Impact of flood hazards on human life and environment in some selected upazilas of Sirajganj district

Md. Zakaria Ibne Baki[1]*, Rehana Khatun[2], Amina Khatun[2], Sharmin Akter[2], Papri Hazra[2], Asma Sultana[2]

[1]Department of Soil Science, Bangladesh Agricultural University, Mymenisngh-2202, Bangladesh
[2]Department of Environmental Science, Bangladesh Agricultural University, Mymenisngh-2202, Bangladesh

ABSTRACT

A study was carried out in Sirajganj district to explore the causes of flooding and to determine the impact of flood hazards on human life and environment. Data were collected from 300 respondents from 5 upazilas using interview schedule during July to August, 2013. From the collected data it is found that lack of communication, food, drinking water, health services, environmental degradation and socio-economic losses were the major characteristics impacted by flood. Majority (44.3%) of the respondents were old aged. Almost 41% of the respondents were illiterate. Average member of the family was 2.233 people. Majority (31.3%) was involved in agriculture and maximum number of respondents (44.7%) had small monthly income. The highest respondent said that main causes of flood were climate changes (40%). About 45.3% respondents used tube well water, 28.7% faced lack of communication problem, 34% faced diarrhea as the major disease and 39.7% got medical support. The losses from flood were crop (32%), land (29%), domestic animal (20%) and houses (19%). About 45% faced problems with high environmental degradation and 44% with high socio-economic loss. The computed value of correlation coefficient showed insignificant positive relationship between sex of the respondents and losses of flood. But the variables like age, education, occupation, monthly income, family members, problem faced and diseases has significant positive relationship with losses of flood. However the study revealed that the flood situation of Sirajganj district has significant impact on human health and environment. The study suggests the government and NGO to address the issues of flood in order to improve the livelihood of peoples impacted by flood.

Key words: Flood, impact, human, environment, Sirajganj.

*Corresponding author. Tel.: +8801724106728
E-mail address: rabbibau240@gmail.com (MZI Baki)

INTRODUCTION

Bangladesh is most vulnerable to several natural disasters. Every year natural climates upset people's lives in some part of the country. The major disasters concerned here are the occurrences of flood, cyclone, and storm surge, flash flood, drought, tornado, riverbank erosion and land slide (UNEP, 2001). In recent times natural hazards are more frequent and intense compared to the similar kinds of events occurred in one or two decades ago. It is now accepted, mainly by the intergovernmental panel and climate change (IPCC) scientists and national government, that these climatic hazards are the results of climatic change at global and regional level. The floods of 1987, 1988, 1998, 2004, 2007 and cyclone of 1991, 2007 and 2009 were treated as a consequence of global warming, sea level rise and other associated problems by the scientists. In this connection, river bank erosion, drought, flash floods, threats from landslides as a result of excessive rainfall could be attributed to recent climatic anomalies. According to IPCC estimates, the rise in the sea level would be in the range of 15 to 95 cm by 2100 due to global warming (IPCC, 2007).

Bangladesh is known as the 'land of rivers' and major rivers that flow through Bangladesh are Ganges, Brahmaputra and Meghna with a complex network of 230 rivers including 57 international trans-boundary rivers. Ganges (Padma), Brahmaputra (Jamuna) and Meghna are largest

fluvial systems in the world. Topography of the country is mainly flat except some northeastern and southeastern parts, which are hilly. The land elevation changes from 3 to 90 m above Mean Sea Level (MSL) (BUET'88 CLUB, 2010). More than 50% of the floodplains in Bangladesh are within the 5 m above MSL. However, the geographical location and the meteorological and the topographical characteristics make the country vulnerable to floods.

Flood is the common phenomenon in Bangladesh. Some 30 to 35 percent of the total land surface of the country is flooded every year during wet monsoon (Milliman et al. 1989). These normal floods are considered a blessing for Bangladesh providing vital moisture fertility to the soil through the alluvial silt deposition (UNEP, 2001). The impacts of flood hazard on agricultural food production are global concerns, and they are very important for Bangladesh. Agriculture is the single most and the largest sector of Bangladesh's economy, accounting for about 35% the GDP and about 63% of the labour force. Agriculture in Bangladesh is already under pressure both from huge and increasing demands for food, and from problems of agriculture land and human life style. The prospect of flood hazard makes the issues particularly urgent (Huq, 2003).

