Bangladesh Journal of Extension Education *ISSN 1011-3916*
Volume 31, No. 1&2, 2019: 131-141 *Research Article*

Assessment of People's Personal Profile Contribution towards Participation in Flood Coping Mechanism

M.Y. Uddin[1], M.N. Islam[2], M.R.A.F. Noman[3] and S. Huda[4]

Abstract

The purpose of this study was to determine the contribution of selected personal profile of the flood affected people towards their participation in flood coping mechanism. Data were collected from a sample of 298 flood affected peoples selected by multistage random sampling procedure from Kazipur upazila of Sirajganj district during the period from 20 August to 20 November, 2014. The contribution of the selected characteristics of the respondents towards participation in flood coping mechanism was assessed following multiple regression analysis. The participation in flood coping mechanism was determined on five aspects viz. food collection and management, agricultural products protection, household assets protection, health and sanitation, and some social context. Among 15 personal characteristics of the respondents, regression analysis indicated that variations in only due to four predictors, namely extension media contact, training received, participation in community activities and disaster management knowledge were statistically significant. Contribution of all the eight variables was 36.8 percent where four significant variables contributed 35.1 percent and four insignificant variables contributed only 0.017 percent to flood coping mechanism.

Key words: Contribution, people's participation, and flood coping mechanism

Introduction

Disaster is a recurrent phenomenon in Bangladesh and the growing climate change is expected to enhance such occurrence in future. Climate change effects take the form of calamities such as cyclones, floods and droughts. The Intergovernmental Panel on Climate Change (IPCC) has underscored that developing countries are disproportionately vulnerable to climate change (IPCC, 2007).

The Climate Change Vulnerability Index (2011) put Bangladesh at top of the list in 170 vulnerable countries to the impacts of climate change (Maplecraft, 2011). The common natural disasters are high rainfall, drought, riverbank erosion, flood, cyclone, earthquake, landslides, tornado, hailstorm, north-western wind, snowfall, insect pest diseases, etc. and again 50 or more disasters are created by man (Sattar, 2012).

In Bangladesh, flood occurrence has increased after 1970 and it is reported that after every 4-5 years a severe flood occurs that covered 60 percent of the total area. After every 10 years a big severe flood takes place. In every two years, Bangladesh faces a middle category flood, in every four to five years a big flood and a big flood that inundates 60 percent areas, in every 8-10 years face a severe flood and in every 100 years a great flood (1786, 1876 and 1988). One fifth to one third of the country is flooded each year during June through October when nearly two thirds of the food grains (mainly rice) are produced. Crops, houses, market etc. go under water and

[1]Assistant Professor, Udgari Degree College, Kazipur, Sirajgonj; [2]Professor, Graduate Training Institute, BAU, Mymensingh; [3]Lecturer and [4]Professor, Department of Agricultural Extension, Hajee Mohammad Danesh Science and Technology University, Dinajpur

people suffering were knows no bound. Bangladesh experiences devastating floods frequently and the impact of it is immense in the national economy. People suffer from food shortage, water, sanitation and hygiene practice, damage of crops, houses and other infrastructures, loss of life, restriction of movement etc from the effects of it (Miah, 2010). Flood such natural disaster hamper national economy, environment, livelihood, ecology as well as ecosystem. Floods are more or less a recurring phenomenon in the country and occasionally they become devastating. Each year in Bangladesh about 26,000 sq km, accounted for 18 percent of the country is flooded, killing over 500 people destroying 7 million home. During severe floods, the affected area may exceed 75 percent (in 1998) of the total area of the country (Anonymous, 2007). Historically the country faced different calamities in the form of cyclones, floods and droughts and the frequency and intensity of these events have increased over the past decades (GoB, 2010).

