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Socio-economic and livelihood status of fishermen around the Atrai and Kankra Rivers of Chirirbandar Upazila under Dinajpur District

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Abstract

The study was conducted to investigate the socio-economic and livelihood status of the fishermen around the Atrai and Kankra rivers at Chirirbandar Upazila, Dinajpur from October, 2013 to January 2014. Twenty five fishermen were randomly selected from the areas who were solely involved in fishing in the rivers. Several PRA tools were used to collect the data from the fishing communities such as, personal interview, crosscheck interview with extension agents, older persons, transect walk and case study. The data interpretations showed that 60% respondent's primary occupation were fishing, majority of them were middle age group (31-45 yrs) and mostly were landless or marginal land holders. All of the respondents were male of which 84% were Muslims and rests were Hindus. About 88% fishermen were married and average size of middle household (56%) was more than the national average (4.4%). Moreover, 64% family was nuclear, 44% fishermen were illiterate and 36% can only sign. The fishermen used different type of fishing gears such as jakhi jal (68%), current jal (48%), lift net (16%), ber jal (40%) and only 40% used boat for fishing. The 88% respondent sold their catch directly to the consumer, 8% to the retailer and rest to the other fishermen. The majority (72%) of the respondent's annual income was BDT 15,000-25,000 which was lower than national per capita income. Among the respondents, 64% received credit from the NGOs and 36% used their own money in fishing activities, whereas, only 28% of them can save after maintaining their daily expenditure. The river bed siltation, depletion of fish stock, lack of financial ability, inadequate credit facilities, lack of training, low fish price and vandalism were the major constraints of fishing in the study area. The study also revealed that only 20% fishermen managed to improve their livelihood status through fishing activities.

Keywords: Fishermen, Socio-economic status, Livelihood status

1. Introduction

Fisheries sector play a major role in nutrition, employment, foreign exchange earnings and the socio-economic development of Bangladesh. There are about 16.5 million people are directly or indirectly associated with the fisheries sector for their livelihood. Although aquaculture has been developed in Bangladesh last two decades, but its development is not enough and equal all over the country, especially most of the districts of the northern part of Bangladesh. Chirirbandar Upazila under Dinajpur district is one of them. As a result, fish and fisheries sector of Chirirbandar largely depend on natural sources. The rivers of Dinajpur districts are Pathraj, Talma, Punarbhaba, Tapa, Tangon, Dahuk, Ghoramara, Jamuna, Koram, Atrai, Kulica, Baral, Garveshwari, Jabuneshwari, Jaldhaka, Torsa, Kollani and Raidak (Wazed, 1991, Khan 1991, Chowdhury 1995) ^[20, 11, 7]. The Atrai River linked with the Karatoya River originated in West Bengal, then after flowing through Dinajpur district of Bangladesh, it enters India again. When the Atrai River enters into Chirirbandar it is divided into Atrai and Kankra rivers in the place of Saintara Union and again jointed after lying 25 km long in Bhiail Union. Most of the fishermen of Chirirbandar Upazila depend on the blessings of these rivers.

A total of 2, 65,176 people live in Chirirbandar Upazila of which about 2% (5300 individuals) are fishermen (BPC, 2001, BBS 2007) ^[5, 4]. The socio-economic and livelihood status of these fishermen is not satisfactory because fish production of natural source is declining day by day. Socio-economic status (SES) is a measure of an individual's or family's economic and social position in relation to others, based on various variables responsible for that like income, education, occupation, family effluence, physical assets, social position, social participation, caste, muscle power, political influence, etc. Majority of researchers agree that income,

education and occupation together best represent SES. Livelihood can be defined as the capabilities, the assets (natural, physical, human, financial and social capital), the activities and the accesses to these (mediated by institutions and social relations) that together determine the living gained by the individual household (Chambers and Conway, 1992) [6]. Natural capital refers to the natural resource bases includes land, water, forests, marine resources, air quality, erosion protection, and biodiversity that yield products utilized by human populations for their survival. Human Capital includes education, skills, knowledge, health, nutrition, and labor power. Physical capital is basically infrastructure which includes roads, buildings, shelters, water supply and sanitation, energy, technology, and communications. Financial capital includes savings (cash as well as liquid assets), credits (formal and informal), as well as monetary inflows (state transfers and remittances). Social capital refers to the social networks in which people participate and from which they can derive support that contribute livelihood by increase trust, ability to work together, access to opportunities, reciprocity, informal safety net, and membership in organizations. As the focus of this research is fishing communities, their livelihood assets

include land ownership, pond ownership, housing condition, health facilities, drinking water facilities, sanitary facilities, electricity facilities and fishing assets (Nets used, fishing boat and gear).

