



PERCEPTION OF THE FISH FARMERS TOWARDS FLOOD COPING MECHANISMS

M.S.K. Rongon*, M.R. Karim, M.R.F. Noman and S. Huda

Department of Agricultural Extension, Hajee Mohammad Danesh Science and Technology University, Dinajpur, Bangladesh

ABSTRACT

The purposes of this study were to determine the selected characteristics of the fish farmers, to determine the perception of the fish farmers towards flood coping mechanisms, and to explore the relationships between the perception of the fish farmers towards flood coping mechanism and their selected characteristics. Data were collected using pre-tested interview schedule from a sample of 92 farmers out of 288 farmers selected by multistage random sampling procedure from Uthrail and Chehelgazi unions of Sadar Upazila under Dinajpur district during 1st February to 15 March 2018. Besides descriptive statistical parameters, Pearson's Product Moment Correlation Coefficient (r) was used for the statistical analysis. The findings revealed that majority (90.20 percent) of the respondents had highly favorable perception while 5.50 percent had less favorable perception and only 4.30 percent had moderately favorable perception towards flood coping mechanism. Based on correlation coefficients (r), among the nine selected characteristics such as; education, family size, pond size, extension media contact, training received and knowledge on disaster management had positive significant relationship with the perception of the fish farmers towards flood coping mechanism. On the other hand, fish farmers' age, farm size and annual income had no significant relationship with the perception of flood coping mechanism. It is recommended that further research should be undertaken to determine fish farmers' perception regarding modern scientific and advanced flood adaptation practices.

Key words: Fish farmers, perception, flood coping mechanisms

INTRODUCTION

Fishery is one of the most important sub-sectors of agriculture in agro-based Bangladesh. Bangladesh is one of the world's leading fish producing countries with a total production of 38.78 lac Metric Ton (MT) in 2015-16, whereas inland open water (capture) contributes 27.03 percent (10.48 lakh MT) and inland closed water (fish culture) contributes 56.82 percent (22.04 lakh MT) to total production. So, 83.85 percent of total production comes from inland fisheries. The growth rates of inland capture and inland culture are 2.37 and 6.94 percent, respectively. The fish production has increased more than five times (7.54 MT in 1983-84 to 38.78 lakh MT in 2015-16) over the last three decades (DoF 2016).

*Corresponding author: Email: shakhaoat9990@gmail.com, Cell phone: 8801723533384

Agro-climatic variation *e.g.* rainfall, temperature, humidity, evaporation *etc* (Sarker *et al.* 2011) has led temporal distribution of water resources into two extremes such as dry season from December to May and wet season from June to October (Karim and Thiel 2017 and Rahman 2013). In addition, Bangladesh is a land of rivers and heavy monsoon rainy season. So, flood is more or less a recurring phenomenon in Bangladesh. Therefore, the country is subject to inundation by overflow from the riverbanks due to drainage congestion rainfall run-off and storm-tidal surges. Around 30-35 percent of the total land surface is flooded during the wet monsoon (Karim 2009). Water related natural hazards have become a serious threat to the lives, livelihoods and sustainable development of Bangladesh. It is predicted that by the year 2030, an additional 14.30 percent of the country would become extremely vulnerable to floods, while the existing flood prone areas will face higher levels of flooding. Analysis of past floods suggests that, about 26.00 percent of the country is subject to annual flooding and an additional 42.00 percent is at risk of floods with varied intensity (Hakim 2012).

