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Assessment of women's vulnerability and the mechanism of their coping with consequences in flood prone areas: a case study of Belkuchi Upazilla, Sirajganj

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Abstract

Women are more vulnerable during disastrous situations compared to their male counterparts. It was noted in many studies that among all other natural disasters, flood causes immense sufferings of women due to the low standard of living conditions and poor institutional arrangement in flood prone areas of Bangladesh. The geographical location and low elevation of land with numerous rivers make Bangladesh really vulnerable. The focus of this research is to explore women's vulnerability at the community level and ways of coping with the consequences of floods. Both secondary and primary data have been used and analyzed to identify vulnerability and the mechanism of women's coping with floods at Khidrachappur, Baradul in Belkuchi

Key words:
geographical location, flood, flood prone areas, vulnerability, coping mechanism, gender

Upazilla. The results of the study found that the consequences of floods have different impacts on men and women. In addition, it has been found that in reality, women are affected more severely and that their role is quite negligible in decision making, as well as their participation in training related to flood issues. Women suffer from physical injuries and are often evicted from their dwellings due to floods. Difficulties in finding adequate shelter, food, safe water, and fuel for cooking, as well as problems in maintaining personal hygiene and sanitation, prevent women from performing their usual roles at home. Despite this heavy burden, which women bear in extremely difficult circumstances, they demonstrate considerable fortitude and ingenuity in their attempts to cope with floods by taking several steps like selling assets, moving towards higher places, storing dry food, social networking, borrowing money, collecting safe drinking water and managing household activities etc. It was noted that despite all adversities, women can cope with the consequences of floods and show their resilience capacity.

Сажетак

Кључне речи:
географска локација, поплава, области угрожене поплавом, угроженост, механизми суочавања, пол

Жене су рањивије у односу на мушкарце у време дешавања катастрофалних ситуација. У многим студијама забележено је да су поплаве природна катастрофа која највише погађа женску популацију због ниског животног стандарда и лошег институционалног ангажмана у областима у којима постоји високи ризик за настанак поплава у Бангладешу. Географска локација и нижа надморска висина терена са већим бројем река чини Бангладеш веома угроженим. Предмет истраживања односи се на испитивање рањивости жена и начине преживљавања последица поплава. Примарни и секундарни подаци анализирани су како би се идентификовала ова рањивост као и механизми суочавања жена са последицама поплава у Кидрахапуру, Барадулу у Белкухи Упазили. Резултати истраживања показали су да последице поплава различито утичу на мушкарце и жене. Такође, утврђено је да жене доживљавају озбиљније последице, да је њихова улога у процесу одлучивања прилично занемарена, као и учествовање у обукама. Тешкоће приликом проналаска одговарајућег смештаја, хране и воде, проблеми у одржавању личне хигијене онемогућавају женама да обављају своје свакодневне активности у домаћинствима. Упркос потешкоћама са којима се сусрећу за време катастрофа, оне показују истрајност и ингениозност у покушајима да се изборе са поплавом па често предузимају следеће мере: продаја и пресељење у делове заједница на вишој надморској висиони, складиштење суве хране, позајмљивање новца. Без обзира на све недаће са којима се суочавају жене су показале да су кадре да се суоче са последицама поплава.

Introduction

Bangladesh was ranked the second of the disaster prone countries in the Asian region, as well as the fifth in the world according to the Index of World Risk Report 2013, aimed at its geographical location, different types of landscape and land features, monsoonal climate and immeasurable rivers [1–2]. Beside this, the over population, long coastal areas and its low elevation of land make it very vulnerable to risk and natural disasters. The land of this country is

universally recognized as a homeland of natural disasters, particularly river and coastal flooding [3]. However, the timing, nature, extent and severity of flood hazard are not equal in all cases [4]. This frequently catastrophic flood becomes a permanent disaster, which makes people suffering and where 40 percent of people live below poverty line. The pattern of flooding in Bangladesh also points to the increasing frequency of floods in river areas. The important aspect of flooding is that it causes the river bank erosion and this adverse disaster is further worsened when the devastating flood and river bank erosion together intensify the process of pauperization in the river areas of the country [5–6]. The country experienced several severe floods like the floods of 1954, 1955, 1971, 1974, 1984, 1988, 1998, 2004, 2007 and other adverse natural disasters [7]. Several researches showed that series of floods created significant hardship for particular households and also caused the loss of property, for those who are affected more as well as for the economically insolvent, such as in the example when 64% of area was inundated and 2380 people (mostly poor people) were killed during 1998s flood [8–12]). Global warming induced the flood disaster which makes people suffer because they lack pure drinking water, food security, and proper sanitation, and it also makes people suffer from different health problems [13, 14]. Severe floods forced the short term population displacement [15].