Total area of Chirirbandar Upazila is 312.35 km² of which 1294.704 ha are water bodies (Rivers 442ha, Govt. pond 48.704ha and Non-Govt. pond 754.00ha). Total fish production 3315.20 MT and demand 3871.50MT. There is a deficiency of fish about 556.30MT (UFO, 2013). So, there is a great potentiality of fishermen to achieve better livelihood opportunities. The study was conducted to know the socio-economic and livelihood status of fishermen and to identify the constraints of socio-economic improvement of fishermen.

2. Materials and Methods

2.1 Selection of study area and period of study

The study was carried out during the periods between October 2013 to January 2014 on the fishing community of seven Unions (Aulia pukur, Abdulpur, Saintara, Bhiail, Amarpur and Tentulia) along the Atrai and Kankra rivers of Chirirbandar Upazila under Dinajpur district (Figure 1).



Fig 1: Map of Chirirbandar upazila of Dinajpur district showing the study area.

2.2 Selection of Target group and sample size

The target group was fishermen who were involved in fishing permanently (as the primary income source) and partially (as the secondary income source) for their livelihood. The data were collected randomly from 25 fishermen.

2.3 Design and formulation of questionnaire for data

2.3.1 Data collection

Data were collected by two data collection methods: (a) Primary data collection and (b) Secondary data collection.

2.3.1.1 Primary data collection

Primary data were collected through field survey at village level, fishing place and market by using a questionnaire interview and cross check interview method. Time required for each interview was about 30 minutes. After collecting, data were recorded and cross checked with Upazila Fisheries Officer (UFO) and Fisheries Extension Officer (FEO).

2.3.1.1 Secondary data source

Secondary data were collected from various books, reports, journals, bulletins, thesis paper and organizations.

2.3.2 Data processing and analysis

The data obtained were accumulated, grouped, summarized and finally arranged and presented in textual, tabular and graphical form for easy understanding.

3. Results

The socio-economic and livelihood status of fishermen are presented in terms of

1. **Natural capital:** Aquatic resource, land ownership and pond ownership.
2. **Human capital:** Age distribution, gender profile, religion status, marital status, family size, family type, educational status and dropout of school going children.
3. **Physical capital:** Housing condition, health facilities, drinking water facilities, sanitary facilities, electricity facilities and fishing assets.
4. **Financial capital:** Occupation status, annual income from fishing, source of credit, savings and marketing system and
5. **Social capital:** Training.

3.1 Natural Capital

3.1.1 Aquatic resource (Water body and fish resources)

In the surveyed area, it was observed that the total area of Chirirbandar is 312.35 square km of which 1294.704 ha was water bodies (Rivers 442ha, Khari 50ha, Govt. pond 48.704ha and Non-govt. pond 754.00ha). The fishermen of the Chirirbandar Upazila are largely dependent on these water bodies, especially on the Atrai and Kankra rivers. Different species of fish fauna were caught by the fishers in these water bodies including carp, barbs, catfish, snakeheads, eels, crustaceans etc.

3.1.2 Land ownership

In the study area, the land ownership of fishermen was grouped into three categories: small land ownership (0-20 decimal), medium land ownership (21-40 decimal) and large land ownership (41 decimal and above). The result showed that 48% of fishermen had small land ownership, 20% had medium land ownership and 32% had large ownership (Table 1)

3.1.3 Pond ownership

The result in the surveyed showed that 24% of fishermen had own pond and 76% had no pond (Table 1).

