



Dependency on common property water resources of nearby community people in Mymensingh and Kishoreganj district of Bangladesh

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Abstract

The research was conducted to assess the dependency on common property water resource of nearby community people in two selected areas of greater Mymensingh. A total of 60 farmers were surveyed from Char Nilokkhiya of Mymensingh district and Char Koromshi of Kishoreganj for collecting necessary data and information using random sampling method during December 2016 to March 2017. It was seen that around 73 percent respondents were engaged in fishing in Char Nilokkhiya and 37 percent respondents were engaged in fishing in Char Koromshi. In Char Nilokkhiya the significant variables were amount of land, religion, and alternate sources of income. In Char Koromshi significant variables were educational level of household head, distance of *beel* from home, power of relatives, and relation with local government. Gini coefficients show that more inequality prevails in Kishoreganj than Mymensingh in terms of income and land holding. This is because some common water resources are underutilized and some are dominated by elite people. Considering the research findings, some crucial policy recommendations have been arisen which are: necessary steps which may be useful for the farmers to achieve social equity should be properly implemented and initiative for supporting true fishers by institutional credit and arranging technical training to enrich the knowledge of the farmers on fish catching..

Key words: Pattern, constraints, common property, water resources

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Introduction

Common property resources (environmental) are natural resources owned and managed collectively by a community or society rather than by individuals. Resources are things that are combined with other things to produce the things that we want: inputs into the production of goods and services. Examples include capital, labor, land, minerals, forests, animals, ecosystems, the atmosphere, natural areas, watersheds, oceans, etc. All common property nevertheless faces

one common problem: how to coordinate individual users to attain an optimal rate of production or consumption for the whole community. Bangladesh is a nation where agricultural production is still the mainstay of the rural population's livelihood system, and therefore its people's livelihoods are still inextricably linked to the nation's water cycle. The nation's water, both above and below ground, provides a multitude of services to the population: water to

drink, water for irrigation, fish water and for transport and other uses. Approximately 1.4 million people are directly engaged in fishing, 11 million in part time fishing and another 3 million in aquaculture activities (Hussain, 2010).

The average annual rate of growth of the fisheries sector is 6.15% over the last 10 years (Maria et al, 2017). But due to over fishing and faulty management policy including other manmade and natural causes like siltation of water bodies, inland open water fisheries has declined significantly during the last 3-4 decades. However, aquaculture and marine fisheries production have increased noticeably. Marine fisheries resources are being exploited beyond maximum sustainable levels with increasing fishing efforts and thereby fishers catch/ and income are declining. The present fish production is 2.56 million tons from different sources. Total catch in inland open water has increased in the recent years due to over exploitation by increasing number of fishers but catch of individual fishers has declined resulting decreased income significantly.

As a result, livelihood of inland poor fishers has been affected seriously. Though fishers are the main players in harvesting the fishes with hard labor in the sun and rains, their access right to the fisheries resources has always been intervened due to faulty management system and interference by middlemen (rich and powerful people).

In Char Nilokkhiya, there is no set rules and regulation related to catch fish from water bodies. When to catch fish, how to catch fish, who will be able to catch fish, who deprived from catching fish; there is no rules or effect of these activities. On the other hand, in Char Koromshi, land owners cannot use their land in the monsoon. Although during monsoon all lands are merged under water and suitable for fish farming, but these water bodies are leased out for three or four years on written agreement by District Commissioner. According to rule, land should be provided to fishermen cooperatives.

The poor fishers cannot pay lease value of the Jalmohal (open water body) and they rely on rich people/Mohajan that pay the lease value and get control of the Jalmohal where fishers work as labor fishers or on contract/catch sharing. The rich people pay the lease value on behalf of the fishers' association and get to use the right of the fishers. The fishers are usually poor, landless and neglected in the society and are deprived of their right. So, it is of crucial need to study into the matter and identify the major factors which the farmers are able to use common property water resources without any rules established by elite class. The aim of the study is exploring the contribution of farmers in household income, employment generation through participating in agricultural and non-agricultural activities, their problems and potentials and their contributions to increase production and maintain social equity in some selected areas of greater Mymensingh. The findings of this study may be helpful to the policy makers and planners in formulating plans for social development. Moreover, the findings may be useful to extension workers and researchers who are directly involved in different social development programs particularly in relation to farmer's development. Based on the above background, the objective of the study is to assess to the present status of water management system and dependency of poor people on common water resources.