Individual factors include age, marital status, educational level, and employment status play a major role in deciding the people level of aspiration. Aspiration is the desired future states of well being of an individual depend on the socioeconomic status of the people. The past researches have also shown that education family education status, farm experiences, annual income were vital for adoption of the improved practices (Roy and Tiwari, 2016). The affected people cope with flood by participating in some local strategies based on the previous experience whenever they faced severe flood. Slowly but steadily the flood coping scenario in the study area is changing through their participating in some coping strategies against various damaging aspects of flood. From that point of view, the study aimed to focus on how peoples' personal profile affects their participation in participation in flood coping mechanism. Keeping this view in mind, the research was undertaken on:

- To determine the personal profile of the flood affected people with their contribution regarding participation in flood coping mechanism.

Methodology

Sirajganj district is located in the northwestern part of Bangladesh, of which the mighty Brahmaputra or Jamuna River flowing at the right edge of the district. Kazipur upazila of Sirajganj district is frequently hit by such natural disaster and therefore, Kazipur upazila of Sirajganj district was purposively selected as the location for this study. From the Kazipur upazila, three unions namely Maizbari, Khasrajbari and Natuarpara union were selected purposively. Then six villages, namely Boduarpara, Natun Maizbari, Khasrajbari, Shanbandha, Fulzora and Ghoragacha also selected purposively from the selected unions. Total populations from these six villages were 2981. From the population 298 (about 10 percent of the population) were selected as sample following simple random sampling technique. They population were from a mixture of professional group e.g. landless farmers, fishermen, boatman, carpenters, rickshaws pullers, school teacher, day laborers and tenant farmers. The dependent variable was 'contribution of the personal profile of the flood affected peoples towards their participation in flood coping mechanism.

For measuring participation in flood coping mechanism first selected items were recorded against each of the following five components of flood coping mechanism: food collection and management, agricultural products protection, household assets protection, health and sanitation and some social contexts

At least 15 items were collected against each of the above components of flood coping mechanism at the first stage. At the second stage, the list of items was validated through judge rating in order to test the internal consistency and suitability of the items against the context. In the third stage, a list of 10 (ten) items against each of the components was kept for final data gathering instruments. Therefore, a total of 50 items were kept against all five components of flood coping mechanism. Each of the items regarding farmers' participation was put against a three point rating scale as 'always', 'sometimes' and 'never' where a score of 3, 2 and 1 was assigned. Therefore, the range of participation score could vary from 50 to 150, where, 50 indicating the lowest level of participation and 150 for highest level of participation in flood coping mechanism by a respondent.

The profile characteristics were age, education, family size, farm size, annual income, extension media contact, training received, aspiration, household belongings, calorie intake, body mass index, environmental awareness, self-confidence, participation in community activities and disaster management knowledge were considered as independent variables. The contribution of the selected characteristics of the respondents towards participation in flood coping mechanism was assessed using multiple regression analysis. The multiple regressions followed in this research is as follows:

$$Y_i = \beta_0 + \beta_0 X_{1i} + \beta_0 X_{2i} + \varepsilon_i \qquad i = 1, 2, \ldots .17$$

Where,

Y = Dependent Variable (Contribution towards participation in flood coping mechanism)

X = Personal profile (age, education, family size, farm size……. participation in community activities and disaster management knowledge

β = Regression coefficients

ε = Random error follows normal distribution with mean zero

The personal socio-economic characteristics of the respondents were the independent variables which were measured by appropriate statistical scales and scores. Data were collected during the period from 20 August to 20 November, 2014 using a pre-tested interview schedule. The collected data were coded, compiled, tabulated and analyzed. The SPSS software was used for data processing and analysis. Various descriptive statistical measures such as range, frequency, number, percentage, mean, standard deviation and rank order were used for describing the variables.

Findings and Discussion

In this section the findings of the study and their logical interpretation has been presented according to the objectives of the study. These are systematically presented below:

Personal Profile of the Flood Affected People

Age of the respondents ranged from 20 to 75 years with the mean of 43.52 and standard deviation 12.76 years. The highest portion (39.9 percent) of the respondents was in the middle age category compared to 34.2 percent young and 25.8 percent old. Similar findings were supported by Huda (2011) and Islam (2005). Majority of the respondents fell into the middle age category. These category respondents are supposed to be more active, energetic and enthusiastic and capable of practicing flood copping mechanism.