Table 1: Natural capital of fishermen in the study area

Natural capital	Pattern	Number of respondents	Percentages
Land ownership	Small ownership (0-20 decimal)	12	48
	Medium ownership (21-40 decimal)	5	20
	Large ownership (41 decimal or above)	8	32
Pond ownership	Yes (1-10 decimal)	6	24
	No	19	76

3.2 Human Capital

3.2.1 Age distribution

In the study the age of fishermen was classified into three group such as young aged (15-30 yrs), middle aged (31-45 yrs) and old (46-70 yrs or above). The result showed that majority (48%) of the fishermen was middle aged (31-45 yrs), other 24% was young aged (15-30 yrs) and 28% was old (46 yrs and above) aged group (Table 2).

3.2.2 Gender profile (sex status)

The survey was conducted among the fishers of whom all of the fishers were male (100%) in the field level (Table 2).

3.2.3 Religion status

In the study it was observed that the maximum fishermen were Muslim (84%) and a small proportion was Hindus (16%) (Table 2).

3.2.4 Marital status

In the survey, it was found that majority of the respondents were married (88%) and few was unmarried (12%) (Table 2).

3.2.5 Family Size

In this study the family size of the fishermen was divided into three categories on the basis of the number of family members. The result showed about 40% families were small (2-4 person), 56% families were medium (5-7 person) and 4% families were large (8 person and above) (Table 2).

3.2.6 Family Type

In rural Bangladesh, normally families are classified into two types such as: (1) Nuclear family: Married couples with children or consist of the member of two generations (parents and children) and (2) Joint family: a group of people related by blood and/or by law means the member of three or more generations. The result showed that 64% fishermen families were nuclear and 36% families were jointed (Table 2).

3.2.7 Educational Status

In the study area it was found that 44% fishermen had no education, 36% fishermen can only sign and 20% had primary education level (up to 5 classes) (Table 2).

3.2.8 Dropout level of school going children of fishermen

The study result showed that about 8% fishermen had no school going children while 60% fisher's children was dropout at primary level and 32% fishers children was dropout at secondary level (Table 2).

Table 2: Human capital of fishermen in the study area

Human capital	Pattern	Number of respondents	Percentages
Age distribution	Young (15-30 yrs)	6	24
	Middle (31-45 yrs)	12	48
	Old (46 yrs or above)	7	28
Gender profile	Male	25	100
	Female	0	0
Religion	Muslim	21	84
	Hindu	4	16
Marital status	Married	22	88
	Unmarried	3	12
Family size (person)	Small (2-4)	10	40
	Medium (5-7)	14	56
	Large (8 and above)	1	4
Family type	Nuclear	16	64
	Joint	9	36
Educational status	No education	11	44
	Only can sign	9	36
	Primary level (up to 5 class)	5	20
	Secondary level (S.S.C.)	0	0
	Higher Secondary level (H.S.C.)	0	0
Dropout level of fisher's children	Children don't go to school	2	8
	Primary level	15	60
	Secondary level	8	32

3.3 Physical Capital

3.3.1 Housing Condition

In the study area, the housing condition of fishermen was divided into three categories: (1) Kacha-house made of bamboo or tin with mud flooring or wall and flooring made of mud, (2) Semi paka- tin shed with tin wall and concrete flooring and (3) Paka- tin shed with brick wall and concrete flooring. The result showed that about 84% fishermen had kacha house while 16% had semi-paka house and none had paka house (Table 3)

3.3.2 Health Facilities

In the surveyed area, it was observed that the medical treatments of fishermen were not satisfactory. Because most of the fishermen were depend on unskilled and non- professional village doctor. The study showed that about 4% was dependent on kobiraj, 72% on village doctor and 24% was dependent on Upazila/ Pourashava hospital and nobody visited to MBBS (private) doctor (Table 3).

3.3.3 Drinking Water Facilities

In the study area, it was observed that 100% of the fishermen used tube well water of which 80% fishermen had own tube-well and rest (20%) of the fishermen used neighbor's tube-well (Table 3).

