the Beel.

The water of Beel Dakatia has already damaged the fresh water fish and pond water. Mrinal Haldar said that Sarputi, Gazar, Magur, Koi, Boal etc. used to be found in abundance. Now, they are not seen. Besides siltation of the river and streams, flowing in to Beel Dakatia may have affected the growth of the fishery in Beel Dakatia area. Brackish-water fish are also found in Beel Dakatia and it comprises approximately 15 % of the total catch.

Table 2. Lists of the endangered species of Beel Dakatia

SL. No.	Name of the endangered sp.	Local name
1	<i>Nandus nandus</i>	Roina
2	<i>Puntius sarana</i>	Sarputi
3	<i>Chunna marulius</i>	Gazar
4	<i>Clarius batrachus</i>	Magur
5	<i>Anabus testudineus</i>	Koi

Besides, different types of frogs, birds, snakes, jackals have decreased which were found in Beel Dakatia. Bishwanath Mondal said that many migratory birds used to come to Beel Dakatia during winter but now they are hardly seen. A new kind of fuel, created from residuals of water hyacinth and other plants due to increased salinity of the water.

In 1994, Bangladesh Water Development Board (BWDB) took an Early Action Plan viz. pumping out water from the Beel; rehabilitation of the three existing sluice gates; re-excavation of Shalua river of 12 kilometers out of 20 kilometers; cutting at least 15 new canals within the Beel area; building a new automatic sluice gate at the connection point of Kajibatcha and Shalua river, and cutting a new canal to connect Sandhya Khal to Shalua river etc. Consequently, a part of the Beel has already dried up. However, the factors adversely affecting the environment are still active and in a way have compounded the problems of livelihood for many. The farmers turned fishermen have been adversely affected with the drying up of the Beel. The new opportunities of employment for them are yet to emerge.

Cent percent of the respondents identified water logging and salinisation as the number one cause of the suspension of agriculture in the area (Atiur, 1995). 90% of the respondents said that soil fertility has been affected by prolonged water congestion, which has reduced the land productivity (Atiur, 1993). Therefore, it may be said the area is not suitable for agricultural production because of saline water. As a result, Shrimp culture is introduced to the Beel Dakatia area and the

practice of shrimp culture is increasing in Beel Dakatia. This area as a whole become suitable for shrimp culture and now as such, the shrimp culture has emerged as a dominant income generating source for the local people.

Present condition of Galda (*Macrobrachium rosenbergii*) culture

During 1995, shrimp culture was introduced in the Beel Dakatia area. Asian Development Bank 1996) reported that in Beel Dakatia area about 503 hectares of aquaculture ponds (ghers) were constructed for Galda culture and put into operation within the last 10 months then. At present 80% people of the area are gher owners. The respondents who were the gher owners said that most of the ghers are under traditional culture i.e. they stock the wild fries from the fry traders and rear them in the gher. Consequently, production is 250-273 kg/ha but in abroad, it is 1500-3000 kg/ha. Farming system adopted by the farmers is primitive and is restricted only on trapping the seed of various organisms including shrimp coming with rising tides, grow them for a certain period of time and then harvest them by draining out the impounded water.

Area of gher

Ninety percent of the respondents who were the gher owners said that the total areas of the gher are not on their own lands. They have taken the land on lease from the land owners. Most of the ghers are of small size and area is about one to three bigha. The reasons for the existence of ownership and economic causes of large number of small size ghers were fragmentation of land due to multiple owners and economic inability of rural people to dig bigger size ghers. Many people have more than one gher.

Sources of fry

The sources of fry included natural sources, hatchery produced sources and foreign fry. In Beel Dakatia area there was no hatchery to supply hatchery-produced fry. Fry stocked by the farmers came from the wild or natural sources by the fry traders.

