Farmers' Knowledge on Flood Coping Strategies: A Study in a Flood Prone Area of Munshiganj District

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Abstract

The objectives of the study were to determine and describe farmers' knowledge on flood coping strategies and to explore the relationships between farmers' selected characteristics with their knowledge on flood coping strategies. The study was carried out at Baultali and Surpara villages under Lauhajang upazila of Munshiganj district. Twenty percent of the population was randomly selected as the sample of the study. Data were collected from the sampled farmers using interview schedule in October, 2010. Farmers' knowledge on flood coping strategies was measured concerning four aspects such as crop, livestock, fisheries and non-farm livelihood activities following the revised bloom's taxonomy technique. Pearson's Product Moment Correlation Co-efficient (r) was used to ascertain the relationship between farmers' selected characteristics and their knowledge on flood coping strategies. Farmers had moderate knowledge on crop aspect to cope with flood. They had very poor level of knowledge in case of livestock and fisheries aspects. About fourty five percent of the farmers fell in a low level knowledge category for non-farm livelihood aspect. Farmers got more score on practical aspects of knowledge (applying, evaluating) on flood coping than theoretical aspects (remembering, understanding). Except family size and annual family income all other selected characteristics of farmers had significant positive relationships with their knowledge on flood coping strategies.

Keywords: *Farmers, knowledge, flood, coping strategy*

Introduction

Most of the land of Bangladesh is river delta, material brought down by the rivers Ganges and Brahmaputra and deposited at the head of the Bay of Bengal. Much of this land is relatively new having been deposited in recent centuries with continual changes in coastline and the course of rivers. As a result of this, most of the country is low lying and over two-thirds of the country is less than 5 m above sea-level (Agrawala, *et al.* 2003). It is, therefore, vulnerable to flooding and arise many problems. Climate models developed by the IPCC indicate that Bangladesh may experience 10% to 15% more rainfall by 2030. An increase in rainfall will increase the frequency and severity of flooding in Bangladesh in the future. The flooding situation may also be worsened by the sea level rise due to the climate change (IPCC, 2001).

According to Hutton and Haque (2003), Bangladesh is among the world's most vulnerable country to the effects of flooding. One-fifth to one-third of the country is flooded to varying degrees in each year between May to September. About two-thirds of the food grain (mainly rice) is produced and harvested at this time (Mazumder, 2005). So rice based agriculture is mostly affected by flood. This loss may be too high if farmers do not able to adopt proper strategies to cope with flood.

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According to Dekens (2007), what people know influences what people do, that is their practices. Consequently, farmers' inadequate knowledge on flood coping strategy may lead them unable to reduce the loss of flood. So it is necessary to determine their existing knowledge and take further step to improve it. In view of this context, the study was conducted with the following objectives; i) to determine the farmers' existing knowledge on flood coping strategies and ii) to explore the relationships between each of the selected characteristics of the farmers' and their knowledge on flood coping strategies.

Methodology

The study was conducted in Lauhajang upazila. This upazila is situated near the bank of river *Padma* which comes under regular flood and farmers are highly vulnerable to flood damage. Two villages namely Baultali and Surpara were selected as the specific study location. The selection was made on the basis of suggestions made by the Upazila Agriculture Officer (UAO), Sub-Assistant Agriculture Officer (SAAO), Union Parishad Members and Officials of Lauhajang upazila. The villages are situated in flood prone areas which are naturally low land. Almost every year flood occurs in these villages and causes human sufferings and damage to crop, livestock, fisheries and other resources. An up dated list of all the farmers of the selected villages was prepared by the help of the SAAO and respective union parishad members. A total 600 farmers (one from each household) in the selected villages were considered as population of the study. Twenty percent of the population (i.e.120 farmers) was randomly selected as the sample of the study.

