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Pearson's Correlation and Likert Scale Based Investigation on Socio-Economic Status of Fisher's Community in Kirtankhola River, Southern Bangladesh

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Abstract: The current investigation was conducted to evaluate the socioeconomic profile of the fishermen in the Kirtankhola River during the period of January to December, 2015. To find out their socio-economic profile, some indispensable socioeconomic information e.g. literacy, income level and saving, religion, age, gender, housing condition, drinking water facility, sanitation and health facilities, electricity facilities, women participations, occupational status, family structure and size, types of fishermen, gender issue, credit source were taken into account from three studied area. Among 120 fishermen, 45% were fulltime and least 21.66% were subsistence fishermen. Maximum fishermen (60%) were middle aged where 3.33% were child. Most of the fishermen were Illiterate (60%) where 1.67 % was Secondary school educated. Majority fishermen (80%) were lived with joint family where 65% fishermen had 7 to 10 family members. Majority fishers (65%) were taken health facilities from village doctor where 5% from private doctor.100% fishermen were used tube-well water and among them 50% fishermen used shared tube-well. Sanitary conditions of majority fishers (70%) were kacha where 15% had no sanitary facilities. Majority households (65%) had electricity facility where 35% had no electricity facility. Annual income of the major respondents (35%) was BDT 56,000 to 70,000.35% women of the fishermen family supported their family by livestock rearing. Gender issue was observed from 45% households of the fishers. The regression curve, Partial and Pearson's correlation test were employed to analyze the data. Likert scale with values of 4, 3, 2 and 1 was developed to determine constraints faced by the fishers in the Kirtankhola River. Study revealed River erosion, the Lack of sufficient fishing craft, Lack of education due to poverty and Lack of alternative income source during band period was very critical in the studied area. Poor socioeconomic conditions of fishermen were forced to overfishing all the year round without considering government rules related to aquatic diversity. Necessary steps should be taken to improve the socioeconomic conditions of fishers in Kirtankhola River.

Key words: Livelihood Status · Fishermen · Kirtankhola River · Constraints · Correlations · Bangladesh

INTRODUCTION

Bangladesh is popularly called the land of rivers [1] and rivers are a prominent feature of its landscape which acts as shelter of large number of fish and other aquatic organisms [2-6]. Fish and Fisheries sector plays a vital role to socioeconomic development of Bangladesh. It acts as the principal source of protein, employment opportunities, food security, foreign incomes and socio-economic improvement [7-11]. About 16.5 million

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people are directly or indirectly associated with the fisheries sector for their livelihood. For the living purpose 10% people of Bangladesh directly or indirectly depended on fisheries [12]. Fisheries sector has already been renowned as a vital income and employment-generating sector in Bangladesh [13], cheap sources of healthy food for the population of the country [14,15]. The rivers are offering immense scope and potentiality for augmenting fish production and socio-economic security of the people living around [16]. A large portion of rural family members are involved in part time fishing from the rivers and beels [17]. Fishermen are considered as one of the most vulnerable communities in Bangladesh who lives hand to mouth and considered as the poorest among the poor [18]. Livelihood is formed with the capabilities, activities and assets (including both material and social resources) that contribute to a means of living. Livelihood status of fishermen fully depend on fisheries resources. A livelihood is a sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and assets both now and in future, while not undermining the natural resource base [19]. For sustainable rural development and poverty elimination, different approaches had been adopted and the sustainable livelihood approach has been gradually extended with its own core and principles for poverty focused development activities [18]. Fishing is the key source of income of the river adjacent fishermen household. But the fishermen cannot fulfill their demand by catch fish properly due to economic, social and technical constraints. Thus, the socio-economic conditions of the fishermen are not satisfactory. They are not capable to earn required amount of money to meet basic needs [20]. Majority fishermen are deprived of many amenities. All the times they have to struggle for survive; as a result, livelihood status of fishing community is not satisfactory at all [21].