3.3.4 Sanitary Facilities

In the surveyed area, it was observed that the sanitary conditions of fishermen were very poor. About 76% fishermen had sanitary facilities of which 52% had kacha while 24% had semi-paka and 24% of the fishermen had no sanitary facilities (Table 3).

3.3.5 Electricity Facilities

In the study area, it was found that 28% of the fishermen had electricity facilities and 72% had no electricity facilities at their residence (Table 3).

3.3.6 Fishing assets (nets, fishing boat and gear)

In the study area, it was found that different kinds of fishing gear specially nets were used. Same fishermen used more than one gear in different season. The survey result showed that about 68% used cast net, 48% was used current jal, 16% was used chatka jal (lift net), 40% was used ber jal (seine net) and only 40% used boat for fishing (Table 3).

Table 3: Physical capital of fishermen in the study area

Physical capital	Pattern	Number of respondents	Percentages
Housing condition	Kacha	21	84
	Semi-paka	4	16
	Paka	0	0
Health facilities	Kobiraj	1	4
	Village doctor	18	72
	Upazila hospital	6	24
	MBBS Doctor (private)	0	0
Drinking water facilities	Own tube-well	20	80
	Neighbor's tubewell	5	20
	Pond, river, canal	0	0
Sanitary facilities	Kacha toilet	13	52
	Semi paka toilet	6	24
	Paka toilet	0	0
	No toilet	6	24
Electricity facilities	Yes	7	28
	No	18	72
Fishing assets	i) Nets		
	Jakhi jal (cast net)	17	68
	Current jal	12	48
	Chatka jal (lift net)	4	16
	Ber jal (seine net)	10	40
	ii)Boat (Dingi)	10	40

3.4 Financial Capital

3.4.1 Occupational status (sources of income)

In the study area, it was found that the maximum (60%) of fishermen were involved in fishing as primary income source while 28% as agriculture and 12% as others (day labor, van driving). On the other hand the maximum (40%) of fishermen was involved in fishing as secondary income source while 16% agriculture and 44% others (day labor, van driving) as secondary income source (Table 4)

3.4.2 Annual Income only from fishing

During the study period, it was observed that 72% of fishermen had lowest annual income from fishing between BDT 15,000-25,000, 16% had a medium income between BDT 25,001-35,000 and 12% had highest annual income between BDT 35,001-50,000 (Table 4).

3.4.3 Credit Access/ Sources of Credit

The survey result showed that 64% of the fishermen received credit (loan) from different NGO's while 36% of the fishermen used their own credit (Table 4).

3.4.4 Savings

In the study area, it was found that only 28% fishermen had savings and 72% had no savings (Table 4).

3.4.5 Marketing system

From the survey, it was found that 88% of fishermen sold their catch to the consumer directly in the local market, whereas 8% sold their catch to retailer or whole seller and 4% sold to other fishermen or neighbor (Table 4).

Table 4: Financial capital of fishermen in the study area

Physical capital	Pattern	Number of respondents	Percentages
Occupational status	i) Primary occupation :		
	Fishing	15	60
	Agriculture	7	28
	Other (Day labor, Van driving)	3	12
	ii) Secondary occupation:		
	Fishing	10	40
	Agriculture	4	16
Annual Income from fishing	Low income (15,000-25,000 BDT)	18	72
	Medium income (25,001-35,000 BDT)	4	16
	High income (35,001-50,000 BDT)	3	12
Credit receive	Bank	0	0
	NGOs	16	64
	Others	0	0
	No (Self credit)	9	36
Savings	Yes	7	28
	No	18	72
Marketing facility of fish	Other fishermen or middlemen	1	4
	Retailer/ whole seller	2	8
	Consumer of local market	22	88

3.5 Social Capitals

3.5.1 Training

From the survey it was found that 4% of fishermen had received training about fishing and 96% had not received any training (Table 5).

3.6 Livelihood Outcome

From the study it was found that 20% of fishermen improved their livelihood status while 80% of fishermen failed to improve their livelihood status through fishing (Table 5).