Various characteristics of the farmers were considered as the independent variables of the study. The characteristics were age, level of education, family size, farm size, the land area affected by flood last time, annual family income, training exposure, extension media contact and social mobility. The dependent variable was farmers' knowledge on flood coping strategies which was measured by the revised Bloom's taxonomy technique as developed by the Anderson and Krathwohl (2001). According to revised Blooms' taxonomy, level of knowledge (cognitive domain) represents six levels i.e. remembering, understanding, applying, analyzing, evaluating and creating. Farmers' knowledge was assessed in four aspects namely crop, livestock, fisheries and non-farm livelihood. Farmers' knowledge on flood coping strategies was measured on the basis of their responses to the questions. Each of the questions was assigned score as 3, 2, 1and 0; in the following manner:

Grade	Category	Assigned Score
A	Very good knowledge	3
B	Good knowledge	2
C	Average knowledge	1
D	Not appropriate	0

So the total score may be ranged from 0 - 36 and for each knowledge level 0 - 6. For each of the aspects i.e. crop, livestock, fisheries and non-farm livelihood; the score may be varied from 0 - 9. On the basis of scores, the respondents were classified into different categories. Pearson's Product Moment Correlation Coefficient (r) was used for testing the relationships between the concerned variables.

Data were collected personally by the researcher himself through face to face interview from the selected farmers in October, 2010 by structured interview

schedule. To secure in depth information, focus group discussion (FGD) and personal observation techniques were followed. The schedule contained both open and closed form of questions. Qualitative data were converted into quantitative data by means of suitable scoring technique wherever necessary. Five percent (0.05) level of probability was the basis for rejecting any null hypothesis. The SPSS computer package was used to analyze data.

Findings and Discussion

Selected Characteristics of the Farmers
Total nine characteristics of the farmers' were selected to find out their relationships with their knowledge on flood coping strategies. The characteristics were age, level of education, family size, farm size, the land area affected by flood last time, annual family income, training exposure, extension media contact and social mobility. The dependent variable was farmers' flood coping knowledge. The farmers were categorized into different categories for different characteristics and their distributions are presented in Table 1.

Table 1 Distribution of farmers according to their characteristics profile (n=120)

Characteristics (Unit of measurement)	Respondent Categories	Respondent Percent (N= 120)	Mean	SD
Age (Year)	Young (up to 30)	22.5	42.18	11.54
	Middle aged (31-50)	68.3		
	Old (above 50)	9.2		
Level of Education (Year of Schooling)	Illiterate (0)	7.5	3.59	3.96
	Can sign only (0.5)	45.8		
	Primary (1-5)	26.7		
	Secondary (6-10)	15.8		
	Higher Secondary (above 10)	4.2		
Family size (Number)	Small (up to 4)	1.7	7.57	2.09
	Medium (5-6)	10.8		
	Large (above 6)	87.5		
Farm Size (Hectare)	Marginal (0.02-0.2)	28	1.09	1.05
	Small (0.2-1)	30		
	Medium (1-3)	38.5		
	Large (above 3)	3.5		
The land area affected by flood last time (Percentage)	Medium (up to 55)	1.7	82.94	12.04
	High (56-75)	28.3		
	Very High (above 75)	70.0		
Annual family income ('000' Tk)	Low (up to 60)	54	67.66	32.23
	Medium (61-120)	35.8		
	High (above 120)	9.2		
Training exposure (Score)	Low (up to 1)	67	1.85	0.94
	Medium (2-3)	27		

Characteristics (Unit of measurement)	Respondent Categories	Respondent Percent (N= 120)	Mean	SD
	High (above 3)	6		
Extension media contact (Score)	Low (up to 8)	62.5		
	Medium (9-13)	24.2	9.63	3.6
	High (above 13)	13.3		
Social mobility (Score)	Low (up to 7)	52		
	Moderate (8-13)	41.5	10.17	3.38
	High (above 13)	6.5		

Farmers' average age was 42.18 years and the overwhelming majority (90.8 percent) of them were middle aged to young. Their mean education was 3.59 years of schooling and the highest proportion of 45.8% of them can sign only. The farmers had an average family size of 7.57 members and the majority (87.5) had large family. They had on an average of 1.09 hectares of land and 58 percent of the farmers had marginal to small sized farm. A large majority (82.95 percent) of the farmers' lands were affected by flood last time About 54% percent farmers had low family income and the average annual income was 67.66 thousand Taka. General training exposure of the farmers was very poor while majority of the farmers (67%) had low exposure. The majority (62.5 percent) of the farmers had low extension media contact while 94 percent of the farmers had low to medium social mobility.