Existing fish diversity of Kirtankhola River plays an emergent role in improving socio-economic conditions of fishermen. The river is the baseline of thousands of people in terms of fishing for livelihood and food. Fishery of this river plays a very important role in alleviation of rural poverty and supplying food to the poor fishing community [22]. Socioeconomic condition of fisherman directly depends on seasonal abundance of fish species in the Kirtankhola River. Instability of socioeconomic status occurs due to fluctuation of fish diversity in the river which have 307.00 km sq. catchment area. The average annual income of per capita of the fishermen is BDT 2,442 i.e. about 70% lower than the per capital income of the country as a whole [12, 22-23]. However, socioeconomic status of this fisherman is not satisfactory, uncontrolled fishing and highly destructive devices of fish capture in river deplete fisheries resources and are followed by great economic distress.

MATERIALS AND METHODS

The study was conducted for a period of one year from January to December 2015 in three different villages namely Bukhainogor, Beltola and Lamchori of Barisal district and alone the Kirtankhola River (Figure 1). A total 120 fishermen were participated from those three studied areas and 40 participants was chosen from each area. Primary data was collected personally through face to face interviews supplemented by multiple methodological Participatory Research Approach (PRA) tools such as Focus Group Discussion (FGD) and Crosscheck Interviews (CI) with key informants.

The sample and data were collected weekly throughout the study period. A draft questionnaire was prepared to assemble a complete view of socioeconomic status of fishermen which was pre-tested with few Fishermen. Pre-testing drown much attention in order to reach the objectives of the study. The final questionnaire was improved, rearranged and modified based on the experience gained in pre-testing. The final questionnaire included the questions on the socio-demographic condition, income of fishermen, family size, family members and factors affecting the level of fish production of Kirtankhola River. Necessary pertinent information on the socio- economic condition of fishermen was collected from Upazila fisheries offices.

The empirical measurements of the selected variables are given in Table 1. All the collected information was accumulated and analyzed by MS-Excel and SPSS software (version 16.0) to find out the mean, percentage and Pearson's correlation, multiple regressions. Study area map was modified by the Arc GIS (version 10.1) software. Likert scale technique was also developed to estimate the socioeconomic constraints of fishers. After analyzing the data, result was presented in textual, tabular and graphical forms to understand the present livelihood status of the fishers.

Likert scale with values of 4, 3, 2 and 1 was developed to determine constraints faced by fishers in the area. In this way the fishermen were enquired to rate their constraint as "very critical" "critical" "to some extent critical" and not "critical". The variable mean score of 2.5 was used to ascertain whether the factor in question was critical or not. The variables with mean score of 2.5 and above were considered critical while variable with less than 2.5 were not.

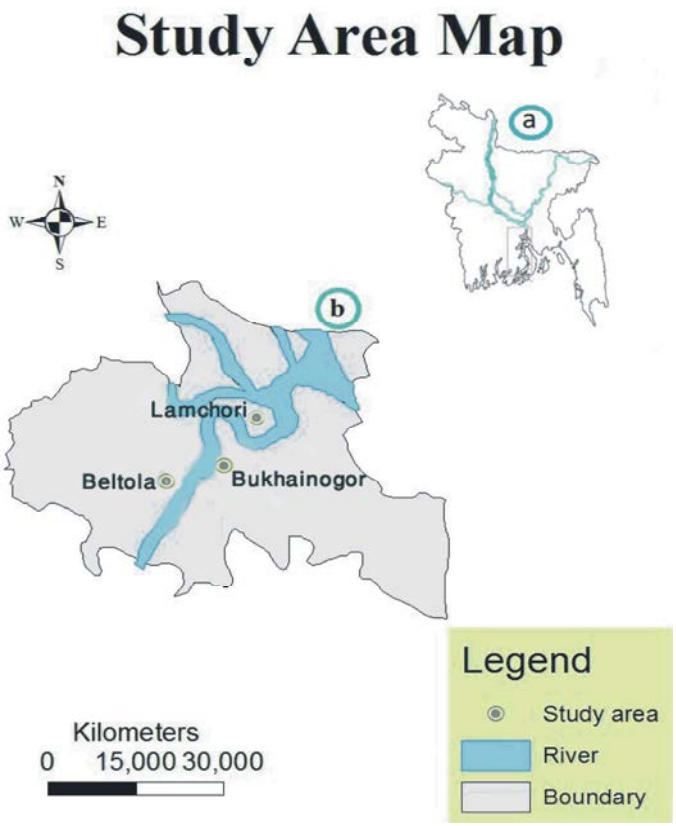

Fig. 1: Map of the Kirtankhola River showing the study area; Map of Bangladesh (a) and enlarged study site (b)

