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Effects of Fishing Practices on Fish Species Loss in Old Brahmaputra River

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Abstract

Bangladesh is one of the world leading fish producing country. This sector is contributing significantly in food security through providing safe and quality animal protein. The objectives of the study were to (i) explore the existing fishing practices used by fishermen and (ii) find out the effects of using fishing practices on fish species loss as perceived by the fishermen. The study was conducted in one village of Sadar upazila under Mymensingh district. Fifty five fishermen were selected as sample from a total population of 157 fishermen. A pre-tested interview schedule was used to collect data from the respondents during August to September, 2014. A total of nine types of fishing gears were recorded for harvesting fish from Old Brahmaputra river. Among them, six were fishing nets, one fish trap, one hook and one bush trap. The major effects of using fishing practices on fish species, as mentioned by the fishermen- over fishing, catch of unwanted fish, loss of undersized fish species, destruction of breeding individual and shrimp, massive aquatic biodiversity loss and others. Among them, fish traps *(Bair)* caused highest effects. The effect of destruction of breeding individual and shrimp is the major one. Ninety five percent respondents considered the overall effect of using fishing practices on fish species loss as low. Seventy eight percent respondents considered the problems in using standard fishing as medium. Different GOs and NGOs should take appropriate strategies to motivate fishermen to use standard fishing practices for protecting fisheries sector as well as improving their livelihoods.

Key words: *Effect, fishing practices, fish species*

Introduction

Bangladesh is a land of rivers. It is endowed with about 250 rivers and it is estimated that the total length of rivers, streams and canals at together cover more than 24,000 km (Rashid, 2008). According to the World Bank (2010), Bangladesh has the water resources (rivers, floodplains, ponds, *beels*, *haors* and a long coastline), aquatic wealth and climate suitable for high yields and considerable increase in fish production. Fish and fisheries sector play an immensely important role on the socio-economic development of Bangladesh from time immemorial and it is the part of our cultural heritage. Riverine capture fisheries in the form of common property and open access resources constitute a vital component of the agro-ecosystem of rural Bangladesh (Sadeque, 2005). This sector contributes about 4.91% of Gross Domestic Product (GDP), 5.10% of the total export earning and about 63% of animal protein to our daily diet (BBS. 2010).

A bangla proverb says "*Mache Bhate Bangalee*" which means "a bangalee thrives on fish and rice". Most of the people in the country depend on fish as main source of protein. Fish, which is rich in high quality protein, lipid and mineral is nutritionally better than meat (Saha, 2005).

About 12 million people (10% of the total population) directly or indirectly depend on

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fisheries (DoF, 2011). Total fish production in Bangladesh is 3.1 million metric tons (DoF, 2012). At present annual fish intake by an individual is 17.52 kg and the annual fish demand is 29.74 metric tons (DoF, 2010). The important rivers of Bangladesh are the Padma, the Jamuna, the Meghna and the Old Brahmaputra. The 3000 km long Brahmaputra steaming through India enters into Bangladesh from the western side of the Garo Hills through Dewanganj, Nalitabari, Jamalpurand Mymensingh. The Old Brahmputra river was once the main flow of the Brahmaputra-Jamuna river system and rich in different fish fauna (Encyclopedia, 2012).

Fishermen catch fish in the Old Brahmaputra river throughout the year, using different types of seine nets, pull nets, lift nets and cast nets along with various forms of traps. Total catch in inland open water has increased in the recent years due to over exploitation by increasing number of fishermen but catch of individual fishermen has declined resulting decreased income significantly. As a result, livelihood of inland poor fishermen has been affected seriously (Rashid, 2008). The fishermen livelihoods are also affected by fishing ban and restriction imposed by government for protection and conservation of fisheries resources. As the fishermen do not have any alternative job opportunity, they suffer badly during fishing ban and lean fishing period and adopt some sort of coping strategies. As a result, the natural production of fish is seriously disturbed through over fishing (Saha, 2005).The socio-economic condition of the fishermen is one of the most important factors that influenced the utilization and development of river fishery resources. Thus uncontrolled fishing and highly destructive devices of capture in river deplete fisheries resources and followed by great economic distress.

