

## **Fish Production and Livelihood of Fish Farmers of Chalan Beel Area, Bangladesh**

Nahid Sultana\* MNazrul Islam

Department of Zoology, University of Rajshahi, Rajshahi 6205, Bangladesh

---

**Abstract:** A survey was conducted in ChalanBeel to determine the fish production and livelihood status of fish farmers for a period of thirty six months (July 2011-June 2014). The survey was conducted on 90 fish farmers of 52 villages under 3 Unions. Data were collected through personal visit and interviews following a detailed questionnaire. Total fish production from the ChalanBeel was 11999 tons in 2012, being comprised of 715.33, 3549.93, 3932.24, 3801.50 tones from river, beels, flood plain, and pond and borrow pits respectively. The total fish production in the ChalanBeel declined by 45% in 2012 compared to the production in 1982. Among the fish farmers 23.3% was illiterate where as 14.4, 8.9 and 6.7% were educated upto primary secondary and higher secondary or above level, respectively. 58% fishermen were with 0.041 hectare lands. Above 50% were lived in nuclear-family. 40% people lived in earthen house, constructed by grass leaves and mud. The highest percentage (33%) fish farmers earned Tk. 25,000-50,000 per year, 32% earned Tk. 50,500-1,00,000 and the rest 25% earned above Tk. 125,000 annually. Only a few 18% of them were found to be use electricity. Fish farmers were found to face various problems such as social, economical and technical problems, which were identified during the study. Necessary overcome efforts are also suggested according to the problems.

**Key Words:** Fish production, fish-farmers, livelihood status, ChalanBeel.

---

### **I. Introduction**

ChalanBeel is a very good natural habitat large and small indigenous fishes of differences food habits. Many of the fish species can multiple in number in ChalanBeel. People living in village around the beel harvest the fish almost round the year without any prior investment except catching devices. A large portion of rural families are engaged in part time fish capture from the flood plains. Fish and fishery resources play a vital role in improving the socio-economic condition, combating malnutrition, earning foreign-currency and creating employment opportunities in Bangladesh. Bangladesh has an extensive water resources of about 4699387 ha of which 3916828 ha is inland open water and 782559 ha is closed water. Beel fisheries is covering the area of 114161 ha with an average productivity 770 kg/ha/yr. In case of culture-fisheries, especially in ponds and ditches covering the area of 371309 ha with an average productivity of 3896 kg/ha/yr, the productivity of pond and ditches are 5 times higher than that of beel fisheries (FRSS, 2012-13). ChalanBeel can be considered as one of the ideal fish production area in Bangladesh. ChalanBeel is suitable for indigenous fishes and culture fishes. There fore, if fishers adopt improved fish culture technology and community based fisheries management then fish production will be increased in this beel through good aquaculture practices. Fisher folk are considered as one of the most backward sections in our society. Information on socio-economic framework of the fish farmers forms a good base for planning and development of the economically backward sector. Lack of adequate and authentic information on socio-economic condition of the target population is one of the serious impediments in the successful implementation of developmental programme (Ellis, 2000). Aquaculture practice has become a promising and gainful methodology to attain self-sufficiency in food sector and also to alleviate poverty in developing country like Bangladesh (Ahmed, 2003). A livelihood is sustainable when it can cope with and recover from stress and shocks and maintain to enhance its capabilities and asset both now and in the future (Chambers and Conway, 1992). The social content is especially important particularly access arrangement and assessments of benefits to livelihood (Azucena et al., 2001). The aim of this study was to assess the natural resources, relative economic performance (Land holding, labour, utilization gender etc.), evaluation the social changes (nutrition, housing, mobility, group involvement etc.) also to identify the constraints associated with fish culture and livelihood status of the farmers.

## II. Materials and Methods

**Study area and duration:** The present study has been carried out study in ChalanBeel the largest wet land of Bangladesh situated in the northwest region (Figure 1). This research was conducted between July 2011-June 2014.