Fertilizer uses for gher preparation

Generally, fertilizers are used at the period of gher preparation to enrich soil nutrient that could provide primary productivity. Fertilizer such as Urea, TSP and cow-dung were used by the farmers. The application rate of fertilizer varied from farmer to farmer. Some of the farmers used mainly cow-dung, urea and TSP during culture period to increase the availability of natural food. Out of 12 gher owners, 11 were used fertilizer during gher preparation and one did not use fertilizer.

Table 3. Fertilizer uses for gher preparation

Types	Amount /decimal
Cow-dung	1-2 kg
TSP	100 – 180 gm
Urea	60 – 120 gm

Stocking of fry

The farmers stocked prawn fry into the ghers in the month of June- July and stocking was done in the morning or late in the afternoon because prawn fry were so much sensitive to abrupt changes of water parameters and exposure to sunlight. Stocking rate was based on fry size. Stocking rate of fry was varied from species to species or even within the same species, various sizes of fry were stocked into the single gher. Other fry such as rohu, catla, grass carp, silver carp, puti were stocked together with galda fry. In such polyculture system the density of galda fry are maintained at low level.

Feeding

Farmers used supplementary feed to culture shrimp for attaining the desired harvesting size within time frame due to lack of natural feed. The farmers used special feed, which were made of locally available raw materials such as mustard oil cake, wheat bran, rice bran and rice. They did not follow any prescribed feeding rate. Considerable amounts of snail meat are also used.

Production and income

The production cost included purchasing of PL and fry of other fish. It also included purchasing of lime, fertilizer, feed and rotenone. Productions cost also considered for labor management, house repairing, harvesting gears, basket, night guard and transport. According to interview taken from the farmers at random the total production cost of a 100 decimal gher was 35455 taka. The total production of a 100 decimal gher was 210 kg prawn, 50 kg rui, 80 kg catla, 90 kg silver carp, 40 kg grass carp, 60 kg puti and the total income was 85700 taka. The net profit was 50245 taka.

Total area	:	100 decimal
Total input (included lease value)	:	35455 Tk.
Total prawn production	:	210 kg
Total fish production	:	320 kg

Total value of prawn	:	73500 Tk.
Total value of other fishes	:	12200 Tk.
Net profit	:	(85700 – 35455) Tk = 50245 Tk.

Problems in Galda fish poly culture

- Antenna erosion disease of prawn.
- Water quality deterioration in prawn farm.
- Ulcerative disease of fin fish.
- Viral disease of prawn.
- High mortality of prawn fry.
- Lack of knowledge about the amount of food to be supplied to be fish.
- Farmers do not know the amount fish that are to be stocked in pond.
- Do not know the steps in pond preparation.
- Lack of knowledge about stoking ratio of Finnish per decimal.
- Lack of knowledge about technique stocking.
- Low growth rate.
- Water logging.
- Reduction of grazing area.
- High interest rate of loan.

Impacts on occupation

There has been a significant change in the occupational pattern in the study area. Beel Dakatia once was a well-known area as a granary. It was self sufficient in food before the onset of the present ecological crisis. Before water logging started, only agriculture was the principle occupation. Fishing has now become the major occupation for earning livelihood after almost all the croplands have been submerged. All able males and females reportedly go out at night for fishing. Apart from this, many have taken to boatmanship, and poultry rearing for survival.

Table 4. Occupation Pattern of the sample Household heads

Occupation	Percentages	
	Year -1984	Year -1998
Agriculture	33.3	7.7
House wife	2.6	0
Agricultural laborer	33.3	33.3
Non-agricultural laborer	2.6	5.0
Services	7.7	12.8
Carpenter	2.6	2.6
Fishing	2.6	17.9
Rickshaw/Van Puller	0	0
Petty Business	2.6	5.1
Others	12.8	15.4
All	100.0	100.0

Sources: Islam, 1998

According to the survey, the poor farmers who had no land before water logging was satisfied with fishing as principal occupation. Moreover, the landowner people were not satisfied with the new profession during water logging. In recent years, about 80% people in the Beel Dakatia area were gher owners.