Education scores of the flood affected people ranged from 0.5 to 12 with the mean education of 3.09 and standard deviation of 2.84.The highest portion (59.7 percent) of the respondents had primary education, 26.2 percent could sign only, 13.1 percent had secondary education and 1 percent had above secondary education. Education is the prerequisite for development. The national average literacy rate in Bangladesh is 59.87 percent (BBS, 2012). The findings indicate that the literacy rate in the study area seems to be higher than the national average because the respondents in the study area were found to be very aware of education.

Family size of the respondents ranged from 1 to 10 with the mean of 4.10 and standard deviation of 1.27. The findings indicate that the highest proportion (66.4 percent) of the respondents had small sized family compared to 29.5 percent having medium sized family and 4 percent had large sized family. The average family size of the respondents in the study area was 4.10 which were slightly lower than that of the national average of 4.65 (BBS, 2012). Farm size of respondents ranged from 0.008 to 3.450 ha with the mean of 0.266 and standard deviation of 0.32 hectares. The findings indicate that the highest proportion (46.0 percent) had marginal farm size compared to 7 percent having landless, 44.3 percent had small size, 2.3 percent had medium farm size and 3 percent had large farm size. The average farm size of the respondents was 0.266 ha which was much lower than that of the national average of 0.46 ha (BBS, 2012). Annual income of the respondents ranged from 12 to 228 with a mean of 58.76 and standard deviation of 26.06. The findings indicate that the highest portion (77.2 percent) of the respondents belonged to medium family income compared to 11.7 percent having low and 11.1 percent had high family income. The findings were supported by the studies of Huda (2011), Islam (2005) and Jamal (2009).Extension media contact scores of the respondents ranged from 0 to 21, against the possible score 0 to 24. The mean and standard deviation were 5.63 and 3.80 respectively. The majority (46.0 percent) of the respondents had low extension media contact, 4.7 percent had no extension media contact, 37.9 percent had medium extension media contact and 11.4 percent had high extension media contact. The findings indicate that an overwhelming majority (83.9 percent) of the respondents had low to medium extension media contact. This may be due to the reason that the respondents had moderate contact with different extension media.

Training received by the respondents ranged from 0 to 29 with the mean and standard deviation of 2.10 and 2.83 respectively. It was observed that most of the respondents (71.8 percent) had short term training, 23.8 percent had no training, 2.7 percent had mid-term training and only 1.7 percent had long term training. The low training experience might be due to lack of well communication facilities and lack of presence of development intervention in the *charland*. Similar findings were found in the study of Forhad (2007) and Rahman (2008).

