Dependency on common property water resources of nearby community people in Mymensingh and Kishorgang 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

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
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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 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:

\[ Z_i = \ln \left( \frac{P_i}{1 - P_i} \right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + U_i \]

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
- \( \beta_0 \) = Intercept;
- \( \beta_1 \) to \( \beta_5 \) = 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 have own boat (70 percent) and 56.67 percent...
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      |
| 1.      | Age                              | No. | %    | No. | %    |
|         | 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|
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 (X₁)              | 0.0460936       | 0.0529393      | -0.87| 0.384|
| Education (X₂)                   | 5.926037*       | 0.3723436      | 15.92| 0.000|
| Distance of beel from home (X₃)  | 28.99059*       | 1.013573       | 28.60| 0.000|
| Power of relatives (X₄)          | 142.7489*       | 6.577822       | 21.70| 0.000|
| Relation with local government (X₅)| 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 Nilokkiya

| No. of respondents | Distribution range | Total income | Portion of total income | Cumulative portion of income | B = X_{k+1} - X_k | A = Y_k + Y_{k-1} | A*B | Gini coefficient = 1 - ∑(A*B) |
|--------------------|--------------------|--------------|-------------------------|-----------------------------|-------------------|----------------|-------|---------------------------------|
| 1 - 6              | 1<sup>st</sup>     | 31600        | 0.135                   | 0.2                         | 0.135             | 0.2           | 0.135 | 0.027                           |
| 7 - 12             | 2<sup>nd</sup>     | 42000        | 0.179                   | 0.2                         | 0.314             | 0.2           | 0.449 | 0.0898                          |
| 13 - 18            | 3<sup>rd</sup>     | 46000        | 0.197                   | 0.2                         | 0.511             | 0.2           | 0.825 | 0.165                           |
| 19 - 24            | 4<sup>th</sup>     | 54800        | 0.234                   | 0.2                         | 0.745             | 0.2           | 1.256 | 0.2512                          |
| 25 - 30            | 5<sup>th</sup>     | 59600        | 0.255                   | 0.2                         | 1.000             | 0.2           | 1.745 | 0.349                           |
| Total              |                    | 234000       |                         |                             |                   |               | 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 | Cumulative portion of income | B = X_{k+1} - X_k | A = Y_k + Y_{k-1} | A*B | Gini coefficient = 1 - ∑(A*B) |
|--------------------|--------------------|--------------|-------------------------|-----------------------------|-------------------|----------------|-------|---------------------------------|
| 1 - 6              | 1<sup>st</sup>     | 38800        | 0.072                   | 0.2                         | 0.072             | 0.2           | 0.072 | 0.0144                          |
| 7 - 12             | 2<sup>nd</sup>     | 51600        | 0.096                   | 0.2                         | 0.169             | 0.2           | 0.241 | 0.0481                          |
| 13 - 18            | 3<sup>rd</sup>     | 57600        | 0.108                   | 0.2                         | 0.276             | 0.2           | 0.445 | 0.0890                          |
| 19 - 24            | 4<sup>th</sup>     | 129600       | 0.242                   | 0.2                         | 0.518             | 0.2           | 0.795 | 0.1589                          |
| 25 - 30            | 5<sup>th</sup>     | 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 Nilokkiya and 37 percent respondents were engaged in fishing in Char Koromshi. In Char Nilokkiya 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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