Table 1: Variable and their empirical measurement

Variable	Measurement
Sex	Male or Female
Religion	Muslim or Hindu
Age	Chronological age in completed year
Experience	Number of years engaged in fishing
Family status	Joint or nuclear
Family size	Number of family members
Fishermen Types	Duration of Fishing in a particular year
Education	Higher educational achievement
Sanitation	Condition of sanitary toilet
Electricity	Accessibility of electricity in fisher's house
Training	Achievement of instruction about fishing
House	Physical structure of living house
Health	Reception of health service
Drinking water	Source of drinking water
Primary Occupation	Main occupation beside others
Women participation	Women's contribution in the income
Income	BDT (Thousand) per year
Fishing	Grouped or individual
Gender issue	Unequal access between boys and girls
Recreation	recreational source both fishing and free time
Savings	Saving of money from income
credit	Formal or informal credit sources

Table 2: Socioeconomic characters of fishers in the Kirtankhola River

Variables		Categories with Percentages (%)			Total	Relevant works
1.Sex	Male (96.67%)	Female (3.33%)			100%	[24]
2.Age	Child (3.33%)	Young (23.33%)	Middle (46. 67%)	Old (26.67%)	100%	[25]
3.Religion	Muslim (86.67%)	Hindu (13.33%)			100%	[26]
4.Family status	Joint (80%)	Nuclear (20%)			100%	[27]
5.Family size	Small (2-4) (15%)	Medium (5-6) (20%)	Large (7-10) (65%)		100%	[1]
6.Educational status	Illiterate (60%)	Sign only (30 %)	Primary (8.33%)	Secondary (1.67 %)	100%	[1]
7.Sanitation	Kacha (70%)	Semi-pucca (15%)	No sanitation (15%)		100%	[28]
8.Electricity	Yes (65%)	No (35%)			100%	[27]
9.House	Wood & tin (45%)	Bamboo & tin (30%)	Tinshed (20%)	Semi paka (5%)	100%	[26]
10.Health	Village (65%)	Upazila (20%)	Private (5%)	Kobiraj (10%)	100%	[28]
11.Drinking water	Own (15%)	Shared (50%)	Neighbors (20%)	Cyclone center's (5%)	100%	[26]
12.Gender issue	Education (20%)	Health (16.67%)	Food & others (8.33%)	No issue (55%)	100%	[29]
13.Recreation	Mobile (60%)	Television (18.33%)	Radio & cassette (18.34%)	Newspaper (3.33%)	100%	[12]

RESULTS AND DISCUSSION

Socio-Economic Characteristics of the Fishers: In the Kirtankhola River both male and female were engaged with the fishing for maintaining their sustainable livelihood conditions. Table 2 represents the overall socioeconomic profile of the fishers of Kirtankhola River. Present study revealed 4 female and 116 male fishers from the 120 respondents, this finding exposes that fishing is not particularly the right of the male. Most of the fishers were Muslim (86.67%) where lest portion were Hindu (13.33%). Age of the fishers ranged from 16 to 68 with the mean of 37.34 years. Unsatisfactory educational status was observed in the fisher's community which represented majority portions were illiterate (60%). Mainstream fishers preferred joint family (80%). Most of the fishers sponged with large family (65%). Maximum fishers lead their life in Wood & tin (45%) making house where very small fishers had Semi paka (5%) house. However, 35% households had not any electricity facilities due to river erosion but 100% had drinking water facilities from different sources. Sanitation conditions of the fishers were not satisfactory, mainstream portion was used Kacha (70%) toilet where 15% had not any toilet. Majority respondents (65%) were depended on village doctor for their medical service. In the fisher's house gender issue was observed between boys and girls based on education (20%), food & others (8.33%), health &dress (6.67%) purposes respectively but 55% had no unequal access in the studied area. Fishers were used different types of devised as their recreational source both fishing time and free time, 60% were used mobile as their recreational source.