Table 1 Salient features of personal profile of the flood affected people

Personal profile (Unit of measurement)	Observed (Possible) Range	Categories	Respondents (n=298)		Mean	SD
			No.	%		
Age (year)	20-75 (Unknown)	Young (Up to 35)	102	34.2	43.52	12.76
		Middle (36-50)	119	39.9		
		Old (above 50)	77	25.8		
Education (year of schooling)	0.5-12 (Unknown)	Ability to sign (0.5)	78	26.2	3.09	2.84
		Primary education (1-5)	178	59.7		
		Secondary education (6-10)	39	13.1		
		Above secondary education (>10)	3	1.0		
Family size (number)	1-10 (Unknown)	Small family (up to 4)	198	66.4	4.10	1.27
		Medium family (5-6)	88	29.5		
		Large family (7 and above)	12	4.0		
Farm size (hectare)	0.008-3.450 (Unknown)	Landless (<0.02 ha)	21	7.0	0.266	0.32
		Marginal farmer (0.02-0.2 ha)	137	46.0		
		Small farmer (0.21-1.0 ha)	132	44.3		
		Medium farmer (1.1-3.0 ha)	7	2.3		
		Large farmer (>3.0 ha)	1	0.3		
Annual income ('000' tk.)	12-228 (Unknown)	Low (up to 35)	35	11.7	58.76	26.06
		Medium (35.1-85)	230	77.2		
		High (Above 85)	33	11.1		
Extension media contact (score)	0-21 (0-24)	No contact (0)	14	4.7	5.63	3.80
		Low (up to 7)	137	46.0		
		Medium (8-14)	113	37.9		
		High (above 14)	34	11.4		
Training received (days)	0-29 (Unknown)	No training (0)	71	23.8	2.10	2.83
		Short term (1-5 days)	214	71.8		
		Mid-term (6-10 days)	8	2.7		
		Long term (above 10 days)	5	1.7		
Aspiration (score)	8-31 (8-40)	Low aspiration (up to 13)	46	15.4	20.47	4.88
		Medium aspiration (14-26)	209	70.1		
		High aspiration (Above 26)	43	14.4		
Household belongings (score)	7-60 (Unknown)	Low belongings (up to 20)	77	25.8	28.01	10.20
		Medium belongings (21-40)	187	62.8		
		High Belonging (Above 40)	34	11.4		
Calorie intake (kcal.)	1863-2895 (Unknown)	Below optimum (up to 2150)	15	5.0	2469.64	235.08
		Optimum (2151-2500)	73	24.5		
		Above optimum (above 2500)	210	70.5		

Table 1 (Contd.)

Body mass index	17.44-33.62 (Unknown)	Up to 16	0.00	0.00	22.39	1.68
		17-24	257	86.2		
		Above 24	41	13.8		
Environmental awareness (Score)	12-39 (10-40)	Low awareness (up to 13)	27	9.1	28.68	5.36
		Medium awareness (14-26)	149	50.0		
		High awareness (above 26)	122	40.9		
Self confidence level (Score)	10-15 (5-15)	Low Self-confidence (up to 5)	12	4.0	12.38	1.21
		Medium Self-confidence (6-10)	202	67.8		
		High Self-confidence (above 10)	84	28.2		
Participation in community activities (Score)	14-39 (10-40)	Low participation (up to 13)	29	9.7	25.52	4.26
		Moderate participation (14-26)	235	78.9		
		High participation (above 26)	34	11.4		
Disaster management knowledge (Score)	12-39 (20-40)	Low knowledge (up to 13)	53	17.8	30.00	4.70
		Medium knowledge (14-26)	212	71.1		
		High knowledge (above 26)	33	11.1		

Aspiration scores of the respondents ranged from 8 to 31 against the possible range 8 to 40 with a mean and standard deviation 20.47 and 4.88 respectively. It was revealed that the highest proportion (70.1 percent) of the respondents had medium aspiration, 15.4 percent of the respondents had low and 14.4 percent of the respondents had high aspiration respectively. Household asset or belongings scores of the respondents ranged from 7 to 60 with the average being 28.01 and standard deviation of 10.20.The highest proportion (62.8 percent) of the respondents had medium belongings, while 25.8 percent had low belongings and only 11.4 percent had high belongings. Calorie intake scores of the respondents ranged from 1863 to 2895 with the mean of 2469.64 and a standard deviation of 235.08. It was found that nearly three-fourths (70.5 percent) of the respondents had above optimum calorie intake, while 24.5 percent had optimum calorie intake and only 5 percent had below optimum calorie intake.

Body mass index of the respondents ranged from 17.44 to 33.62 with the mean of 22.39 and a standard deviation of 1.68. The highest proportion (86.2 percent) of the respondents had body mass index of 17 to 24 while 13.8 percent of the respondents had body mass index of above 24. The distribution was supported by Islam (2005).
Environmental awareness scores of the respondents ranged from 12 to 39. The mean and standard deviation were 28.68 and 5.36 respectively. Half of the respondents (50.0 percent) had medium awareness while 9.1 percent had low awareness and 40.9 percent had high awareness about environment. Self confidence scores of the respondents varied from 10 to 15 against the possible range was 5 to 15. The mean score was 12.38 and standard deviation of 1.21. The highest proportion (67.8 percent) of the respondents had medium self-confidence while near about one-fourth (28.2 percent) of the respondents had high self-confidence and only 4.0 percent of the respondents had low