Table 5: Social capital of fishermen in the study area

Social capital	Pattern	Number of respondents	Percentages
Receiving of training	Yes	1	4
	No	24	96
Livelihood Status	Improved	5	20
	Worsen	20	80

3.7 Socio-Economic Constraints of the Fishermen

In the study area it was found that most of the fishermen were facing different types of problems. The main problems faced by the fishermen are as follows:

- Depletion of fish stock and catch.
- Lack of financial ability.
- Inadequate credit facilities and financial support.
- Lack of training facilities.
- Vandalism i.e. theft of boats, nets etc.
- Low fish price etc.

4. Discussion

In the present study, it was observed that maximum fishermen had land ownership below 50 decimal in which 48% of fishermen had small land ownership (0-20 decimal), 20% had medium land ownership (21-40 decimal) and 32% had large land ownership (41 decimal and above). Momotaz (2009) [14] found that the highest number of fishermen (60%) had above 50 decimal lands. So, this result is different from the present study because of land ownership varied place to place.

From the study it was observed that the majority of the fishermen (48%) was middle aged (31-45 yrs) while 24% was young aged (15-30 yrs) and 28% was old (46 yrs and above) age group. Resulted by Ahmed (1996) in Tangail and Ahmed (1999) [11] in coastal region found that 66% and 70% fishermen were less than 40 years age, respectively. Fishing is an ancient but a profitable profession; for this reason younger and middle aged people of the fishing community like to adopt this profession which was mostly closed with the present study.

In the study area it was found that only male were involved in fishing and females were like to work as housewife. Hossain *et al.* (2013) [10, 13] studied on the socio-economic condition of the fishermen in Jelepara under Pahartoli of Chittagong district. They reported that among the respondents 94% was male and 6% was female. So, this result is different from the present study because of fishing profession is varied place to place.

Religion is a heritable human capital which plays a very important role in the social and cultural life of people of a particular area and can act as a notable constraint or modifies in social change. In the study it was found that the maximum fishermen were the Muslim (84%) and rest (16%) was the Hindu. AL-Mamun (2012) [3] in Gomoti river and Khan (2011) [12] in Teesta river in Rangpur district found that 80% and 70% was Muslim, respectively. Ahmed (1999) [11] studied in coastal area and showed that majority of fishermen were Muslim (68%). Hindu fishermen were found (32%) at Sundarban (Ahmed, 1999) [11]. So, previous study was related with the present study and more or less similar result has been observed.

In the present survey, it was found that majority of the respondents were married (88%) and few were unmarried (12%). Hossain (2009) [9] studied on the socio-economic condition of the fishermen in Jessore District and found that 68% fishermen were married and rests (32%) were unmarried. The result showed about 40% families were small (2-4 person), 56% families were medium (5-7 person) and 4% families were large (8 person and above). Shahjahan *et al.*, 2000 [17] in Jamuna river observed that largest family size was 7.87 persons and the lowest family size was 5.25 persons. The family size of the fishermen varied from 3 to 10 with an average of 6.43 as reported by Islam (2005).

The present study showed that 36% fishermen had joint and 64% had nuclear families. Roy (2010) found that majority (64%) of the fishermen were interested to live separately. On

the other hand only 36% of the fishermen liked to live in a joint family, which is similar to the findings of present study.

There is a strong relationship between social status and education. The higher is the education the better is the livelihood opportunities. From the study area it was observed that 44% fishermen had no education, 36% fishermen can only sign and 20% had primary education level (up to 5 classes). Rahman (2008) ^[16] studying at Jamuna river found that among the fishermen 52.5% illiterate, 22.5% had literateracy (capable of writing their name), 15% educated up to primary level, 7.5% educated up to secondary level and 2.5% educated up to S.S.C. level. Khan (2011) ^[12] studying at Teesta river in Rangpur district found about 20% of the fisher had literacy up to primary level, 68% were illiterate and 6% up to secondary level and 1% up to SSC. This was closely related with the present study.

The nature of housing indicates the social status of the people. In the present study it was observed that maximum fishermen (84%) had kancha house while 16% had semi-paka house. At Teesta river in Rangpur district, Khan (2011) ^[12] found that 83% fishermen had kacha house, 17% fishermen had semi paka house, which is similar to the present study because Rangpur and Dinajpur area belongs to the similar socio-economic conditions.