Farmers' knowledge on flood coping strategies
Farmers' knowledge on different aspects of flood coping strategies has been described below.

Knowledge on crop related coping strategies
Farmers were classified into three categories based on their scores on crop related coping knowledge as shown in the Table 2. It was found that 30.3 percent farmers fell in low category, 49.8 percent in moderate category and 19.9 percent were in high category. Although crops were their main source of income, about fifty percent of the respondents had moderate knowledge on crop related flood coping strategies. The poor educational condition and improper extension services may be the reasons for their unsatisfactory knowledge. Rana (2009) found that majority of the respondents had medium management ability in crop production in a flood prone area.

Knowledge on livestock related coping strategies
Table 2 represents different categories of the farmers on the basis of their scores on livestock related knowledge. It was found that 55.8 percent farmers fell in low category, 35 percent in medium category and 9.1 percent were in high category. Khatun *et al.,* (2009) found that majority of the respondents had low coping ability regarding livestock aspect. This might be because of having less assets and low income in a flood prone area; the respondents have less scope to manage livestock.

Table 2 Farmers' categories based on their knowledge on different aspects of flood coping strategies

Aspects	Respondents' knowledge level	Score range	Respondents		Mean	SD
			Frequency	Percentage		
Crop	Low	up to 3	36	30.3		
	Moderate	4-6	60	49.8	5.07	2.83
	High	Above 6	24	19.9		
Livestock	Low	up to 3	67	55.8		
	Moderate	4-5	42	35	3.78	1.98
	High	above 5	11	9.1		
Fisheries	Low	up to 3	58	48.3		
	Moderate	4-5	44	36.5	4.13	2.18
	High	above 5	18	15.1		
Non-farm livelihood	Low	up to 3	55	45.8		
	Moderate	4-5	49	40.8	4.46	2.73
	High	above 5	16	13.3		

Knowledge on fisheries related coping strategies

There were three categories of farmers based on fisheries related coping knowledge score which is shown in the Table 2. It was found that 48.3 percent farmers fell in low category, 36.5 percent in medium category and only 15.5 percent farmers were in high category. Majority of the farmers (84.8 percent) fell into low to medium categories regarding fisheries aspect because repeated and unpredicted severity of flood made fish culture less profitable. Alam (2009) found that almost all farmers faced medium to high constraints (99 percent) in fisheries aspect in a flood prone area of Jamalpur district. These less profitability and high constraints may be reasons for their low knowledge.

Knowledge on non-farm livelihood related coping strategies

Table 2 represents three categories of the farmers on the basis of their scores on non-farm livelihood related knowledge. It was found that 45.8 percent farmers fell in low category, 40.8 percent fell in medium category and 13.3 percent were in high category. About 87 percent farmers fell in low to moderate category for non-farm

livelihood related coping knowledge to maintain their livelihood and reduce the loss of flood. Khatun *et al.,* (2009) also found that majority of the respondents had medium coping ability in different aspects of livelihood beyond agriculture.