self-confidence. Participation in community activities scores ranged from 14 to 39 against the possible range of 10 to 40. Average score being 25.52 with a standard deviation of 4.26. Slightly more than three fourths (78.9 percent) of the respondents had moderate, 9.7 percent had low and 11.4 percent had high participation in community activities. It may be due to that the extension agents as well as mass media might have played a vital role in creating awareness among the large number of respondents to participate in different community activities.

Disaster management knowledge of the respondents ranged from 12 to 39 with the mean of 30.0 and standard deviation being 4.70 against the possible range of 0-40. Near about three-fourths (71.1 percent) of the respondents had medium knowledge followed by 11.1 percent of the respondents had high knowledge and 17.8 percent had low knowledge on disaster management. The finding may be due to that the respondents of the study are char inhabitant and their educational qualification is low, therefore, they have experience on disaster management but knowledge is low.

Contribution of the Personal Profile towards Their Participation in Flood Coping Mechanism

Multiple regression analysis was done to determine the peoples' personal profile contribution i. e. age, education, family size, farm size, annual income, extension media contact, training experience, aspiration, household belongings, calorie intake, body mass index, environmental awareness, self confidence, participation in community activities and disaster management knowledge with participation in flood coping mechanism (the dependent variable). These variables were included in the regression analysis model and findings of the regression analysis are presented in the Table 2.

The variables were entered for linear multiple regression analysis, four variables, namely extension media contact, training experience, participation in community activities and disaster management knowledge were found statistically significant. The R-square value was 0.368 with corresponding F-value of 21.19, $p<0.000$ (Table 2). This R-square value indicated that nine independent variables all together explained 36.8 percent variation in participation in flood coping mechanism. In other words, contribution of all the nine variables was 36.8 percent out of which four significant variables contributed 35.1 percent variation (adjusted $R^2= 0.351$) to participate in flood coping mechanism.

Therefore, it was decided to run a stepwise multiple regression analysis. It was observed that out of nine variables only four, namely extension media contact, training experience, participation in community activities and disaster management knowledge met the 0.05 significance level for entry into the regression model. So, whatever variation was found in the participation flood coping mechanism, it was mainly due to the contribution of these four variables. From the findings Table 3 the R-square value obtained was 0.363 with an F-value of 42.09, $p<0.000$. This final analysis indicated that 36.30 percent of the total variation in the participation in flood coping mechanism was explained by the following four variables: extension media contact, training experience, participation in community activities and disaster management knowledge.

Table 2 Multiple regressions co-efficient of the respondents' participation in flood coping mechanism with their personal profile (independent variables)

Independent variables	Dependent variable: Participation in flood coping mechanism				
	Regression Coefficients Unstandardized Beta	Regression Coefficients Standardized Beta	t-value	Significance level	Adjusted R^2
(Constant)	82.491		27.004	0.000	
Age	0.010	0.021	0.385	0.700	
Education	-0.216	-0.101	-1.690	0.092	
Family size	0.197	0.041	0.791	0.430	
Farm Size	-0.380	-0.020	-0.405	0.686	
Annual income	-0.021	-0.090	-1.705	0.089	
Extension Media Contact	0.363	0.240	4.348	0.000	
Training Received	0.435	0.202	3.965	0.000	
Aspiration	-0.078	-0.063	-1.271	0.205	0.351
Household Belongings	0.013	0.022	0.443	0.658	
Calorie Intake	0.001	0.034	0.699	0.485	
Body Mass Intake	-0.276	-0.076	-1.547	0.123	
Environmental awareness	-0.082	-0.073	-1.363	0.174	
Self confidence	-0.068	-0.014	-0.272	0.786	
Participation in Community Activities	0.311	0.219	3.826	0.000	
Disaster Management Knowledge	0.307	0.237	4.497	0.000	
R^2=0.368, F-value=21.19, p<0.000					

Regression analysis revealed that extension media contact had significant positive (B_1=0.361) effect on flood coping mechanism (Table 3). Increase in extension media contact of a respondent indicated increase participation in flood coping mechanism. With the increase in extension media contact, the respondents were more conscious about the flood coping mechanism.