Sirajganj district lies on the bank of the most treacherous river Jamuna. The monsoon spillage of Jamuna is so high that it regularly overflows the banks and creates flooding in most of the upazilas of Sirajganj district. It is an area of perennial floods and its image is that of an area which is always flooded. Every part of the district is not equally vulnerable to flood. Some upazilas are more vulnerable than other due to their location. Chauhali, Kazipur, Sirajganj Sadar, Belkuchi, Ullahpara and Shahjadpur are most flood affected upazilas, of the district because major parts of these upazilas lay in the Jamuna River. These areas are affected by normal and flash flood almost every year. Tarash and Ullahpara upazila is also exposed to flood. Raiganj and Kamarkhanda are comparatively less flood affected upazilas. Severe periodic flooding is also common in the district. Every flood that strikes in Bangladesh affects Sirajganj district. Sirajganj is more or less flooded almost every year, however, severe floods

of 1949, 1956, 1961, 1962, 1966, `1968, 1974, 1979, 1987, 1988, 1996, 1998, 2002, 2004, 2007 and 2008 are worth mentioning (NDP, 2007).

Extensive floods greatly affect the marginal population, who lose whatever assets they have and suffer from lack of work and wages. People who live in perennial flood zones in the bank of the Jamuna River have low indicators in all sectors of health, nutrition and education. However, floods cause serious damage to crops, property, fisheries and livestock and other resources (Sirajganj Zila Parishad, 2012). It is an important issue to assess the social-environmental impact of flood and vulnerability of this area. Therefore, the study was conducted with the objectives to explore the causes of flooding in the study area and to determine the impact of flood hazards on human life and environment.

MATERIALS AND METHODS

Study area

The study was carried out at five selected upazilas (Sirajganj sadar, Belkuchi, Chauhali, Kazipur, Tarash upazila) under Sirajganj district. Sirajganj district is located in the northwestern part of Bangladesh, in the bank of the river Jamuna. It is relatively a plain land area but there are some low land and marsh land in this district. The annual average temperature reaches a maximum of 34.6 °C, and a minimum of 11.9 °C. The annual rainfall is 1610 mm (63.4 in) (BWDB, 2007).

Collection of data

Information was collected from 300 respondents in five upazilas of Sirajganj district. Respondent were selected through simple random sampling method. Data for the study were collected through personal interview during July to August 2013. The purpose of the study was explained to the respondent and requested them for help and co-operation to collect necessary data. The responded provided information from their memory. During collection of data, both primary and secondary sources were considered. Primary data were collected from respondents. Several visits were made to the study area to collect accurate information related to objectives of the study through interview schedule.

A combination of interview schedule, participatory rural appraisal (PRA) tool such as focus group discussion (FGD) was used for data collection. For this research work, the secondary data were collected from literature review of various national and international books, journals, research paper and newspaper, articles of various institutions like Bangladesh Water Development Board (BWDB), Bangladesh Bureau of Statistics (BBS), Pouroshova, Relief and Rehabilitation District office, various NGOs, search from internet, Sirajganj statistics office.

Variables

Data were collected on sex, age, educational level, occupation, monthly income, family member, causes of flood, sources of drinking water, problem face at the timing of flooding, diseases, taking medical support, loss by flooding as observed by respondents.

Statistical analysis

The SPSS computer programmed was used for analysis of data. The collected data for this study were analyzed by basic statistics such as range, frequency, number, percentage, mean and standard deviation which were used in describing the variables of the study. Analysis of variation (ANOVA) and correlation between dependent and independent variables were carried out to find out the relationship.

RESULTS AND DISCUSSION

The findings of the study and its interpretation are presented in this section according to the objectives of the study (Table 1, 2).

Social characteristics and facilities

The study revealed that 70.3% male and 29.7% female were responded in the study. The male are usually play role as head of the family and hence the number of male respondents were higher. In the study area, the highest percentage (44.3%) were old aged, 32.7% were middle aged and 23% were young aged (Table 1). The old aged people has more experienced on impact of flood in the affected areas and found interested to give the

interviews in this regard. The highest portion (41%), of respondents was illiterate and lowest portion was up to upper level (11%). Among the categories of occupation, farmer was the major occupation (31% respondents), 24% were labor, 11.0% were Govt. /private sector, 13% were businessman and 21% were fisherman. The percentage of large family (46%) was higher followed by medium (31.3%) and small (22.7%) among the respondents. The majority of the respondents (45%) had small income, while, 24% belonged to medium income and only 22% of the respondents belonged to large income. The study also revealed that most of the respondents (45 %) use from tub well water, 28% use river water and 27% use supply water for the drinking purposes (Table 1). According to the respondents the majority of the peoples are suffering from diarrhea (34%), cholera (25%), typhoid (22%) and dysentery (19%) in the study area (Table 1). About 40% respondents got medical support from hospital, 18% from clinic and 30% from different types of Governments, Non-governments organization and 12% from mobile health service.