Farmers' performance on different levels of knowledge

Farmers' knowledge on flood coping strategies were measured in six levels of knowledge as i.e. remembering, understanding, applying, analyzing, evaluating and creating. The highest score was counted for applying level of knowledge and in descending orders followed by evaluating, remembering, understanding, analyzing and creating level of knowledge as shown in the Table 3. This may be due to the fact that farmers in real life situation face a lot of problems and they have to cope with those problems every day. When the researcher asked questions to assess their knowledge at different levels, they could not reply properly the theoretical aspects of flood coping but they could reply the practical or applied aspects of flood coping properly. It indicates that they have more practical knowledge (applying, evaluating) on flood

coping than theoretical knowledge (remembering, understanding). Islam (2005) also found that farmers got highest score on practical aspects (evaluating, creating) of knowledge than theoretical aspects (remembering, understanding).

Table 3 Farmers' knowledge on different levels

Level of knowledge	Statements	Mean	SD
Remembering	Mention the severely damaged crops due to flood	2.92	1.42
	Name some diseases of livestock and poultry which generally occurs due to flood		
Understanding	Explain the reasons for flood occurrence	2.17	1.13
	Describe why fish culture is not so profitable in a flood prone area		
Applying	How do you manage food crisis for livestock?	4.09	1.98
	What should you do to secure pure drinking water if tube well is submerged?		
Analyzing	How do you select appropriate cropping pattern in your area?	1.75	0.88
	What steps do you follow to protect your fisheries from flood damage?		
Evaluating	Is it possible to keep livestock and poultry together during flood?	3.76	1.57
	What type of settlement should you have to minimize the flood loss?		
Creating	How fish culture can be profitable in your area?	2.75	1.27
	How you prevent your family from different diseases during flood?		

Relationship between farmers' selected characteristics and their knowledge on flood coping strategies

Pearson's product moment correlation co-efficient (r) was computed in order to explore the relationship between the selected characteristics of the farmers and their knowledge on flood coping strategies. The findings are presented in Table 4.

The findings indicate that except family size and annual family income all other characteristics of the farmers such as age, level of education, farm size, land area affected by flood last time, training exposure, extension media contact and social mobility had significant positive relationship with their knowledge on flood coping strategies.

Table 4 Results of correlation between farmers' selected characteristics and their knowledge on flood coping strategies

Selected characteristics	Correlation of Co-efficient (r value)
Age	0.360**
Level of education	0.841**
Family size	-0.088
Farm size	0.202*
Land area affected by Flood last time	0.196*
Annual family income	0.215
Training received	0.653**
Extension media contact	0.621**
Social mobility	0.442*

* Significant at 0.05 level of probability with 118 d.f.
** Significant at 0.01 level of probability with 118 d.f.

It means that the more the above characteristics are, the more the farmers' knowledge on flood coping strategies increases. So it may be argued that there are certain characteristics of farmers' which can shape their knowledge on flood coping strategies. These findings are supported by the previous studies. Islam (2005) reported similarly that farmers' age, education, farm size, extension media contact and social exposure had significant positive relationship with their knowledge on flood coping strategies.

Conclusions

Farmers had moderate knowledge in crop aspect to cope with flood. They had very poor level of knowledge in case of livestock and fisheries aspects. Their knowledge level in non-farm livelihood aspect was also unsatisfactory as more than forty five percent of the farmers fell in low level knowledge category. They had more practical knowledge (applying, evaluating) on flood coping than theoretical knowledge (remembering, understanding). Except family size and annual family income all other selected characteristics of farmers had significant relationship with their knowledge on flood coping strategies. Among the selected characteristics, farmers' educational condition, training exposure and extension media contact were very poor. But these characteristics had significant positive relationships with their knowledge on flood coping strategies.

The overall knowledge on flood coping strategies of the farmers' was not satisfactory. So, first of all general awareness about flood coping should be enhanced. Then some specific programmes to be launched for crop, livestock and fisheries and other aspects. Besides the increasing of educational level, the extension service and proper training should be conducted. To do so, Department of Livestock Services (DLS) and the Department of Fisheries (DoF) along with the Department of Agriculture Extension (DAE) should come forward to launch appropriate extension campaign. Both Government and the farmers should jointly come forward in a holistic way to develop more knowledge about flood coping to minimize the loss of flood.

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