Job Related Characteristics of the Fishers: Majority fishers ensured that their previous generation was engaged with this occupation and their family influenced them to continue this activity. Table 3 represents the overall job-related profile of the fishers of Kirtankhola River. Most of the fisher's families were not capable to continue their study due to poverty. Besides that, some of the families were interested to educate their children but due to the crackpot of their children they were not completed their dream. However, consciously or unconsciously they were involved with this occupation. A wide range experienced was observed from the fishers, minimum experienced was 3 and maximum was 58 years where min experienced value was 20.20 years.

Fishing was the main occupation of 75% fishers where agriculture and day labor was the primary occupations of 15% and 10% fishers. Majority fishers (58.33%) preferred group fishing where 41.67% preferred individual fishing. Fishers believed that group fishing is more efficient than the individual fishing. In spite of the advantage of group fishing some portion were not capable to conduct group fishing due to poverty. Different types of issue were involved with group fishing likes cost of fishing gear, fishing net, storage equipment's etc. 35% of the fishers had received different types of training about fish handling, storage, harvesting, marketing from the Department of fisheries and other non-government extension service. Besides male fishers, participations of women were satisfactory in the studied area. For supporting the fisher's family 35% women were engaged with Live-stock rearing where 30% Poultry rearing, 25% vegetation, 5% handicraft and rest 5% with business. Though fishers were living in the poverty line but they also tried to saving money for their future

Table 3: Job related information

Variables	Categories with Percentages (%)					Total	Relevant works
1.Experience	Low (<15year) (22.5%)	Medium (16-30 year) (55.83%)	High (<31 to above) (22.67%)			100%	[30]
2.Fishing	Group (58.33%)	Individual (41.67%)				100%	[29]
3.Types	Fulltime (45%)	Seasonal (33.33%)	Subsistence (21.67%)			100%	[29]
4.Training received	Yes (35%)	No (65%)				100%	[27]
5.Women participation	Live-stock rearing (35%)	Poultry rearing (30%)	Vegetation (25%)	Handicraft (5%)	Business (5%)	100%	[29]
6.Income (Thousand BDT)	25 to 40 (30%)	41 to 55 (20%)	56 to 70 (35%)	71 to above (15%)		100%	[1]
7.Savings	Bank (5%)	Co-operative societies (20%)	Personal (5%)	No savings (70%)		100%	[28]
8.Credit	Money lender (28.33%)	NGO's (55%)	Relatives (11.67%)	Neighbors (5%)		100%	[31]
9.Primary Occupation	Fishing (75%)	Agriculture (15%)	Day labor (10%)			100%	[32]

Table 4: Partial correlation among different variables of the fishers

Variables	r value	P value
Age and experience	0.969	0.01
Age and income	-0.015	0.01
Age and types	0.049	0.01
Age and saving	0.380	0.01
Age and fishing	-0.084	0.01
Types and saving	0.568	0.01
Income and savings	0.720	0.01
Types and fishing	0.611	0.01
Saving and fishing	0.663	0.01
Income and fishing	0.896	0.01
Income and types	0.727	0.01
Income and Health	0.618	0.01
Income and Sanitation	0.766	0.01
Saving and Health	0.358	0.01
Saving and Sanitation	0.574	0.01

requirement. The selected fishermen were grouped into four categories based on the level of annual income and it was found that about 30% of the fishermen had annual income between BDT 25,000 to 40,000, 20% had BDT41,000 to 55,000, 35% had BDT 56,000 to 70,000 and rest 15% had BDT 71,000 to above. Present study revealed that majority fishers had saving in cooperative society (20%) where 5% in Bank, 5% Personal and rest 70% had not any saving. For supporting fishing activities fishers were taken credit facilities from formal and informal source. Majority fishers were taken credit facilities from different types of NGO, s (BRAC, Prosikha, Grameen bank, Nobojibon, ASA) where 28.33% from money lender, 11.67% from relatives and 5% from Neighbors.

