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Improvement of Livelihood through Fish Farming in Haor Areas of Bangladesh

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Abstract

The major purpose of the study was to determine the livelihood of fish farmers through fish farming in Tarail upazila under Kishoregonj district. Livelihood situation of fish farmers was measured on the basis of five dimensions such as the change in i) food intake, ii) household condition, iii) physical assets, iv) sanitation and v) income due to involvement in fish farming activities. Data were collected by using a pre-tested interview schedule through personal interview method during July 2014 from 60 fish farmers. The paired t-test was used to measure the comparative change of 'before' and 'after' involvement in fish farming. The findings revealed that food intake, housing condition, physical assets, sanitation and income all are increased significantly among the respondents. The average food consumption increased to 2279.40 Kcal from 941.28 Kcal, average housing condition increased to 2.58 from 1.38 which indicates move towards having building house, average physical assets increased to 39.83 from 14.73, sanitation increased to 2.38 from 1.40 which indicates move towards *paka* latrine and income increased to 48.80 thousand to 37.30 thousand per year. The results indicate the betterment of livelihood of fish farmers due to involvement in fish farming. The fish farmers face some problems such as fish disease problem, over flood problem, lack of market facilities, high cost of fertilizer and fish feed, lack of knowledge on application of fish feed and fertilizer, unavailability of quality seed and species etc. Support from DoF and NGOs working in fisheries sector should be provided to manage these problems. Therefore, it will improve the livelihood of fish farmers in the study area.

Key words: *livelihood, fish farming, improvement, haor area*

Introduction

Bangladesh is considered as one of the most suitable country in the world for freshwater rural fisheries because of its resources and agro-climatic condition (Ahmed and Hasan 2007). This sector (capture fisheries and aquaculture combined) contributed 4.4 per cent of national gross domestic product (GDP) and 25per cent of agricultural GDP in 2012 (MoF, 2012).The total output of this sector is 3.41 million tons of which 55per cent were obtained from inland aquaculture, 28per cent from inland capture fisheries and 17per cent from marine fisheries (DoF, 2013). Around 400,000 ha of fish ponds/ditches and more than 900,000 households are involved in aquaculture (ADB, 2010). Apart from direct self-employment opportunities, fisheries expansion include the provision of nutrients, income generation for the poor, diversification of production and generation of foreign exchange earnings through export of high valued products (Hossain 2009). About 12 million people (10per cent of total population) directly or indirectly depend on fisheries sector for their livelihood. There are over 1.2 million fishermen in the country but almost two-thirds of them get involved in fishing during the monsoon. This sector contributes about 50-60per cent

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animal protein intakes of the population of Bangladesh and also provides essential vitamins, minerals, and fatty acids. (DoF, 2009). Fisheries play an important role in rural people income generation as well as nutrient supply as 70per cent people of Bangladesh live in villages (BBS, 2012).

Apart from pond fisheries, fisheries of haors play a very important role in the livelihood earning of haor people. Large areas of Sylhet, Mymensingh, Sunamganj, Habiganj, MoulviBazar, Kishoreganj and Netrokona districts are covered by many haors. The haor basin has its commercial and ecological importance for fish production (Salauddin and Islam, 2011). Haors and beels support major subsistence and commercial fisheries. Although the rapid growth haor fish production has resulted in large increases in the aggregate volumes of fish produced, much of their areal expansion has taken place through the enclosure and conversion of seasonal floodplains. These changes have resulted in reductions of wild fish biodiversity and biomass, as well as exclusion of poor fishers from access to them (Sultana, 2012). Moreover, haor areas are very much vulnerable area with diversified problems shortage of food, and damage due to floods, erosion, excess rain and cyclones, loss of land (DoF 2009). In addition, the fish production of haor is decreasing as a result of rampant harvesting of other fish, lack of river velocity for brood, use of agrochemicals, high population pressure, natural sedimentation on haor basin, destruction of habitats (Ahmed, 2012). In haor areas people have fewer opportunities to switch over income generating activities that's why their livelihood largely depends on fisheries sector. So, fisheries sector is very much important despite the declination of fish production in haor areas. Considering the above facts, the present study was carried out to assess the role of fish farming to improve livelihood of fish farmers in haor areas of Bangladesh.

Materials and Methods

The study was conducted at three villages namely parura, kaulogeeti and vauyal of Rauti Union of Tarail Upazila under Kishorgonj district. These villages were purposively selected because fish farming of these areas was higher than other areas of Tarail Upazila. People of these areas are highly dependent on haor fish farming practices for their livelihood (DoF, 2013).The selection was also made because of the suggestions made by Upazila Fisheries Officer (UFO) and other relevant officials such as Upazila Rural Development Officer, Upazila Agriculture officer etc. of Tarail Upazila. The total numbers of fish farmers in these three villages were 302 which constituted the sampling population. In the second step 34per cent of the fish farmers were selected as sample by random sampling. Sixty (60) fish farmers were selected and constituted the sample for this study. Both qualitative and quantitative data were used in the study. The research team interviewed the sample fishermen at their houses and/or farm sites. Data were collected through the pre-tested interview schedule by face-to-face interview procedure during the period of1 to 31 July 2014.The interviews, lasting about two hours, focus on their existing livelihood condition and their previous livelihood condition. The researcher collected first hand idea and information about villages, local people, resources, institutions,

infrastructure and public services through informal discussion with local people, local elite, and personnel of different organisation working in the locality.Cross-check interviews were conducted with Local Extension Agent for Fisheries officer, researchers and relevant non-government organization (NGO) workers. Where information was found to be contradictory, further assessment was carried out. The collected data were coded and entered into SPSS software package for analysis. The comparative analysis between before and after condition was done through paired t-test.