Materials and Methods

Study area population and sampling

The study purposively selected two villages named Char Nilokkhiya (Mymensingh Sadar) and Char Koromshi (Karimgong Upazila). A total number of sixty samples (thirty from each) were taken from those villages on a random basis, who are directly engaged in informal fish trading, catching and selling of fishes or work as a day laborer in the arath (wholesale fish market) for more than two years. Therefore, a number of 30 respondents were taken from each village and a pre-tested semi- structure interview schedule

was used with those participants to collect necessary data to address the research objectives. Random sampling technique was used for the selection of sample from the both villages. Primary data was collected through field survey using interview schedule during December 2016 to March 2017.

Selection and measurement of explanatory and focus variables

The explanatory variables of the study were 14 selected characteristics of fish farmers. These were age, literacy level, family member's occupation, coping strategies, monthly income level (BDT), boat ownership status (%), fishing gear ownership status (%), amount of land, distance of beel from home, power of relatives, relation with local government, religion, alternate sources of income and involvement in catching fish. Most of the explanatory variables were measured on the basis of raw data through developing scale (Table 1).

To analyze data different computer software packages like Excel and EViews programming were used. In tabular form final data were summarized and presenter with meaningful interpretations.

In the present research, the following logit models have been used for estimating the determinants of fish catching for two different management systems in two different areas in the same region:

$$Z_i = \ln [P_i / (1 - P_i)] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + U_i$$

Where,

P_i is the probability of fish catching and not fish catching;

$P_i = 1$ indicates fish catching and $P_i = 0$ indicates not fish catching.

Dependent variable:

Z_i = Probability of fish catching..

Independent variables:

X_1 = Amount of land (decimal)

X_2 = Educational level of household head (years of schooling)/ age (years);

X_3 = Distance of beel from home (km.)/religion (1= Hindu, 0 otherwise)

X_4 = Power of relatives (1 indicates having power of relatives and 0 indicates having no power of relatives);

X_5 = Relation with local government

β_0 = Intercept;

β_1 to β_5 = Regression coefficients of the dependent variables; and

U_i = Error term.

Gini coefficient calculation also done to see the income inequality in two areas using computer software packages

Results and Discussion

Selected characteristics of the fish farmers

Catching fish practices from common property water resource in two selected areas of greater Mymensingh was affected by their selected characteristics. Selected characteristics of the fish farmers have been presented in Table 1.

Data in Table 1 indicates that in Char Nilokkhiya majority of the fish farmers of the study area were 0 to 45 years aged and 66.67 percent farmers were illiterate. Majority of the fish farmers engaged with fishing and having monthly income BDT 9000 to 14000. Majority (73.3 percent) farmers catch fishes and take loan from different sources as a coping strategy. They did not had own boat (70 percent) and 56.67 percent had fishing gear ownership status. More than 50 percent fish farmers did not have own land and they lived near the beel areas. Majority of them belongs hindu religion and did not have any powerful relatives. That's why they depends on fish catching for income.

In case of Char Koromshi, majority (50 percent) of the fish farmers were 0 to 30 years aged and 33.33 percent farmers were primary school passed. Majority of the fish farmers having monthly income BDT 9000 to 20000 and only 11 farmers catch fishes and take loan from different sources as a coping strategy. They did not had own boat (83.33 percent) and 66.67 percent

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had fishing gear ownership status. Fifty seven percent had own land range from 0.1 to 1 hectare and they lived away from the beel area. Majority of them

belongs Muslim religion. Having powerful relatives and good relationship with local government they were less involved in fish catching (only 11 percent).