Flood vulnerability and gender are strongly related in the context of Bangladesh [16]. Whereas, vulnerability is the susceptibility to damage in the natural or social systems and the ability to adapt a little to the changes in the environment is severely inhibited.

Table 1. An alternative approach to vulnerability by Liverman [17].

Environmental conditions	Technological conditions	Social relations	Demographics and health	Land use and ownership	Economy and institutions
i.e. temperature, rainfall, soil types, storms, genetic varieties and meteorological extremes	i.e. the use of irrigation, reservoirs, genetically modified seeds and fertilizers, indigenous agricultural techniques	i.e. social class, income, gender, race and ethnicity	i.e. health, age, population density, populations growth rates	i.e. unstable land tenure, land productivity, levels of independence, landlessness	i.e. lack of access to markets, artificial or inflated prices, lack of supporting social safety net, debt

Gender is socially fabricated casts, roles, opportunities, difficulties and connections associated with being a man or a woman [18, 19]. Bangladesh is primarily a masculine country in the context of gender relations [19–21). On the other hand, it has been found in the study that, although flood disaster affects the whole society, it has a gender-centric dimension. The poor rural women are affected more

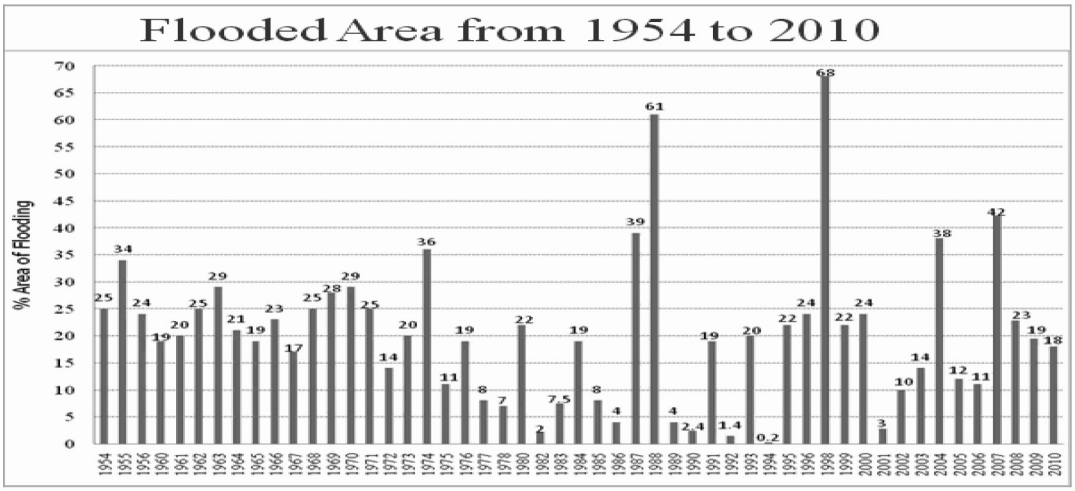

Figure 1. Flood affected area of Bangladesh from 1954 to 2010. (Source: BWDB annual flood report 2011)

severely than the men are [20–22]. Women of Bangladesh are more vulnerable to floods, because they do not have proper and equal access to the basic rights like, the initial conditions of a person, the resilience of the livelihood, opportunities for self-protection and social protection and social capital [16]. National flood management policies, adaptation measures, poverty, social position and established religious norms and values create an obstacle to women development and set them into the fragile condition during the flood disaster [23]. Women have to perform different household duties and their socio-economic condition is always lower than men's, which is also responsible for making them vulnerable in flood disaster situations.