Determination of livelihood improvement of fish farmers was the main objective of the study. The five selected dimensions were used to determine the livelihood improvement. These were: change in food intake, change in housing condition, change in physical assets, change in sanitation and change in increasing scope of income. The livelihood improvement was measured comparing the average results of previous condition (recall data of five years) and present condition considering these five dimensions. Paired t-test was done to measure the significant difference between 'before' and 'after' involvement in fish farming. The problems faced by the farmers on fish farming which hinder their livelihood improvement was also determined using a four point rating scale such as, high, medium, low and not at all. The possible range of problem score for each respondent could be 'o' to '30' a total score of '0' indicated no problems in respect to utilize support services while a score of '30' indicated highest problem. Problem confrontation score was measure and a rank order was done on the basis of this score. For each problem the score could range from 0 to 180.

Results and Discussion

Change in food intake: Change in food intake is a good indicator for livelihood improvement. Increase in income raised the capacity of people to spend more money on diversified food. The average per capita per day calorie intake of the respondents previous was 941.28 k cal which improved to 2279.4 k cal after the families were intensively involved in fish farming. According to the food consumption score, the respondents were classified into three categories following the Household Income and Expenditures Survey (FAO, 2000) such as:

Below poverty line 11(Hard core poverty) = up to 1805 k cal,
Below poverty line 1 (Absolute poverty) =1806-2122 k cal and
Upper poverty line = >2122 k cal.

The average food intake of the respondents was in the upper poverty line after involvement in fish farming. As the result indicates more than 50per cent fish farmers upgraded from below poverty line to upper poverty line. As a result, their total calorie intake is significantly high. Moreover, this above findings indicates the move towards better food consumption habit was due to their involvement in fish farming.

Change in housing condition: As the livelihood condition improves, people have a tendency to reconstruct and improve their housing condition. The study reveals that 61.7 percent of the respondents' families had tin made house, 38.3 percent of the respondents' families had half building and no one had building before involvement in fish farming. After involvement in fish farming 48.7 percent of the respondents'

families had half building and 58.3 percent respondents' families had building. It is notable that, no one had tin made house. This results indicates that the intensive involvement in fish farming increase the ability of the fish farmers to spend extra money on their housing condition. Improvement of housing condition is a major priority of village people as their income increases. Due to the involvement in fish farming the fish farmers were able to keep some money even after the fulfillment of basic needs which they spend to improve their house.

Change in physical assets: As the income increases, the people try to keep hold of more physical assets for safe future. So, enrichment in physical assets is a good indicator for determining livelihood improvement. The study shows that before involvement with fish farming 51.7 respondent families had low asset possession, 46.7 percent families had medium asset possession and only 1.7 percent family had high asset possession. After involvement in fish farming 80.3 percent respondent family had medium asset possession and 90.0 percent families had high asset possession. Regarding average family asset score, the asset possession score of the respondent family increased to 39.83 from 14.73 due to their involvement with fish farming activities. This significant change in asset possession is definitely a positive change in their livelihood by alleviating their poverty. It also indicates strengthening their power to hold on assets and make a mark for their own in the society.

Change in sanitation: Condition of sanitation of a household indicates the livelihood condition of them. Development in sanitation facilities marks for the livelihood improvement status of the people. The study reveals that 60.0 percent of the respondents' families used bushes or open place, 40.0 percent of the respondents' families used *katcha* toilet and no one used sanitary toilet before involvement in fish farming. After involvement in fish farming 16.7 percent of the respondents' families used *katcha* toilet and 83.3 percent respondents' families used sanitary toilet and no one used buses or open place. Increasing percentage of respondents using sanitary toilet is a sign of awareness building on health and sanitation among the beneficiaries. Moreover, it indicates the better livelihoods improvement due to involvement in fish farming as fish farming increases the income of the respondents which allows them to spend more money to improve the sanitation facilities.

Change in increasing scope of income: Increasing scope of income is a major indicator for livelihood improvement of the people. When scope of income increases, it shows the ability of people to improve their livelihood status. From the study, it was observed that the average income increased from Tk. 37,300 thousand to Tk. 48,800 thousand per year. Before involvement in fish farming 3.3 percent respondent had low income, 43.3 percent respondent had medium income and 51.7 percent respondent had high income. After involvement in fish farming 1.7 percent respondent had low income, 10 percent respondent had medium income and 88.3 percent respondents had high income. Every other facility comes with the increased income of the people. So, increased scope of income helps the respondents to spend more money of facilities that improves their livelihood status. Moreover it indicates that the income increases and livelihood improves due to involvement in fish farming.