Therefore, the present study was undertaken in order to explore the existing fishing practices used by fishermen and to find out the effect of using fishing practices on fish species loss as perceived by the fishermen.

Methodology

Locale of the study, Population and Sample

The area for the study was the Old Brahmaputra river adjacent village opposite to the Bangladesh Agricultural University, Mymensingh. The Char Iswardia Union consists of 13 villages among which one village namely Char Kalibari was purposively selected for this study. Most of the people of this village depended on fishing from the river. The total household number of this village was 157 and among them 55 households actively depended on fishing activities. This information was collected from Upazila Statistics Office and Upazila Fisheries Office of Mymensingh sadar upazila. One fisher from one household was considered as a respondent. Thus, data was collected from 55 households standing to a total number of 55 respondents.

Data collection methods and analysis

A structured interview schedule was prepared on keeping the objectives of the study in mind. The questions and statements contained in the schedule were simple, direct and easily understandable by the respondents. The schedule was checked by the several researchers and experts from the Department of Agricultural Extension Education, BAU, Mymensingh. Appropriate

statements were included into the schedule and then finalized for collecting data.

To reveal the names of existing fishing practices used by fishermen was done through focus group discussion (FGD). The purpose of focus group discussion was to stimulate discussion around issues concerned. For this study eight fishermen were selected for conducting a single FGD. Group discussion was facilitated by the researcher through active participation of the fishermen. After exploring the possible names of fishing practices through FGD, these were put into the interview schedule to measure their extent of use. After that the data were properly edited and coded, put into the computer and analyzed by using SPSS software.

Variables and their measurement

A four-point rating scale was used for measuring the extent of using fishing practices. scores were assigned as '0' for no use, '1' for low use, '2' for medium use and '3' for high use.

Effect of using fishing practices on fish species loss as perceived by fishermen was the dependent variable of the study. A four-point rating scale was used for measuring the effect of using fishing practices on fish species loss as perceived by fishermen. Scores were assigned as '0' for not at all, '1' for low, '2' for medium and '3' for high. A total 23 major effects were included in the interview schedule and the total score for effect on species loss could vary from 0 to 69.

Findings and Discussion

Existing Fishing Practices Used by Fishers

Various types of fishing gear were found being operated in the study area and these were classified into three groups; i.e. net, traps and wounding gear. The gears like *ber jal, current jal, jhaki jal, thela jal, dharma jal, bair* and *borshi* were operated in the Old Brahmaputra river. Distribution of the respondents according to their fishing practices has been presented in Table 1.

Data presented in Table 1 show that the highest proportion (81.82 percent) of the fishermen used fish trap, where 47.27 percent used gill net, 29.09 percent used hook, 16.36 percent used push net, 9.09 percent used bush trap, 9.09 percent used cast net, 7.27 percent used lift net and 3.63 percent used seine net.

From the Table 1 it is evident that fish trap got the highest score of 121 and hence considered as the 1st fishing practices used by the fishers (Table 2). The fish trap is easy method for catching fish. So majority of the fishers use this practice.

Table 1 Distribution of the fishermen according to the fishing practices used

Fishing practices	Number (n=55)	Percentage
Fish trap *(bair)*	45	81.82
Gill net *(current jal)*	26	47.27
Hook *(borshi)*	16	29.09
Push net *(thela jal)*	9	16.36
Dragged net *(moiya jal)*	7	12.72
Bush trap (*katha*)	5	9.09
Cast net *(jhaki jal)*	5	9.09
Lift net *(dharma jal)*	4	7.27
Seine net *(ber jal)*	2	3.63