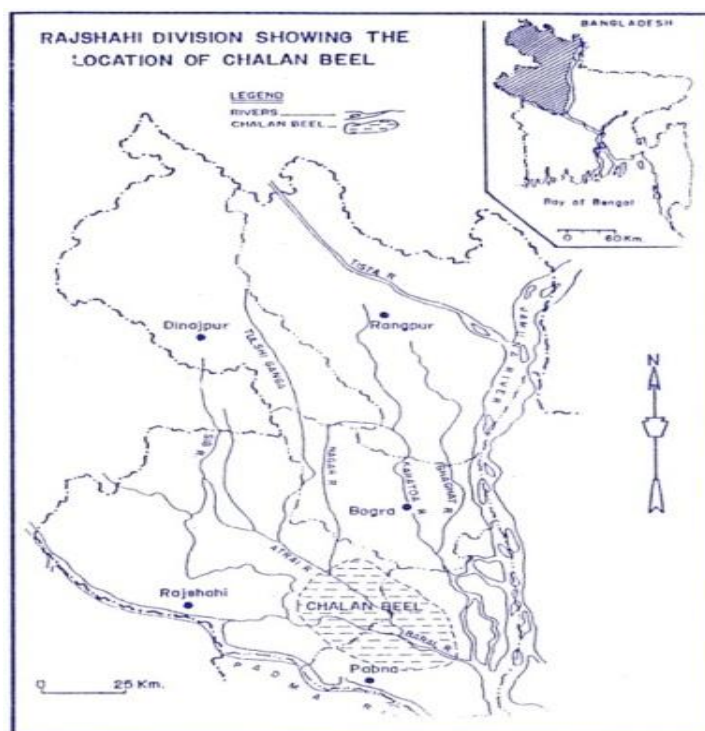


Figure-1. The location of the ChalanBeel

**Field survey and data collection:** Extensive field surveys were made for the collection of primary data. The survey was conducted on 90 fish farmers of 52 villages under 3 unions. Various literatures and statistical data were collected from Upazila Fisheries Officer (UFO), Local Government and Engineering Department (LGED) Office and Statistical Office at SingraUpazila Gurudaspur Upazila and Tarash Upazila. For collecting data on various aspects of livelihood and technological issues, three methods were used-interview, photograph and direct observation. For collecting data both individual and group interviews were conducted. In most of the cases, a range of PRA tools were applied with different degree of effectiveness of the farmer's information.

**Data analysis:** Collected data were accumulated grouped and interpreted according to the objective. Data were subjected to simple descriptive analysis using computer software Microsoft Excel 2007.

## III. Results and Discussion

**Fish production in the Chalan Beel:** The total fish production from the ChalanBeel was 11999 tons in 2012, being comprised of 715.33, 3549.93, 3932.24, 3801.50 tones from river, beels, flood plain, and pond and borrow pits respectively (Table 1). The corresponding productivity-estimates were 224, 387 and 179 kg/ha<sup>-1</sup>, respectively, in river, beel and flood plains. The total fish production in the ChalanBeel declined by 45% in 2012, compared to the production in 1982. Because the total fish production from the ChalanBeel was 26990 tones in 1982, 24336 tones in 1987, 18700 tones in 1992, 15421 tones 1997, 12460 tones in 2002 and 12211 tones in 2007. The present study suggested that the production of the ChalanBeel could be increased to 50,000 tones if basic management-practices are followed (e.g. proper execution of fish act, establishment of fish sanctuaries, maintaining minimum water depth in the dry season).

Table 1. Total fish production in different water bodies in the ChalanBeel in 2012.

Types of water body	Total fish production (tone)	Production (kg/ha <sup>-1</sup> )*
River	715.33	22.53
Beel	3549.93	380.70
Flood plain	3932.24	177.90
Ponds & borrow pits	3801.50	1493.07
Total	11999	