Impacts on birds and other species

Many species of birds such as dove, crow, drake, heron, sparrow, cuckoo, kite, water hen, kingfishers were seen. But today they are nearly out of sight. Different kinds of animal like fox, jackal, squirrel, mangoose etc were used to be seen in the Beel. However, they have migrated to some other place due to shortage of food.

Along with, livestock and insects have decreased in the village. In these villages, 95% of the respondents have opined that birds have decreased in their areas. On the issue of decrease of insects 59% opined in the affirmative.

Table 5. Opinion of the respondents on the impact of water logging on Birds and Insects

Opinion	Percentage	
	Yes	No
Birds decreased	94.9	5.1
Insects decreased	59.0	41.0

Beel Dakatia is the glaring example of a man made disaster. Unforeseen condition, faulty construction of the coastal embankment and lack of proper maintenance of the polders of Beel Dakatia however led to a tragic situation. Instead of protecting the Beel from saline water intrusion, there was initiation of water logging together with salinity, which turned into a huge permanent water body. The impact of this water logging and salinity over a period of thirteen years in Beel Dakatia has been disastrous for the physical environment; the people of the area and their livelihood. The magnitude and suffering of the population is incalculable.

The number of fish and fish species in the open water bodies in the Beel Dakatia has declined since water logging became acute. But more people now engage themselves in fishing out of desperation. Even women participate in big numbers in fishing for survival. Water logging and salinisation have not only wiped out trees and shrubs and fish species, but also these twin problems have also caused havoc to local wild animals.

Water logging in Beel Dakatia has profoundly affected people of all socio-economic backgrounds. Most farmers in the project area have changed their occupations and now earn from fishing activities. During water logging over a period of thirteen years, fishing was the principal occupation in the project area as against only 2 percent of the people with this occupation before water logging.

In recent years, after the reclamation program by the Bangladesh Water Development Board (BWDB) a part of the Beel has already dried up. However, the factors adversely affecting the environment are still active. The soil fertility has been affected by prolonged water congestion and by salinisation, which has reduced the land productivity. Therefore, Shrimp culture is introduced to the Beel Dakatia area and the practice of shrimp culture is increasing in the area. Now (2000) the area is in favour of shrimp culture and culture practice has emerged as dominant income sources for the local people of the area.

From the above, it is appeared that it will take at least another 5-6 years to resolve the Beel Dakatia water logging problem. But people have to survive now. In this context, the authorities should come forward to help the victims. The water logging may be considered as a resource base instead of a menace. This water can be used for creating employment through introduction of extensive fish culture and other economic activities such as duckery and hog rearing. After above discussion, the following recommendations may be included.

1. All measures must be undertaken to preserve the general environment through better management of water bodies and sustainable exploitation of the resources.
2. Conventional data collection by outsiders should complement by information generation process, which can take note of people's perception of the problems.
3. It should be clearly identified the water logged area and involved communities for their management.
4. Formation of field level beel management coordination committee.
5. Beel management measures e.g. khal excavation must be installed in Beel Dakatia.
6. Step should be undertaken to decrease the salinity of land for both agriculture and fisheries production.
7. Sustainable stocking program must be implemented in the low water bodies of Beel Dakatia where water remains all the year round.
8. Promotion of alternative economic activities and employment for the fishing communities during the period of fishing restriction.
9. It should develop the socio-economic condition of the fisherman through support service including savings/credit.
10. Modern technology of fish-prawn polyculture must be defused to the fish farmers to increase the production.
11. The government or NGOs must provide extension service about prawn culture to the fish farmer.

12. Local organizations like villages club, cultural groups, schools, collages, local NGOs, local self government bodies etc. should be meaningfully involved in both the planning and implementation phases of any development projects that affects the survival economy and people lives at grass root level.
13. It should manage the conflict between the Beel users and fish communities.

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