Comparative change in terms of before and after involvement in Fish farming: The significant change in relation to change in food availability, household, physical asset, sanitation and income of the respondents after their involvement with fish farming activities have been shown in the Table 1:

Table 1 Comparative change in terms of before and after involvement in Fish farming

Dimensions of poverty	Mean		Observed t value with 1 df
	Before	After	
Food intake (k cal)	941.28	2279.40	20.281*
Household (score)	1.38	2.58	23.043*
Physical asset (score)	14.73	39.83	12.949*
Sanitation (score)	1.40	2.83	22.281*
Income (Thousand Tk. per year)	37300	48800	12.925*

*Significant at 95per cent level of confidence

Data contained in Table 1 indicated that the rate of Calorie intake has increased after the involvement in fish farming. The food consumption habit of the fish farmers became better due to fish farming as they were more exposed to fish protein intake. The t value (20.281*) also suggests improvement in food consumption.

From Table 1 it can be seen that the housing condition of the respondent fish farmers has improved due to involvement in fish farming. This result is supported by the t value (23.043*) as it indicates significant improvement in housing condition due to fish farming (Table 1).

The results also indicates that the physical asset possession of the respondent fish farmers has increased after their involvement in fish farming. The t value (12.949*) shows a change in physical asset possession between before and after involvement with fish farming. This also makes them more confident in the society.

Table 1 revealed that the sanitation condition of the respondents has improved due to involvement in fish farming. This clearly indicated an improvement of the sanitation, which is furnished by the t-value (22.281*). Better sanitation ultimately improves the livelihood condition of the people.

The income of the respondent fish farmers has increased due to involvement in fish farming activities. This clearly indicated an improvement of the income, which is furnished by the t-value (12.925*). As the income increases people are tend to spend more money to better their livelihood condition (Table 1).

Problems faced by Fish farmers in fish farming activities: The respondents of the study area were assumed to face a number of problems while involving in fish farming activities. Ten problems were in connection with fish farming were included in problems confrontation scale. The results show that the highest proportion 83.3 percent of the respondents had high problem while 16.7 percent of them had medium problem of the fish farmers on fish farming activities (Table 2).

Table 2 Distribution of fish farmers according to their overall problem

Categories of respondents	No. of respondents	Percentage of respondents	Mean	Standard deviation
Low problem (up to 10)	0	0	22.28	3.27
Medium problem (11-20)	10	16.7		
High problem (above 20)	50	83.3		

Considering the fact that overwhelming majority of the respondents faced medium to high problems in fish farming activities, it could be concluded that appropriate measures should be undertaken to remove the barriers for encourage the respondents of haor areas in fish farming activities.

The respondents were ranked according to their problems faced to improve their livelihood condition is shown in the Table 3.

Table 3 Rank order of the respondents according to their problem confrontation score

Problems	Level of problems				Mean	Problem confrontation score	Rank order
	High	Medium	Low	Not at all			
Fish disease problem	42	18	0	0	2.70	162	1
Problem of over flooded	42	12	1	0	2.77	151	2
Lack of marketing facilities	27	21	12	0	2.15	135	3
High cost of fertilizer and fish feed	28	18	14	0	2.17	134	4
Lack of knowledge on application of fish feed and fertilizer	29	13	17	0	2.20	130	5
Unavailability of quality seed and species	24	16	20	0	2.07	124	6
Lack of financial support	24	10	27	0	1.95	119	7
Poor extension service	11	36	12	0	1.98	117	8
Lack of knowledge on species selection	15	25	20	0	1.92	115	9
Inadequate knowledge on site selection	5	31	17	7	2.20	94	10

Table 3 revealed that in the study area, most of the respondent had problem of ‘fish diseases’ as the major problem of fish farming in haor areas. Most of the respondent reported that the over flooded problem and it was ranked as the second problem. ‘Lack of market facilities’ was the third problem of the fish farmers. However, inadequate knowledge on site selection was the least problem faced by the respondents.

As the haor areas are full of natural resources, so controlling its condition is very tough. It results in more uncontrolled diseases of fish. Haor areas are low lying land. So, flooding is very common during the monsoon seasons. Thus, the communication system is not so good in these areas which hamper the marketing of fish captured in the haor areas. Due to lack of different facilities, the haor people are deprived of some basic requirements such as education, health treatment etc. Lack of education hinders them to understand the proper selection of fish species as well as

benefits and limitations of using several fish feed and fertilizers. The price of feed and fertilizers is increasing day by day. So they need financial support to utilize their resources to the maximum production of fish.

Conclusion

After involvement in fish farming the extent of livelihood improvement of the respondents has been increased remarkably in respect of food intake, housing, physical assets, sanitation and income. As a result fish farmers get the opportunity to spend the money in diversified sectors other than fulfilling just the basic requirements. On the other hand, a number of problems were observed among the respondents regarding fish culture. Therefore, the government and other related organizations should initiate some programs to improve the knowledge of the fish farmers of haor areas about the fish species selection, disease of fish, controlling measures, feed and fertilizer use etc. Proper training can be arranged to make fish farmers more skillful to mitigate these problems.

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