Table 2 Rank order of extent of use fishing practices used by the fishermen

Fishing practices	Extent of use			Total score	Rank order
	High	Medium	Low		
Fish trap (*bair*)	31	14	-	121	1
Gill net (*current jal*)	20	5	1	71	2
Hook (*borshi*)	-	10	6	26	3
Push net (*thela jal*)	1	7	1	18	4
Dragged net (*moiya jal*)	1	6	-	15	5
Bush trap (*katha*)	1	3	1	10	6
Cast net (*jhaki jal*)	2	-	3	9	7
Lift net (*dharma jal*)	1	1	2	7	8
Seine net (*ber jal*)	-	1	1	3	9

The other fishing practices such as, gill net, hook, push net, dragged net, bush trap, cast net, lift net and seine net got the score 71, 26, 18, 15, 10, 9, 7 and 3 hence considered as the 2nd, 3rd, 4th, 5th, 6th, 7th, 8th and 9th ranked as the fishing practices used by the fishers. Easy handling methods are used by majority of fishers.

Fish species caught by fishing practices

In the Old Brahmaputra river different types of fish species are caught by the fishers who used different types of gear. Some fish species are being caught by the particular gears and these particular gears are used in particular season. For harvesting fish fishing gear is necessary. Different fish species caught by different fishing gears which are given in Table 3.

Data presented in Table 3 show that Gill nets were fixed by poles in all depths of water, so various types of fish caught by this net. Seine nets mesh size was small, all large and small size fishes were caught by this net. Cast net is hauled the sinkers disturb the fish in the bottom such as shing, magur, baim etc. and make them enter the pockets and are secured there.

Table 3 Different fish species catch by the different fishing gears

Sl. no.	Fishing gears	Fish species
1.	Gill net *(Current jal)*	*Punti*, carp fingerlings, *tengra* etc.
2.	Seine net *(Ber jal)*	*Chingri, mola, tit punti, darkina, bata, rui*, *ayr* etc.
3.	Cast net *(Jhaki jal)*	*Shing, magur, baim, ayr* etc.
4.	Push net *(Thela jal)*	*Chingri, baim, shing, magur, taki* etc.
5.	Lift net *(Dharma jal)*	Especially *darkina* are catch.
6.	Fish trap *(Bair)*	*Chingri, baim, gutum, chapila, tengra* etc.
7.	Hook *(Borshi)*	*Punti, tengra, taki* etc.

Push net used in shallow portion of water bodies. Lift net is let down into the water and after some times the net is raised and fish are collected by hand. Fish trap mainly operated in shallow water and various types of fish caught by this gear. All types of fish caught by hook.

Effect of Using Fishing Practices on Fish Species Loss as Perceived by the Fishers

The overall effect of using fishing practices on fish species loss for 23 selected statements on nine different types of fishing gears were used by the fishers which could theoretically range from 0 to 69, where 0 indicating no effect and 69 indicating high effect. However, the observed overall effect scores of the fishers ranged from 4-42 with a mean of 12.17. Based on their effect score, the respondents were classified into three categories as presented in Table 4.

Data presented in Table 4 show that the highest proportion (94.55 percent) of the fishers observed overall effect of fishing practices as low, where 5.45 percent and 0 percent of them have observed medium and high category overall effect of fishing practices, respectively.

Table 4 Categorization of fishers according to their opinion on overall effect of using fishing practices on fish species loss

Respondents (n=55)			Mean
Category (Score)	Number	Percentage	
Low (≤23)	52	94.55	
Medium (24-46)	3	5.45	12.17
High (47-69)	-	-	

Here the statement "destruction of breeding individual and shrimp" got the highest score of 119 and hence considered as the 1st effects of fishing practices (Table 5). Most of the fishermen used fish trap which cause the destruction of breeding individual and shrimp.