Dinajpur is a district in northern Bangladesh and the main rivers around this district are Dhepa, Punarbhaba, Kanchan and Atrai. Fish culture scenario of Dinajpur district is composed of annual fish production in Inland water 40265MT, rivers 194 MT, Beel 1490MT, flood plain 5782MT, pond 30430MT and cultured water body 3366MT (DoF 2016). Although, Dinajpur is not flooding prone area, but riverine floodplain area situation becomes quite opposite to the rainy monsoon. This is because of heavy rainfall in the upper catchments of rivers create overflow of water during the rainy season (Karim *et al.* 2017). As a result, fish farmers face the devastating impacts of flood in terms of loss of assets and shelter, loss of livelihood opportunity, health hazard and increasing food insecurity (Ahmed 2010). As flood is not a new phenomenon in Bangladesh, people have traditionally developed different kinds of coping strategies to avoid or minimize the loss due to flood (Karim and Ateh 2016 and Ahmed 2010). However, many people become perplexed what they will do during and after flood. Many of them are not well known about appropriate responses against flood damage (Khandker 2007). The affected people cope with flood by practicing some local coping strategies based on the previous experience whenever they faced severe flood. As we know perception is a mental process by which an individual become aware of the world around. In light of the above discussion, the present study was undertaken to determine the perception of fish farmers towards flood coping mechanism. From that point of view, the present study aimed to find out the objectives: i) to determine the selected characteristics of the fish farmers; ii) to determine the perception of the fish farmers towards flood coping mechanisms and, finally iii) to explore the relationship between the selected characteristics of fish farmers and their perception of flood coping mechanism.

METHODOLOGY

Study area, population and sampling

The study was conducted in Sadar Upazila of Dinajpur district. Among 10 unions of Sadar Upazila, Uthrail and Chehelgazi unions were purposively selected as study locations based on the availability of fish farmers involved in small scale fish culture and suffered from seasonal flood. The total numbers of fish farmers in the two unions were around 288 which constituted the population of the study. Total 92 fish farmers (about 32.00 percent of total population) were

selected by using multistage random sampling technique which constituted the sample size.

Measurement of selected characteristics and focus issue

Nine (9) characteristics of the fish farmers were considered as causal factors. The selected characteristics were age, education, family size, farm size, pond size, annual income, extension media contact, training received and knowledge on disaster management. These selected characteristics were measured by following appropriate scale and techniques. Perception of the fish farmers towards flood coping mechanism was the focus issue. The respondents were asked to express their opinions on the extent of perception in each of 15 listed flood coping mechanisms using Likert scale; 'strongly agree (5)', 'agree (4)', 'no opinion (3)', 'disagree (2)' and 'strongly disagree (1)' for positive statement and vice-versa for negative statement. The summation of the scores against all 15 mentioned coping mechanism expresses their perception of the fish farmers towards flood coping mechanism. Thus, overall score of the fish farmers towards flood coping mechanism varied from 15 to 75; where 15 indicates less perception and 75 indicates high perception towards flood coping mechanism.

Data collection and analysis

Data were collected from the sampled fish farmers through personal interview using structured interview schedule during 01 February to 15 March, 2018. Necessary cooperation was obtained from the field staff and Fisheries Officer of concerned fisheries office. After data collection, data were processed, compiled and analyzed to facilitate tabulation. The analysis was performed using Statistical Package for Social Sciences (SPSS) software package. Descriptive analysis such as range, number, percentage, mean and standard deviation were determined to describe the selected characteristics of the fish farmers. Pearson's Product Moment Correlation Co-efficient (r) was used to examine the relationships of the selected nine characteristics of the respondents and their perception towards flood coping mechanism.

RESULTS AND DISCUSSION

Characteristics profile of the fish farmers

The characteristics profile of fish farmers such as age, education, family size, farm size, pond size, annual income, extension media contact, training received and knowledge on disaster management were presented in the Table 1. The age of the respondents ranged from 29 to 65 years with a mean of 47.38 and standard deviation of 9.94. Less than half (44.60 percent) of the fish farmers were middle aged compared to 39.10 percent belonged to the old aged and only 16.30 percent were in the young aged. The educational mean score of the fish farmers was 6.01 with a standard deviation of 3.12. More than half (54.30 percent) of the fish farmers had secondary education compared to 28.30 percent primary, 12.00 percent illiterate, and only 5.40 percent of the fish farmers had above secondary education.