Sound health is the key points for better living. From the present study it was observed that about 4% fishermen were dependent on kobiraj, 72% on village doctor, 24% on upazila/pourashava hospital and nobody went to the MBBS (private) doctor. Robbani (2007) at Karatoya river found that 45% fishermen were dependent on village doctor, while 11.67% and 3.33% got health service from Upazila Health Complex and MBBS doctors, respectively.

Drinking water facilities help to maintain better health condition. From the present study it was observed that, 100% of the fishermen used tube well water of which 80% used own tube-well and 20% used neighbor's tube-well. AL-Mamun (2012) ^[3] in Gomoti river found that about 30% had own tube well and rest (70%) used neighbor's tube well. This finding is not similar to the present study because the study area was different but closely related with it.

Sanitation is one of the major causes to prevent disease. In the surveyed area, it was observed that the sanitary conditions of fishermen were very poor in which about 76% had sanitary facilities of which 52% had kacha while 24% had semi-paka and 24% of the fishermen had no sanitary facilities which are more or less similar to the findings of Alam (2006). Another study conducted by CPP (1996) ^[8] in Tangail reported that 4% fishermen's household used no latrines.

Electricity facility is one of the major commodities for better living. It was found that 28% fishermen of the surveyed area had electricity facilities whereas, 72% had no electricity facilities. Shamima (2000) ^[18] reported that 20% fishermen used electricity in the Gallamary Fishing Community of Khulna. Momotaz (2009) ^[14] at three villages (Garakhola, Chatiani & Jamira) of Phultala, Khulna showed that 90% fishermen had a facility of electricity and 10% fishermen had no electricity facilities.

The survey result showed about 68% fishermen used cast net, 48% used current jal, 16% used chatka jal (lift net), 40% used ber jal (seine net) and 40% used boat. Ali (2013) ^[2] studied on Atrai river and identified 8 gears from the study. Tsai and Ali (1997) ^[19] reported that different types of fishing gear were changed with seasons according to flooding condition, target species and size of species. Generally, the fishermen used all

conceivable types of fishing gear ranging from bare hand to sophisticated seine and gill nets to catch fish. The present study is similar to Ali (2013) ^[2] and Tsai and Ali (1997) ^[19].

From the present study it was observed that 72% of fishermen had lowest annual income only from fishing between TK. 15,000-25,000, 16% had moderate income between TK. 25,001-35,000, and 12% had highest income between TK. 35,001-50,000. Khan (2011) ^[12] found that the highest income of fishermen was above TK 60,000, moderate income was TK.30, 000- 60,000 and lowest income was TK. 10,000-30,000. Ali (2013) ^[2] at Atrai river in Dinajpur district found that the highest annual income ranged from TK. 61,000-90,000 and the lowest annual income ranged from TK. 30,000-40,000 which is very similar to the present study.

The survey result revealed that maximum (88%) fishermen sold their fish directly to the consumer, 8% to the retailer and 4% to other fishermen. The majority of the fishermen sold their catch to the consumer because the amount of catch per day was very low ranging from 1-5 kg. Few of the fishermen sold their catch to the retailer when they perform Kata Fishery. From the study it was found that 20% of fishermen improved their livelihood status through fishing while 80% of fishermen failed to improve their status. Kundu *et al.*, (2013) ^[13] found that about 95% of the fishermen have improved their socio-economic conditions through fish farming. This finding is not similar to the results obtained in the present study because the study area was different.

From the survey it was identified that many socio-economic constrains exist in fishermen communities. So there is a necessity to manage and provide proper guidelines and training for the proper use of resources to improve their socio-economic and livelihood status.

5. Conclusion

It was revealed that the socio-economic and livelihood status of the fishermen in the study area were very poor. Data from Upazila Fisheries Office (UFO) indicated that about 10% fishermen have changed their profession every 5 years interval. So GO and NGO should come forward to take proper steps and necessary actions for the protection of livelihood status of the fishermen.