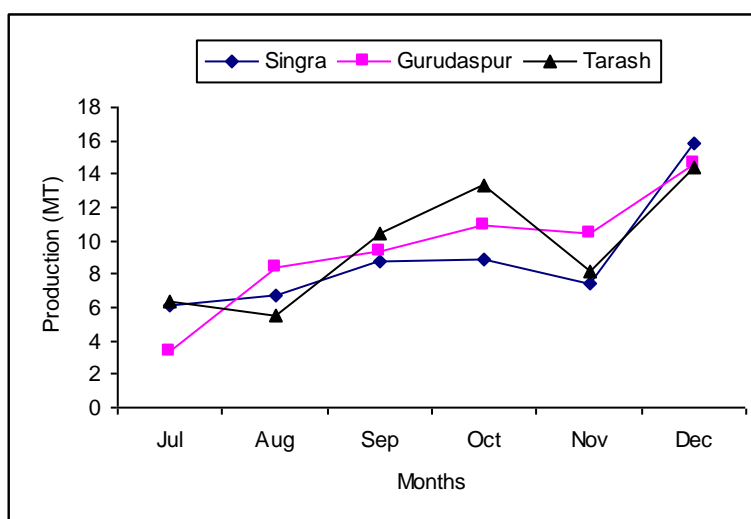
\* Calculation of per unit production, total production is divided by area of water bodies in monsoon season.

Source: Upazilla Fisheries Offices (Singra, Gurudashpur and Tarash) 2012.

Monthly fish production during the study period is given in Table 2 and Figure 2. The fish production showed significant ( $P < 0.05$ ) difference among the months, however, not among the sites (Singra, Gurudaspur and Tarash). The higher fish production was observed in the month of December followed by October and September. The monthly production different significantly ( $P < 0.05$ ) in different months.

**Table 2.** Mean±SD of fish capture (MT) in different study area and month during study period in 2012.

Month	Mean±SD of fish captured (MT) at different Upazillas		
	Singra	Gurudaspur	Tarash
July	6.08±0.12	3.32±0.19	6.33±0.01
August	6.73±0.70	8.37±0.35	5.51±0.05
September	8.77±0.25	9.40±0.03	10.39±0.15
October	8.94±0.17	10.93±0.12	13.34±0.03
November	7.45±0.08	10.50±0.16	8.12±0.07
December	15.80±0.15	14.62±0.09	14.44±0.05



**Fig 2.** Fish production trends in different months in the ChalanBeel during 2012

The annual growth rate was positive in 2004-2005, 2005-2006, 2007-2008 and 2008-2009. But it was negative in 2002-2003, 2003-2004, 2006-2007 and 2009-2010. The Annual Growth Rate was declined in 2009-2010 as compared to 2008-2009. Annual Growth Rate of fish production in the ChalanBeel was -0.842 in 2002-2003. It indicates that fish production of beels is in the alarming situation (Table 3).

**Table 3.** Year-wise fish production of beels in Bangladesh (2001-2002 to 2009-2010).

Year	Fish production in Beel (M tone)	Annual growth rate of production over last year
2001-2002	76,101	-
2002-2003	75,460	-0.842
2003-2004	74,328	0.803
2004-2005	74,925	1.921
2005-2006	76,365	-1.608
2006-2007	75,137	3.176
2007-2008	775,24	2.161
2008-2009	79,200	-11.35
2009-2010	70,209	-
Average	75472	-
SD	2326.69	-
CV (%)	3.72	-

Source: DoF (Department of Fisheries), Bangladesh

#### IV. Livelihood status of fish farmers

**Income and living standard:** The farming sources included agriculture, vegetables, aquaculture and livestock. The annual income from different farming and non-farming sources are given in Table 5 and 6. The level of non-farming income is one of the important socio-economic characteristics of the farm families. It was found that agriculture was the main profession, which accounts 51.1% and the second most common profession was aquaculture practice 18.9% (Table 4) which is as same as Islam & Dewan (1986). Women involvement in

earning was some extent low but in same households it was at desired level. Most of the fish farmers had improved their living standard through aquaculture practices.