The regression coefficient for training experience showed significant positive (B_2=0.411) effect on participation in flood coping mechanism (Table 3). The respondents who received training had more knowledge about flood coping mechanism.

The regression result in Table 3 showed that the respondents participation in community activities had significant positive (B_3= 0.300) effect on their participation in flood coping mechanism. Participation in community activities is considered as one of the important social factors that facilitates respondents to have better social network and opportunity to communicate outside home that have a positive impact on their flood coping mechanism.

Disaster management knowledge also had significant positive (B_4= 0.310) effect on participation in flood coping mechanism (Table 3). The respondents who had received training on disaster management

had more knowledge on this regards. Because, usually training increase skill which will also increase the knowledge on that specific aspects in some extent.

Table 3 Multiple regressions co-efficient of the respondents' participation in flood coping mechanism with their personal profile

Independent variables	Dependent variable: participation in flood coping mechanism				
	Regression Coefficients unstandardized Beta	Regression Coefficients Standardized Beta	t-value	Significance level	Adjusted R^2
Extension Media Contact	0.361 (B_1)	0.238	4.365	0.000	0.355
Training Received	0.411 (B_2)	0.191	3.898	0.000	
Participation in Community Activities	0.300 (B_3)	0.211	3.771	0.000	
Disaster Management Knowledge	0.310 (B_4)	0.239	4.607	0.000	
R^2=0.363, F-value=42.09, p<0.000					

In view of the significant contribution of the above mentioned characteristics of the respondents with flood coping mechanism, the researcher rejected the concerned null hypothesis and concluded that each of these characteristics had a significant positive effect on the participation in flood coping mechanism. These facts led the researcher to conclude that 'the flood coping mechanism of the respondents increased when they had more extension contact, had received more training, had adequate participation in community activities, and acquired more disaster management knowledge'. The other null hypotheses pertaining to farm size, aspiration, household belongings and calorie intake in this study and the participation in flood coping mechanism of the respondents could not be rejected in view of their insignificant regression coefficient.

Table 4 Stepwise regression analysis showing contribution of the personal profile to participation in flood coping mechanism of the respondents

Variables entered	R-Squared	R-Squared Change	Variance explained (%)
Extension Media Contact	0.213	0.213	21.3
Training Received	0.298	0.085	8.5
Participation in Community Activities	0.333	0.035	3.5
Disaster Management Knowledge	0.363	0.031	3.1
F-value=46.91, p<0.000			

The unique contribution of each of the four variables was also determined by taking the changes in R-square value occurred for entry of a particular variable in the stepwise

regression model. The findings of the stepwise regression presented in Table 4 indicate that 'extension media contact' had the largest possible contribution (21.3 percent) to the variation in the participation in flood coping mechanism, followed in descending order, by training experience (8.5 percent), participation in community activities (3.5 percent) and disaster management knowledge (3.1 percent).

Conclusion

On the basis of the findings and their logical interpretations in the light of relevant facts, the following conclusions are presented below:

i) In case of participation in flood coping mechanism R-squared values indicated that extension media contact had the highest contribution 21.3 percent against 36.8 percent of the total variation explained by all the variables. It was thus concluded that, more extension media contact should be focused in using effective flood coping measures.

ii) Extension media contact enriches the knowledge and attitude with new information ideas, techniques and technologies, makes confidence among the flood affected people resulting surviving with the flood condition during and after flood. Contact with extension people helps increase the social mobility and networking which enable a person to undertake various actions against natural catastrophe. Extension media contact showed statistically significant contribution in the participation in flood coping mechanism meaning that more of a person with extension media contact more will be his/her ability to have better performance in disaster coping strategy. From the findings it may however, be concluded that, people need to build up their capacity to increase extension media contact for better disaster coping ability.