6. Reference

1. Ahmed NU. A Study on Socio-economic Aspect of Coastal Fishermen in Bangladesh, MS Thesis, Department of Fisheries Management, Bangladesh Agricultural University, Mymensingh, 1999.
2. Ali FIK. Present Status on Fisheries and Livelihood of Fishermen in Atrai River, Dinajpur, MS Thesis, Department of Fisheries Management, Bangladesh Agricultural University, Mymensingh, 2013.
3. AL-Mamun MA. Present Status of Fisheries with Socio-economic Condition of the Riverine Fishermen of Gomoti River, Comilla, MS Thesis, Department of Fisheries Management, Bangladesh Agricultural University, Mymensingh, 2012.
4. BBS. Bangladesh Bureau of Statistics, *Cultural survey report of Chirirbandar Upazila*, Statistics and Informatics Division (SID), Ministry of Planning, Government of the People's Republic of Bangladesh, Dhaka, Bangladesh, 2007.
5. BPC. Bangladesh Population Census, Bangladesh Bureau of Statistics, Statistics Divisions, Ministry of Planning, Government of the People's Republic of Bangladesh,

- Dhaka, Bangladesh, 2001.
6. Chambers R, Conway G. Sustainable rural livelihoods: Practical concepts for the 21st century, Institute of Development Studies (IDS), Discussion Paper, University of Sussex, Brighton, UK, 1992, 296.
 7. Chowdhury SI. *Arthanitik Bhugol: Visva o Bangladesh* (Economic Geography), University of Dhaka, 1995, 21.
 8. CPP. Compartmentalization Pilot Project, Socio-economic profile of the professional fishermen and institutional organization, *Final report*, Bangladesh Water Development Board, Tangail, 1996, 11-45.
 9. Hossain MA. Socio-economic Condition of Fish Farmers in Jessore District, Khulna, B.Sc. Thesis, Fisheries and Marine Resource Technology Discipline, Khulna University, Khulna, 2009.
 10. Hossain S, Das M, Hossain MS, Mimi MJ. Socio-economic condition of the fishermen in Jelepara under Pahartoli of Chittagong district. *International Journal of Bio Research*. 2013; 1:13-22.
 11. Khan FH. *Geology of Bangladesh*. The University Press Limited, Dhaka, 1991, 207.
 12. Khan MAR. Study on Fish Biodiversity and Livelihood Status of Fishing Community of the Tista River in Rangpur district, MS Thesis, Department of Fisheries Management, Bangladesh Agricultural University, Mymensingh, 2011.
 13. Kundu R, Hossain MS, Das M, Shahem MA, Khairuzzaman M, Mimi MJ. Socio-economic aspects and livelihood of fishermen in Gopalpur upazila under Tangail district. *International Journal of Bio Research*. 2013; 1:01-09.
 14. Momotaz S. Socio-economic Condition of Small Indigenous Species Beneficiaries at Three Villages (Garakhola, Chatiani & Jamira) of Phultala, Khulna, B.Sc. Thesis, Fisheries and Marine Resource Technology Discipline, Khulna University, Khulna, 2009.
 15. Rabbani MG. Fisheries and Socio-economic Condition of Fishermen of Karatoa River, MS Thesis, Department of Fisheries Management, Bangladesh Agricultural University, Mymensingh, 2007.
 16. Rahman. Studied the Socio-economic Status of Fishermen of the Jamuna River, MS Thesis, Department of Aquaculture, Bangladesh Agricultural University, Mymensingh, 2008.
 17. Shahjahan M, Islam MS, Bapary MAJ, Miah MI. Socio-economic conditions of fishermen of the Jamuna River. *Bangladesh Journal of Fisheries*. 2000; 26(1-2):47-52.
 18. Shamima SH. Socio-economic Condition of Fishing Community: Gallamary Fish Market, Khulna, B.Sc. Thesis, Fisheries and Marine Resource Technology Discipline, Khulna University, Khulna, 2000.
 19. Tsai CF, Ali MY. Open water Fisheries of Bangladesh, The University press limited, Dhaka, Bangladesh, 1997, 99-199.
 20. Wazed A. *Bangladesher Nadimala* (Rivers of Bangladesh, in Bangla). Labani, Dhaka, 1991.