Therefore, majority of the fish farmers had primary to secondary level education. The average family size of the respondents was 6.13 with a standard deviation of 1.41. More than half (54.30 percent) fish farmers had medium family size, while 37.00 percent had large family size and only 8.70 percent had small family size. The national average family size in Bangladesh is 4.85 (BBS 2018), which is lower than the mean value of the present study (6.13). This may be due to that the study area is in the remote villages where people did not adopt family planning as per the expectation of the government. The average farm size of the fish farmers was 0.82 hectare and

Table 1. Selected profile characteristics of the fish farmers (N=92)

Characteristics	Scoring method	Range		Categories	Respondents		Mean	SD
		Observed	(Possible)		No.	Percent		
Age	No. of year	29-65 (Unknown)		Young (≤ 35)	15	16.30	47.38	9.94
				Middle (36-50)	41	44.60		
				Old (>50)	36	39.10		
Education	Year of schooling	0.0-12 (Unknown)		Illiterate (0)	11	12.00	6.01	3.12
				Primary (1-5)	26	28.30		
				Secondary (6-10)	50	54.30		
				Above secondary (>10)	5	5.40		
Family size	No. of members	2-10 (Unknown)		Small (≤ 4)	8	8.70	6.13	1.41
				Medium (5-6)	50	54.30		
				Large (>6)	34	37.00		
Farm size	Hectare	0.20-4.42 (Unknown)		Marginal (0.02-0.20)	5	5.40	0.82	0.89
				Small (0.20-1.0)	67	72.80		
				Medium (1.0-3.0)	16	17.40		
				Large (>3.0)	4	4.30		
Pond size	Hectare	0.1-1.94 (Unknown)		Very small (up to 0.2)	36	39.10	0.42	0.37
				Moderately small (0.21-0.5)	33	35.90		
				Small (0.5-.99)	9	9.80		
				Medium (>0.99)	14	15.20		
Annual income	('000' Tk.)	43.5-231.0 (Unknown)		Low income (≤ 53.0)	13	14.10	98.55	45.76
				Medium income (53.01-144)	67	72.80		
				High income (>144.0)	12	13.00		
Extension media contact	Score	0-35 (0-39)		Low (≤ 13)	67	72.80	9.51	10.57
				Medium (13-26)	11	12.00		
				High (>26)	14	15.20		
Training received	No. of days	0-12 (Unknown)		No (0)	72	78.30	1.22	2.71
				Short ($\leq 1-3$)	6	6.50		
				Medium (4-7)	12	13.00		
Knowledge on disaster management	Score	7-20 (0-22)		Fair (≤ 7)	5	5.40	15.87	2.59
				Good (8-14)	8	8.70		
				Excellent (>14)	79	85.90		

standard deviation 0.89. About three-fourths (72.80 percent) of fish farmers were under small farm size compared to 17.40 percent medium, 5.40 percent marginal and only 4.30 percent large farm size. So, majority of the fish farmers had small farm size. The average pond size of the fish farmers was 0.42 hectare and standard deviation of 0.37. Most (39.10 percent) of the fish farmers had very small pond size compared to 35.90 percent moderately small pond size, 15.20 percent medium pond size and only 9.80 percent had small pond size. This means that the respondents under the study are under small scale to moderately small pond fish culture. The average annual income of the fish farmers was 98.55 BDT and standard deviation of 45.76. Hence, majority of the fish farmers had medium income compared to 14.10 percent under low and only 13.00 percent under high income. The extension media contact mean score of the fish farmers was 9.51 and standard deviation of 10.57. Majority (72.80 percent) of the fish farmers

had low extension media contact, while 15.70 percent high and only 12.00 percent had medium extension media contact. The training received scores of the fish farmers ranged from 0 to 12 with a mean of 1.22 and standard deviation of 2.71. More than three-fourths (78.30 percent) of the fish farmers had no training followed by 13.00 percent received medium training, 6.50 percent received short training and only 2.20 percent received long-term training. The average knowledge score of the respondents on disaster management was 15.87 with a standard deviation of 2.59. Majority (85.90 percent) of the fish farmers had excellent knowledge compared to 8.70 percent had good knowledge and only 5.40 percent had fair knowledge on disaster management like flood issue.

Overall perception of the fish farmers of flood coping mechanism

The overall perception score regarding flood coping mechanism of the fish farmers ranged from 15 to 75, where 0 indicating 'no perception' and 75 indicating 'high perception'. However, the observed perception scores of the fish farmers ranged from 23 to 65 with a mean of 55.52 and standard deviation 9.13. Based on the possible perception score, the respondents were classified into three categories such as 'less favorable' (up to 25), 'moderately favorable' (26-50) and 'highly favorable' (above 50) as follows (Table 2).