iii) Training received was positively related and had positive effect on participation in flood coping mechanism which indicates that a person having more training experience s/he used to have better performance in participation in flood coping mechanism. Through training a person become acquainted with different extension officials at upazila level and be able to know different items of disaster coping strategy which might play a significant role in disaster coping capability. From the findings it may be concluded that in the study area people need adequate training experience in order to upgrade their capability towards disaster coping strategy.

iv) Participation in community activities encourages the flood affected people to solve the problems being encountered during and after disaster. Participation in community activities showed statistically significant contribution in participation in flood coping mechanism. This indicates that participation in community activities may also help the affected people properly and effectively in participation in flood coping mechanism. Participation in community activities helps an individual increase his/her social networking which enable him/her to take necessary action against natural disaster. The findings lead to conclude that there is an ample scope in the study area to encourage people in participating different volunteers' community work which eventually strengthen their coping capability towards disasters.

References

Anonymous. 2007. Emergency Response and Action Plan- Interim Report. Ministry of Food and Disaster Management, Dhaka, Bangladesh.

BBS, 2012. Statistical Pocket Book of Bangladesh.Bangladesh Bureau of Statistics, Ministry of Planning, Government of the Peoples Republic of Bangladesh.

Forhad. A.K.M. 2007. Coping Strategies Practiced by Farmers Against Flood in Bangladesh. PhD Thesis, Department of Agricultural Extension and Rural Development. Bangabandhu Sheikh Mujibur Rahman Agricultural University, Salna, Gazipur, Bangladesh.

GoB, 2010. Bangladesh Country Report, 2010 Combating Human Trafficking.Ministry of Home Affairs Government of the People's Republic of Bangladesh, Dhaka, Bangladesh.

Huda, S. 2011. Effect of Micro-credit on Livelihood Improvement of Women Beneficiaries Involved in Association for Social Advancement. Ph. D. Thesis, Department of Agricultural Extension, Hajee Mohammad Danesh Science and Technology University, Dinajpur, Bangladesh.

IPCC (Intergovernmental Panel and Climate Change). 2007. Climate change 2007; Fourth Assessment Report http://www.ipcc.chl.

Islam, M.S. 2005. Farmer's Ability to Cope with Flood in a Selected Area of Jamalpur District.M.S.(Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Jamal, M. S. 2009. Farmers' Awareness of the Use of Indigeous Technical Knowledge (ITK) for Sustainable Agricultural development. M.S.(Ag.Ext.Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Maplecraft. 2011. Water Stress Index 2011. The Towers, St Stephen's Road, Bath BA1 5JZ, United Kingdom.

Miah M.M.U. 2010. Assessing of Long term Impact of Vulnerabilities on Crop Production Due to Climate Change in the Coastal Areas of Bangladesh, Bangladesh Center for Advance Studies, Prepared for national Food Policy Capacity Strengthening Program. Retrieved from: http://www.nfpcsp.org/agridrupal/sites/default/files/Muslem_Uddin_Miah-PR10-08.pdf.

Rahman, M.M. 2008. Vulnerability Effects on Human and Physical Capitals of Flood Affected Farmers in an Area of Naogaon District. M.S. (Ag. Ext. Ed.) Thesis, Department of Agricultural Extension Education, Bangladesh Agricultural University, Mymensingh, Bangladesh.

Roy, R. and R. Tiwari. 2016. Socio-Personal and Socio-Economic Profile of Goat Owners in India. *Indian Journal of Extension Education.* 52(3 & 4), PP: 57-6o.

Sattar, M.A. 2012. Universal Guideline on Climate Change Adaptation and Awareness for Facing the Challenges of Disasters and Vulnerable Situations for Human Peace. Bangladesh Journal of Environmental Science, 22:150-159.