Partial Correlation among the Different Variables: Age and experience of the fishers were strongly positively correlated (r=0.969, p=0.01), which indicates the experience of fishers gradually increased with the passing of year. Partial correlations within different variables are presented in the Table 4. Figure 2 demonstrated the strong relationship between age and experience which also exposed the age and experience of middle-aged fishers as dominant groups. Age and type of the fishers was positively correlated (r=0.049, p=0.01) which predict that majority middle aged fishers were fulltime fishers. Age and income were negatively correlated (r=-0.015, p=0.01) which predict that, saving was not correlated with the age. Figure 3 indicates higher saving for middle age fishers but poor savings for both child and old aged fishers. Studied revealed the negative correlation (r= -0.084, p=0.01) between Age and fishing (Fig. 4). Majority youth fishers preferred grouped fishing than individual where most of the child and old were subsistence fishers. Present findings exposed positive relationship (r = 0.380, p = 0.01) between age and saving (Fig. 5) which predict that saving was increased at the certain age level but when they became old, they were not capable to save as like as the youth. Youth were physically strong than the child or old fisher which enforced to more earning and saving. Fisher types and saving exhibited the positive correlation (r=0.568, p=0.01) which denoted the rich saving from fulltime and seasonal fishers. Basically, child and old aged fishers occasionally involved with the fishing for supporting their daily expenditure. Income and savings displayed the strongly positive correlations (r=0.720, p=0.01) because saving always depended on income. Present study also showed the moderate positive correlations (r =0.611, p=0.01) between fisher's types and their fishing method. Majority fulltime and seasonal fishers were preferred group fishing; on the other hand, there was no scope to group fishing for the subsistence fishers due to lacking's of fishing equipment's. Saving and fishing showed the moderate positive correlations (r=0.663, p=0.01) which predict that grouped fishers had more savings than individuals. Income and fishing displayed very strong correlations (r =0.896, p=.01) which predict that grouped fishers were earned more money than individuals' fishers. Studied showed strongly correlations between Income and types (r=0.727, p=0.01) which predict that fulltime and seasonal fishers had more income than subsistence fishers.