Causes and problems associated with the flood

According to the respondents the most important causes of flooding is the climate change (39.7%) followed lack of management (36.3%) and Farakka barrage (24%). The study found that, major problems faced by the respondents are lack of communication (29%), lack of food (25%), lack of drinking water (26%) and lack of health services (21%) during the flooding time in the study area (Table 2). These problems during the flood cause loss/damage of crop, land, domestic animal, houses, health and economy.

According to the respondent flood damaged mainly crops (32%), land damage (29%), domestic animal (20%) and houses (19%) (Table 2). It was also noted that environment degraded day by day through flood which. About 22% respondents said environment was degraded slowly, 33% of the respondents said medium degradation and 45% said environment degraded highly. Data revealed that 23% of the respondents faced low socio-economic loss, 33% faced medium socio-economic loss and 44% faced high socio-economic loss.

Table 1
Distribution of respondents according to their social characteristics and facilities.

Characteristics		Percentage (%)
Sex	Male	70.3
	Female	29.7
Age	Young aged (up to 20 years)	23.0
	Middle aged (>20 to 45years)	32.7
	Old aged (above 45 years)	44.3
Educational level	Illiterate	41.0
	primary level (1-5)	28.0
	Secondary level (6-10)	20.3
	Upper level (above 10)	10.7
Family members	Small family (up to 2)	22.7
	Medium family (3-5)	31.3
	Large family (>5)	46.0
Occupation	Labor	24.3
	Govt./private sector	11.0
	Businessman	12.7
	Farmer	31.3
	Fisherman	20.7
Monthly income	Small income (<15000)	44.7
	Medium income (15000-20000)	33.0
	Large income (>20000)	22.3
Sources of drinking water	Tub well water	45.3
	River water	27.7
	Supply water	27.0
	Tub well water	45.3
Medical support	Hospital	39.7
	Clinic	18.3
	NGO health center	29.7
	Mobile health service	12.3

Table 2
Distribution of respondents according to causes and problems associated with the flood.

Characteristics		Percentage (%)
Causes of flood	Climate change	39.7
	Farakka barrage	24.0
	Lack of management	36.3
Problem face	Lack of communication	28.7
	Lack of food	24.7
	Lack of drinking water	25.7
	Lack of health services	21.0
Disease	Diarrhoea	34.0
	Cholera	25.0
	Typhoid	22.0
	Dysentery	19.0
Losses	Crop	32.7
	Land	28.7
	Domestic animal	20.0
	House	18.7
Environmental degradation	High degradation (>20)	45.0
	Medium degradation (13-20)	33.0
	Low degradation (up to 12)	22.0
Socio-economic losses	Low socio-economic loss (up to 12)	23.0
	Medium socio-economic loss (score 12)	33.0
	High socio-economic loss (above 20)	44.0

Relationship between the selected characteristics of the respondents and their losses by flood

This section deals with the relationship of the nine selected characteristics of the respondents that are affected by flood. The selected characteristics constituted independent variable (viz. sex, age, education, occupation, monthly income and family member, causes, problem face and diseases) and

losses of flood was considered as dependent variable. Co-efficient correlation 'r' was computed to determine the relationship between any variables concerned. Probability ($p<0.001$) level of significant was used as basis to test the relationship. The computed co-efficient of correlation have been presented in table 3. All the relations, except sex with losses of flood were highly significant.

Table 3
Relationship between characteristics of respondents and looses by flood.

Dependent variable	Independent variable	Computed value of 'r'	Table value of 'r' at 299 degrees of freedom
	Sex	0.053[NS]	
	Age	0.776[***]	
Loss by flooding	Education	0.824[***]	0.69
	Occupation	0.804[***]	
	Monthly income	0.842[***]	
	Family members	0.798[***]	
	Causes of flood	0.801[***]	
	Problem face	0.882[***]	
	Diseases	0.862[***]	

NS- Non significant; *** Significant ($p<0.001$).

The relationship between the socioeconomic characteristics and losses by flood was significant and positive as shown in table 3, except relationship of sex with losses by flood.

The socio-economic and environmental impact of the flood affected people was multilateral. Considering the assessment of impact of flood on human health and environment the necessary actions should be taken by government and non government authorities to mitigate the flood situation and promote the livelihood in flood affected areas of Sirajganj district.

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