Table 5 Rank order of the effects of using fishing practices on fish species loss as perceived by the fishermen

Practice name	Effects	Extent of opinion				Total score	Rank order
		High	Medium	Low	Not at all		
Gill net *(Current jal)*	Loss of under sized fish species	-	16	9	1	41	6
	Withdrawal of breeding individual during spawning season	-	22	4	-	48	5
	Catch of unwanted fish	4	16	6	-	50	4
	Over fishing	26	-	-	-	78	3
Push net *(Thela jal)*	Unwanted harvest of very undersized individual	3	4	-	3	17	10
	Destruction of fish	1	2	7	-	14	12
	Destruction of fertilized egg adhered to aquatic weeds	-	5	3	2	13	13
	Decay of sediment useful as habitat for fish	6	3	-	1	24	8
Dragged net *(Moiya jal)*	Over fishing	6	1	-	-	20	9
	Catch of unwanted fish	2	3	2	-	14	12

Table 5 (Contd.)

Practice name	Effects	Extent of opinion				Total score	Rank order
		High	Medium	Low	Not at all		
Cast net *(Jhaki jal)*	Loss of under sized fish species	-	6	-	-	12	14
	Withdrawal of breeding individual during spawning season	3	2	1	-	14	12
	Catch of unwanted fish	-	5	1	-	11	15
Seine net *(Ber jal)*	Loss of under sized fish species	1	1	-	-	5	17
	Withdrawal of breeding individual during spawning season	-	1	1	-	3	18
	Catch of unwanted fish	1	1	-	-	5	17
Lift net *(Dharma jal)*	Mass destruction of spawn and small individual	-	5	-	-	10	16
	Catch of any fish species	2	3	-	-	12	14
Fish traps *(Bair)*	Destruction of breeding individual and shrimp	29	16	-	-	119	1
	Catch of unwanted fish	14	29	2	-	102	2
Hook *(Borshi)*	Colossal loss of spawn due to catch of respective parent fish	-	16	-	-	32	7
Bush trap *(Katha)*	Withdrawal of breeding individual for nest monsoon	4	2	-	-	16	11
	Massive biodiversity loss	2	4	-	-	14	12

The other statements "catch of unwanted fish"(fish trap), "over fishing"(gill net), "catch unwanted fish"(gill net), "withdrawal of breeding individual during spawning season"(gill net), "loss of under sized fish species"(gill net) got the score 102, 78, 50, 48, 41 and hence considered as the 2nd,3rd, 4th, 5th, 6th effects of fishing practices. The gill net is easy methods for catching fish and which causes the above effects. "Colossal loss of spawn due to catch of respective parent fish" (hook), got the score of 32 and considered as the 7th effects of fishing practices. In Old Brahmaputra river sometime fishers and other people are catching fish for recreational purpose by the hook, which causes "colossal loss of spawn due to catch of respective parent fish". "Decay of sediment useful as habitat for fish" (push net) is also important effects which got score 24 and considered as the 8th effects.

Conclusions

Fishermen use different types of fishing practices to catch fish from river. A total nine types of fishing gears were recorded for harvesting fish from Old Brahmaputra river. Use of such types of fishing gears lead to the conclusion that fishers use these gears for their instant economic benefit, poor awareness and ease in operation. There are fifteen types of fish species caught by seven different type of fishing gears. Most of the fishermen (81.82 percent) in this area used fish traps for catching fish. Use of fish trap got the highest score of 121 and hence considered as the 1st fishing practices used by the fishermen. Due to easy operating method and cheap rate, marginal fishers widely used these traps for commercial and household consumption purposes. Ninety five percent respondents considered the overall effect of using fishing practices on fish species loss as low. The major effects of using fishing practices on fish species loss as opined by the fishers were over fishing, catch of unwanted fish, loss of undersized fish species, destruction of breeding individual and shrimp, massive aquatic biodiversity loss. The statement "destruction of breeding individual and shrimp" got the highest score of 119 and hence considered as the 1st effect of fishing practices. This findings lead to the conclusion that existing fishing practices may decrease the fish species as well as production of fish for consumption and marketing. Extension media contacts need to be increased to make the fishermen more conscious about the effect of destructive fishing practices and motivate them to use standard fishing practices as practical as possible.

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