**Table 4.** Occupation status of the fish farmers.

Occupation	Main Occupation (%)	Subsidiary Occupation (%)
Household work	4.4	15.6
Agriculture	51.1	41.1
Aquaculture	18.9	12.2
Business	6.7	20
Service	6.7	5.6
Labour	2.2	2.2
Student	8.9	-
Unemployed	1.1	3.3
Total	100	100

**Table 5.** Annual income from different farming sources (in thousand Tk.)

Agricultural		Fish farming		Livestock		Vegetables and fruits	
Income	%	Income	%	Income	%	Income	%
Below 20	18.8	Below 25	23.3	Below 5	36.67	Below 3	15.5
20-40	4.4	25-50	13.3	5-10	21.11	3-9	3.3
40-60	3.3	50-75	17.8	10-15	6.67	9-12	21.2
60-80	14.5	75-100	7.8	15-20	11.11	12-15	26
80-100	24.5	100-125	10	20-25	8.89	15-18	16.7
100-120	34.5	125-130	27.8	25-30	15.56	18-20	13.3
Total	100		100		100		100

**Table 6.** Annual non-farming income and its sources (in thousand Tk.)

Source	Income	Number of farmers	%
Business	Below 20	8	8.89
	20-40	13	14.44
	40-60	6	6.67
	60-80	11	12.22
Service	Below 10	3	3.33
	10-20	5	5.56
	20-30	2	2.22
	30-40	9	10.00
Wage labours	Below 2	0	0.00
	2-4	3	3.33
	4-6	5	5.56
	6-8	11	12.22
Others	Below 10	2	2.22
	10-20	4	4.44
	20-30	2	2.22
	30-40	6	3.67
Total		90	100

### V. Literacy and education

Education is a basic right of all population, besides food, cloth and medicine. Majority (14.4%) of the fish farmers were educated up to primary level followed by secondary level (8.9%) and higher secondary or above (6.7%) levels while 27.8% persons can only sign (Table 7) Quaddus et al. (1998) reported that there were no illiterate fish farmers owners in Demra area in Dhaka.

**Table 7.** Educational status of the farmers

Educational status	Number of farmers	%
Illiterate	21	23.3
Can sign	25	27.8
Primary level (Class I-V)	13	14.4
Secondary level (Class-VI-X)	8	8.9
SSC Pass	11	12.2
HSC Pass	6	6.7
Above HSC Pass	6	6.7
Total	90	100

**Family type and size:** In the study area, it was found that 56% people lived in nuclear families and 44% live in joint families. Nuclear-families were popular because of getting freedom of movement and economic opportunities, well dress, better education and authority. The highest percentages (47.76%) found for 7-8 members in a family, the lowest percentage (1.27%) was obtained for 1-2 members. Small family (members <

5) was found in majority (48%) cases in fishermen of the BaluharBaor, Jhenaidah, Bangladesh (Abdullah-Bin-Farid et al 2013). Mahabubullah (1986) found that family size of 44% household was varied between 6 and 8 members.

**Housing condition:** 68% people constructed their house on their owned land and 5% have no house. Majority 66% respondents were living in earthen house. Ahmed (1999) reports that the housing conditions of most of the fishermen are poor, their house made of mud and one kind of wood leaves. Most of the family constructed their house in own land.

**Use of electricity:** It was observed in the study area that majority households (12%) had no electricity connection. DoF (1996) reported from that only 2% fishermen used electricity. Samima (2000) reported that 20% used electricity in Gollamari fishing community.

**Gross annual household income:** The highest percentage (33%) fish farmers earned Tk. 25,000-50,000 per year, 32% earned Tk. 50,000-1,00,000 and the rest 25% earned above Tk. 1,25,000 annually.

**Land holding status:** Majority (58%) of fishermen had only 0.001-0.041 ha land while, 22% fishermen had 0.042-0.082 ha land, 6% fishermen had 0.083-0.123 ha land, 6% fishermen had 0.124-0.164 ha land and 12% of them had above 0.164 ha land. Shahriar et al. (2010) found that the average homestead area of the fishers is 0.003 ha in Jamalpur district.

**Drinking water facilities:** The study showed that household (HH) of 100% fishermen used tube-well water for drinking and among them, 96% HH used owned tube-well, and remaining 4% used tube-wells belonging to others.

**Sanitation status:** The sanitation status found poor in most cases. The finding of the survey revealed that 36% household used closed pit latrines followed by earthen latrines (32%).

**Health and diseases:** Information was collected on the nature of treatment of the people. It was found that 64% respondents received treatment from the quack and only 16% visited trained doctors for treatment of disease. From the survey, it was found that 45% women suffered from skin diseases like diseases like fungal skin diseases, skin irritation.