Table 1. Selected characteristics of the fish farmers

Sl. No.	Variables	Classification	Respondents			
			Char Nilokkhiya		Char Koromshi	
			No.	%	No.	%
1.	Age	0-30 yr	11	36.67	9	30
		31-45 yr	12	40	15	50
		46 -60 yr	5	16.67	4	13.33
		above 60 yr	2	6.67	2	6.67
		Total	30	100	30	100
2.	Education	Illiterate	20	66.67	3	10
		Can sign only	8	26.67	6	20
		Primary	1	3.33	10	33.33
		Secondary	1	3.33	8	26.67
		higher Secondary	-	0	2	6.67
		Graduate and above	-	0	1	3.44
		Total	30	100	30	100
3.	Family member's occupation	Fishing	22	73.33	11	36.67
		Agriculture and day labor	8	26.67	17	56.67
		Service	0	0	2	6.67
		Total	30	100	30	100
4.	Coping Strategies	Catch fishes and loan from different sources	22	73.33	11	36.67
		day labor	8	26.67	17	56.67
		Other services	-	-	2	6.67
		Total	30	100	30	100
5.	Monthly income level (in BDT)	0 to below 9000	11	36.67	2	6.67
		9000 to 14000	14	46.67	11	36.67
		14001 to 20000	4	13.33	7	23.33
		20001 to 40000	1	3.33	3	10
		40001 to 55000	-	-	4	13.33
		Above 55000	-	-	3	10
		Total	30	100	30	100
6.	Boat ownership status (%)	Own boat	9	30	5	16.66
		No boat	21	70	25	83.33
		Total	30	100	30	100
7.	Fishing gear ownership status (%)	Own gear	13	43.33	10	33.33
		No gear	17	56.67	20	66.67

Sl. No.	Variables	Classification	Respondents			
			Char Nilokkhiya		Char Koromshi	
			No.	%	No.	%
		Total	30	100	30	100
8.	Amount of land	No land	16	53	6	20
		0.1 – 1 hectare	14	47	17	57
		More than 2.5 hectare	-		7	23
		Total	30	100	30	100
9.	Distance of beel from home	0.1 – 4 km	30	100	21	70
		More than 5 km.	-		9	30
		Total	30	100	30	100
10.	Power of relatives	Relatives are powerful	-		12	40
		Otherwise	30	100	18	60
		Total	30	100	30	100
11.	Relation with local government	Strong	-		15	50
		Moderate	-		15	50
		Not at all	30	100	0	0
		Total	30	100	30	100
12.	Religion	Hindu	22	73	6	20
		Muslim	8	27	24	80
		Total	30	100	30	100
13.	Alternate sources of income during fishing	Yes	22	73	14	47
		No	8	27	16	53
		Total	30	100	30	100
14.	Involvement in catching fish	-	22	73	11	37

Source: Author’s estimation, 2016-17

Factors Influencing Fish Catching

In order to determine different socio-economic factors influencing on the present status of water management system and dependency of poor people on common water resources of the study area logistic regression were used.

Determinants of Fish Catching at Char Nilokkhiya

From Table 2 we can see that, amount of land and religion has positive significant relationship with respondents fishing practices. Most of the respondents in this area were Hindu who directly involve in catching fish. They have land and did both agricultural

works and fishing together. Alternate source of income is negatively significant with the dependent variable, those who do not have land they went to the city and engage in different types of works such as rickshaw pulling, selling labor etc. They were less involved in catching fish. So, those have alternate source of income have low involvement in catching fish.

Determinants of Fish Catching at Char Koromshi

From Table 3, we can see that, education, distance from beel, power of relatives and relation with local government have significant positive relationship with catching practice. Those who have access to water bodies are more educated, their home is far from beel

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areas. Due to having powerful relatives and strong relationship with local government they are able to take lease water bodies from government. In one word we

can say that elite people have more access to the submergence water bodies in this area.