Table 2. Distribution of the farmers according to their overall perception

Range		Categories (Based on possible score)	Respondents (N=92)		Mean	SD
Possible	Observed		Number	Percent		
15-75	23-65	Less favorable (up to 25)	5	5.50	55.52	9.13
		Moderately favorable (26-50)	4	4.30		
		Highly favorable (above 50)	83	90.20		

Data revealed that majority (90.20 percent) of the fish farmers had highly favorable perception compared to 5.50 percent had less perception and 4.30 percent had moderate perception towards flood coping mechanism (Table 2). The average value of perception indicates that in average the fish farmers had more than moderate perception towards flood coping mechanism. During rainy season, due to high rainfall most of the ponds become flooded, hence fish farmers' perception regarding locally available flood coping mechanisms might be high because of their excellent knowledge on disaster management like flood issue.

Relationship between characteristics and perception of flood coping mechanism

The relationships between the selected characteristics and focus issue were computed by using the Pearson's product moment correlation co-efficient (r). The co-efficient of correlation (5.00 percent level) was used to test the null hypothesis (Table 3). Based on the computed 'r' value, the relationship between age and their perception of flood coping mechanism was insignificant. It meant that the age of the respondents had no significant effect on their perception of flood coping mechanism. Findings revealed by Kabir (2002) and Islam (2005) support our present study findings. The relationship between education of fish farmers and perception of flood coping mechanism was significant. Supportive results were found in their respective study by Uddin (2004), Majlish (2007) and Karim *et al.* (2009). Family size and perception of the fish farmers towards flood coping mechanism had significant relationship and similar result was found by Roy (2009). The relationship between farm size of the fish farmers and their perception of flood

coping mechanism was statistically insignificant. So, the farm size of fish farmers had no significant effect on their perception of flood coping mechanisms. Sharmin (2005) and Pal (2009) also found similar relationship that supports the findings of our present exploration. Pond size and perception of flood coping mechanism had significant statistical relationship. This meant that the higher the pond size, the higher perception of the fish farmers towards flood coping mechanisms. The relationship between annual income and perception of flood coping mechanism was statistically insignificant.

Table 3. Relationship between characteristics and perception of flood coping mechanism

Focus issue	Selected characteristics	Pearson correlation (r) values with 90 df
Perception of the fish farmers towards flood coping mechanism	Age	-0.244
	Education	0.355*
	Family size	0.525**
	Farm size	0.240
	Pond size	0.355*
	Annual income	0.218
	Extension media contact	0.354*
	Training received	0.373*
	Knowledge on disaster management	0.519**

*indicates correlation is significant at 5% probability level, ** indicates correlation is significant at 1% probability level.

The finding was supported by the results of Pal (2009) and Majlish (2007). The relationship between extension media contact and perception of flood coping mechanism was positively significant. Supportive result was found by Fardous (2002) and Syeed (2003). It meant that the higher extension media contact, higher the perception of the fish farmers towards flood coping mechanism. Training received and perception of flood coping mechanism had positively significant relationship. Thus, it meant that the higher training received, higher the perception of the fish farmers towards flood coping mechanism, and it was supported by Fardous (2002) and Uddin (2004). The relationship between knowledge on disaster management and perception of flood coping mechanism was positively significant. Supportive result was found by Uddin (2004), Majlish (2007) and Roy (2009) in their respective studies.

CONCLUSION

The overall perception of fish farmers towards flood coping mechanism was found highly favorable and satisfactory. Therefore, it might be concluded that fish farmers are more popular to use local and traditional coping mechanisms for fish culture against flood loss. The selected characteristic such education, family size, pond size, extension media contact, training received and knowledge on disaster management had positive significant relationship with the perception of the fish farmers towards flood coping mechanism. But majority of the fish farmers have low exposure to extension media contact and training opportunities on modern and advance flood coping and adaptation measures for fish culture against severe flood. So, the Department of Fisheries (DoF) and other concerned government and non-government organization should further take care regarding advanced and modern flood adaptation and coping mechanism in order to tackle the future unexpected flood disaster. Steps should be taken by the DoF to increase

the practices of coping mechanisms through massive motivation, which could help them reduce the losses from fisheries. The significant selected characteristics such as education, family size, pond size, extension media contact, training received as well as knowledge on disaster management should be taken under consideration in decision making process.

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