**Problem:** The major problems were lack of technical knowledge about fish farming livestock and poultry farming, educational institutions like school school, college, etc. as well as infrastructural facilities for the respondents, poor sanitation, credit facilities, insufficient medical. Ali et al. (1982) and Ali & Rahman, (1986) reported that lack of scientific knowledge, attack of fish disease and non availability of good quality fish fry are a major problem in fish culture in Bangladesh. The main constraints in improving this living standard were the lack of input and the persistent indebtedness to the usurious traditional credit system. Chowdhury (1981) also reported that lack of fund for re-excavation of water bodies ranked first among all the problems faced by the fish farmers of Bangladesh.

## VI. Conclusion

The present socio-economic status of the fish mermer of ChalanBeel was not satisfactory. Most of them were solely depended on fishing for their-livelihood. They were not aware of proper sanitation system, schooling of children, balance nutrition and even their health conditions. However, some of them wanted to change their profession for better living. The fish farmers should be given amenities for education so that they can be well aware of their problems and prime rights. All the water resources should be utilized for fish culture to get maximum production by using suitable technology.

## Acknowledgement

The authors are thankful to the Ministry of Science and Technology for Providing financial support to carry out this research work. The authors are also thankful and grateful to the fisher community of the ChalanBeel for this kind help in collecting necessary data and information. We would also like to thank two reviewers of our manuscript for their constructive comments on manuscript.

## References

- [1]. Abdullah-Bin-Farid BMS, Mondal S, Satu KA, Adhikary RK and Saha D 2013. Management and socioeconomic condition of fishermen of the BaluharBaor, Jhenaidah, Bangladesh. *Journal of Fisheries* 1(1): 30-36. DOI: 10.17017/jfish.V1:1. 2013.7
- [2]. Ahamed N (1999). A study on socio-economic aspects of coastal fishermen in Bangladesh. *Bangladesh Journal of Zoology* 24(1-2): 20-26.
- [3]. Ahmed, MNU 2003. Fisheries sector in Bangladesh. *Economy and Development of Livelihood. MothshoPakkho (Shoronika)* 86 pp.
- [4]. Ali, MH & Rahman, MH 1986. An investigation on Socio-economic and technical problems in fish culture in Bangladesh, *Bangladesh J. Agri.* 8(1): 47-51.
- [5]. Ali, MZ, Murollah, M, Rahman, MH & Shofiqz-zaman, AM 1982. Level of inputs used and culture-practice of fish culture in eastern Bangladesh. *Bangladesh, J. Agri. Sci.* 22(2): 37-45.
- [6]. Azucena, CWW, Oliver, MSS, Jonen, BP, Viray, MH and Malley, S 2001. Utilizing different aquatic resources for livelihood in Asia. A resource book, printed in philippines 361 pp.
- [7]. Chambers, R and Conway, G 1992. Sustainable Rural livelihood practical concepts for the 21th century. IDS-discussion papers no 246. Sussex: Institute of Development Studies. England. 148 pp.

- [8]. DoF (1996). Establishing a common prospering Regime Experience of an Inland Fisheries Project in Bangladesh and Some Case Studies of Baor Fishermen.
- [9]. Ellis, F 2000. Rural livelihoods and Diversity in Developing Countries, Oxford.
- [10]. Islam, MS & Dewan S 1986. Economics of fish culture in some selected areas of Bangladesh. Bangladesh J. Aquacul. 8(1): 57-61.
- [11]. Mahbubullah M (1986). Case study of polder and estuarine fisheries community in Bangladesh. In-Socio-Economic study of Tropical Fishing Community in Bangladesh. A report for Food and Agricultural Organization (FAO), Rome, pp. 12-14.
- [12]. Shahriar M, Hoque MM, Haque MR, Hossain MA and Das DR (2010). Livelihood status of fishing community of Morgangi Beel under Melandah Upazila of Jamalpur District, MS Thesis, Department of Aquaculture, BAU Mymensingh. pp. 45-63
- [13]. Shamima A (2000). Socio-economic conditions of fishing community: Gallamary fish market, Khulna. A project thesis in Fisheries and Marine Resource Technology Discipline, Khulna University, Bangladesh, pp. 11-34.