Table 2. Estimates of logistic regression of determinants of adopting fish catching practice in Char Nilokkhiya

Variables	Coefficient	Robust standard error	Z	P> z
Constant	20.424	5.124	3.986	0.000
Amount of land	0.615**	0.291	2.116	0.020
Religion	2.012*	0.810	2.483	0.003
Age	-0.037	0.046	-0.797	0.412
Alternate sources of income	-8.628*	0.965	-8.939	0.000
Dependent variable: Fish catching,; Log Likelihood: 35.713; Pseudo R ² = 0.781				

Source: Author's estimation, 2016-17; Note: * and ** indicate significant at 1% and 5%

Table 3. Estimates of logistic regression of determinants fish catching practice in Char Koromshi

Variables	Coefficient (β)	Standard Error	Z	P> z
Constant	25.71549	4.084756	6.30	0.000
Amount of land (X ₁)	0.0460936	0.0529393	-0.87	0.384
Education (X ₂)	5.926037*	0.3723436	15.92	0.000
Distance of beel from home (X ₃)	28.99059*	1.013573	28.60	0.000
Power of relatives (X ₄)	142.7489*	6.577822	21.70	0.000
Relation with local government (X ₅)	57.28514*	1.83546	31.21	0.000
Dependent variable: Fish catching, Log Likelihood: 35.713; Pseudo R ² = 0.652				

Source: Author's estimation, 2016-17; Note: * indicate significant at 1% probability level.

Income inequality in the two Study areas

Gini coefficient calculation also done to see the income inequality in two areas. Gini coefficient lies between 0 to 1. Here, 0 means no inequality in income but 1 means perfect inequality in income.

The findings from Table 4 and Table 5, the Gini coefficient score is 0.118 in case of Char Nilokkhiya but 0.386 is in Char Koromshi. So, huge income inequality exists in char Koromshi than char Nilokkhiya.

Table 4. Gini coefficients of income of all respondents in Char Nilokkhiya

No. of respondents	Distribution range	Total income	Portion of total income	portion of farmers (X)	Cumulative portion of income (Y)	$B = X_{k+1} - X_k$	$A = Y_k + Y_{k-1}$	$A * B$	Gini coefficient $= 1 - \sum(A * B)$
1 - 6	1 st	31600	0.135	0.2	0.135	0.2	0.135	0.027	0.118
7 - 12	2 nd	42000	0.179	0.2	0.314	0.2	0.449	0.0898	
13 - 18	3 rd	46000	0.197	0.2	0.511	0.2	0.825	0.165	
19 - 24	4 th	54800	0.234	0.2	0.745	0.2	1.256	0.2512	
25 - 30	5 th	59600	0.255	0.2	1.000	0.2	1.745	0.349	
Total		234000	1					0.882	

Table 5. Gini coefficients of income of all respondents in Char Koromshi

No. of respondents	Distribution range	Total income	Portion of total income	portion of farmers (X)	Cumulative portion of income (Y)	$B = X_{k+1} - X_k$	$A = Y_k + Y_{k-1}$	$A * B$	Gini coefficient $= 1 - \sum(A * B)$
1 - 6	1 st	38800	0.072	0.2	0.072	0.2	0.072	0.0144	0.386
7 - 12	2 nd	51600	0.096	0.2	0.169	0.2	0.241	0.0481	
13 - 18	3 rd	57600	0.108	0.2	0.276	0.2	0.445	0.0890	
19 - 24	4 th	129600	0.242	0.2	0.518	0.2	0.795	0.1589	
25 - 30	5 th	258600	0.482	0.2	1.000	0.2	1.518	0.3036	
Total		535600	1.000					0.6141	

Conclusion and Recommendations

Around 73 percent respondents were engaged in fishing in Char Nilokkhiya and 37 percent respondents were engaged in fishing in Char Koromshi. In Char Nilokkhiya the significant variables were amount of land, religion, and alternate sources of income. In Char Koromshi significant were educational level of household head, distance of beel from home, power of relatives, and relation with local government. Huge inequality exists in income between two areas. This is because some common water resources are underutilized and some are dominated by elite people. So, fishermen's organization would play a very important role to empower true fishermen. There should be stricter enforcement of fisheries laws and regulations and sufficient number of fish sanctuaries should be established in suitable locations as part of a national program. Institutional capacity strengthening, the laws and regulations and policies for protection, conservation and management for fisheries resources should be properly enforced due by the enforcing agencies, particularly Department of fisheries (DoF).

As fish farmers dependency rate on common property resources already cover a big part for maximizing social benefit but there remains a huge unused resources for productive purpose and therefore why those resources are reducing over the time in Bangladesh. Introduction of water resource conserving agriculture can play a vital role in increasing sustainable fish production in an efficient way and create employment opportunities.

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