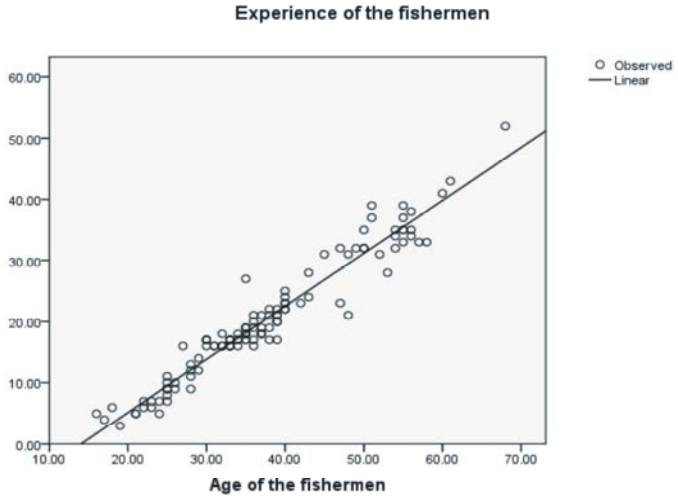

Fig. 2: Regression curve of the age and experience

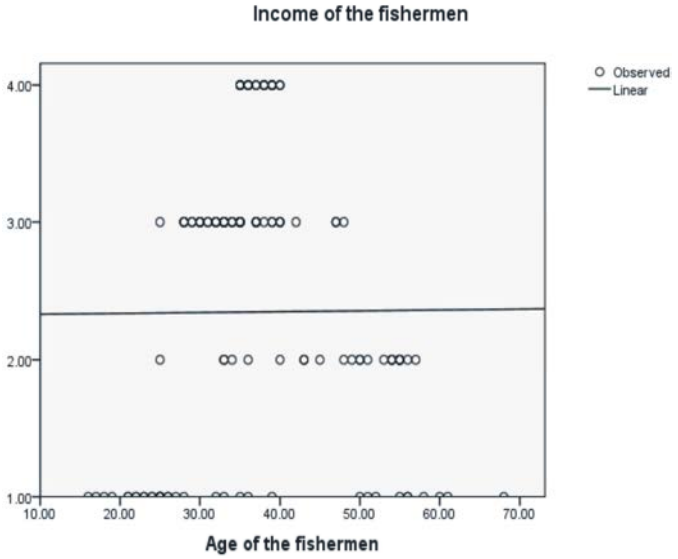

Fig. 3: Regression curve of age and income of the fishers

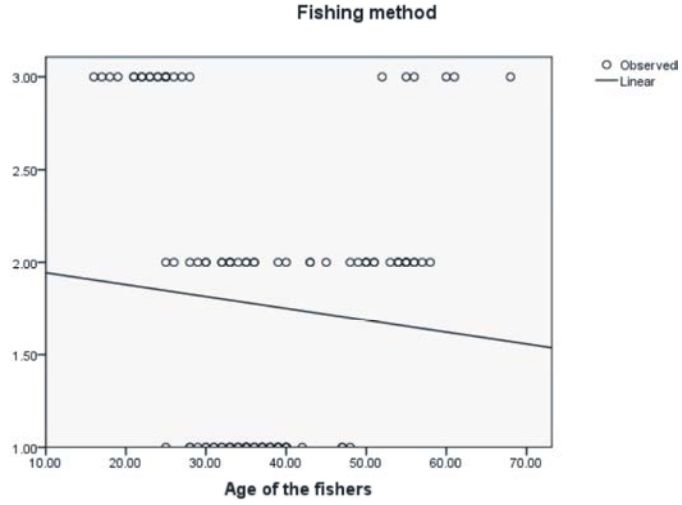

Fig. 4: Regression curve of age and fishing methods of the fishers

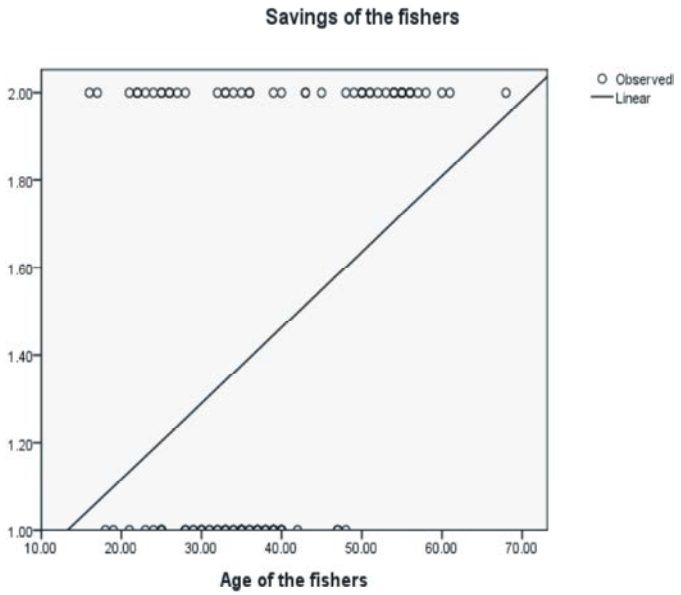

Fig. 5: Regression curve of age and saving of the fishers

Table 5: Constraints faced by the fishers in the Kirtankhola River

	To Sum						
Constraints	Very critical	Critical	Extent Critical	Not critical	Scores	Points	Remarks
Lack of sufficient fishing craft	39	15	40	26	307	2.56	Critical
Lack of fishing gears	11	28	14	67	223	1.86	Not critical
Household pressure for large size family	7	19	21	73	200	1.67	Not critical
Climate changing problem	27	40	52	21	335	2.79	Critical
Lack of credit facilities	8	30	23	59	228	1.90	Not critical
Lack of training facilities	5	26	56	33	243	2.03	Not critical
Lack of education due to poverty	69	37	8	6	409	3.41	Critical
Unbalanced eating due to poverty	2	20	48	50	214	1.78	Not critical
Lack of alternative income source during band period	92	22	6	00	446	3.72	Critical
Poor housing condition	9	17	20	74	202	1.68	Not critical
River erosion	80	00	00	40	360	3.00	Critical

This suggests that government should give attention to the fishers by providing alternative income source in the banning period and proper steps against river erosion.

Socio-Economic Constraints of the Fishers: The Likert scale technique was used to analyzed Table 5; it illustrates the response of fishers on socioeconomic constrains. Table revealed River erosion, the Lack of sufficient fishing craft, Lack of education due to poverty and Lack of alternative income source during band period was very critical in the studied area. On the other hand, Lack of fishing gears, Household pressure for large size family, Climate changing problem, Lack of credit facilities, Lack of training facilities, Unbalanced eating due to poverty and Poor housing condition was not very critical in the studied area. Majority of the fishermen were very poor and they have limited support to buy nets, crafts and other fishing equipment. They are neglected in all respect in the society. Dominant portion of fishermen were illiterate and they live from hand to mouth. Due to poverty they were not capable to continue the study of their children, so their children often go for fishing rather than going school. As a result, generation after generation they remain illiterate and not capable to contributes for the betterment of their community.

Problem Tree Analysis: A problem tree analysis (bottom up approach) was applied to diagrammatic presentation of the problem, its causes and effects. A participatory rural appraisal (PRA) tool (problem tree) was applied to find out the problem of fishers of Kirtankhola River system (Fig. 6). The staple problem was identified as "Reduce fisheries

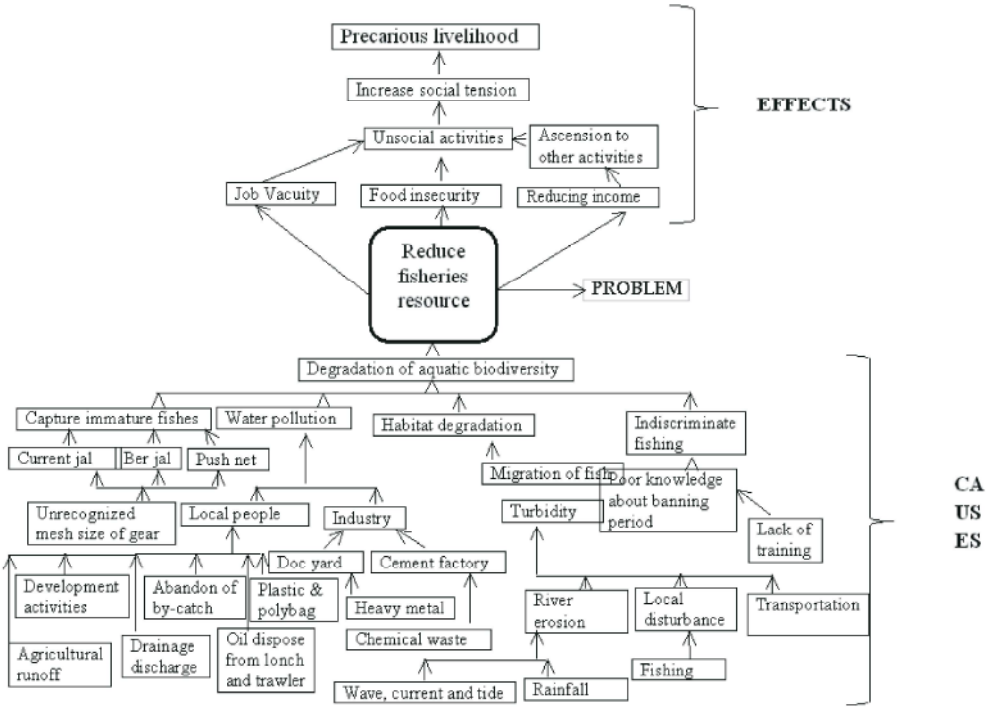

Fig. 6: Problem tree analysis of reduce fisheries resource at the Kirtankhola Rive

resource" through participants' brain storming where the participants identified the causes as well as effects. Problem tree analysis identified four major reasons for degradation of aquatic biodiversity viz., Capture immature fishes, Water pollution, Habitat degradation and indiscriminate fishing. Chowdhury *et al*. [33] identified same problem from the Naaf River, Bangladesh but Roy *et al*. [34] identified decrease in hilsa production from Ganga River, India.

CONCLUSION

Present study demonstrated that the fishing operation is one of the traditional occupations among the respondents in the study area. Study was found out specific problem from the particular area of adjacent Kirtankhola River. Due to lack of income significance proportion of fishermen was depended on village doctor. Socioeconomic status of Lamchori area fishermen was comparatively very poor due to river erosion. Major problems included River erosion, the Lack of sufficient fishing craft, Lack of education due to poverty and Lack of alternative income source during band period. In this circumstance, there is a necessity of proper administrative involvement to make proper guideline for the proper use of resources. That may be done within the providing of the VGF card. Some forms of NGO's activity must be ensured in the adjacent area for the improvement of the life leading status of the Fishermen.

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