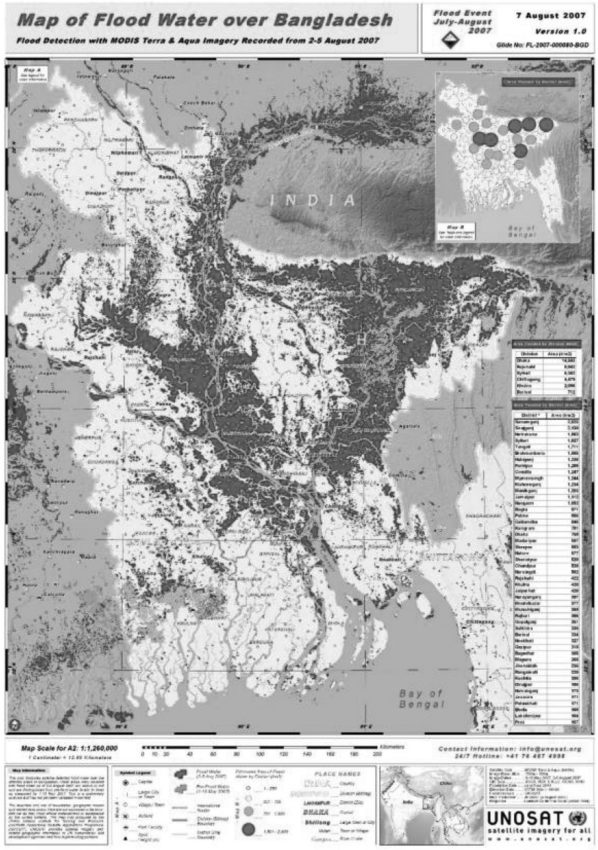

Figure 2. Inundation map of the 2007 flood (Source: BWDB annual flood report 2015)

Methodology

The study intends to form an overall understanding of women's vulnerability and their coping mechanisms in flood-affected areas. Primarily, investigation was done in Baradul Union, Belkuchi Upazilla Sirajganj District.

Belkuchi Upazilla of Sirajganj district has an area of 164.31 square kilometers located in between 2413 to 2422 north latitudes and in between 8937 to 8947 east longitudes. There are six unions in the Upazilla and Baradul union is the study area which is most affected by floods [24].

Figure 3. Map of the Study Area

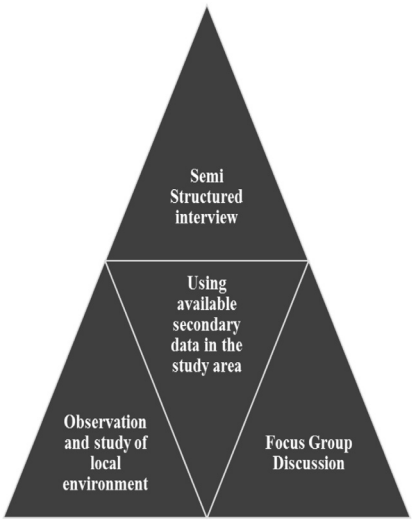

Figure 4. Data collection methodology

Table 2. Population of Belkuchi Upazilla and Sirajganj District [24]

Population of Sirajganj District at a glance				Belkuchi Upazilla population	
Population	Census 1991	Census 2001	Census 2011	Census 2011	Census 2001
Both sex	2264000	26,93,814	30,97,489	3,52,835	3,02,678
Male	1164000	13,97,863	15,51,368	1,79,738	1,60,265
Female	1100000	12,95,951	15,46,121	1,73,097	1,42,413
Urban		2,29,106	3,76,432	75364	0
Other urban		92,147	60,145	0	20328
Rural		23,72,561	26,60,912	2,77,471	2,82,350
Annual growth rate		1.76	1.38	1.52	2.13
Literacy rate (%)		40.6	42.1	45.7	47
Male		45.5	45.1	48.2	51.5
Female		35.4	39	43.1	42

Both primary and secondary data have been used for the study. The target respondents for the study comprised women living in flood affected areas of Baradul union, Belkuchi Upazilla, Sirajganj. Primary data were collected from flood-affected people in the study area of the Baradul Union, Belkuchi Upazilla, Sirajganj by using a semi-structured interview with a questionnaire and focused group discussion. They are village women, civil society representatives and different government and non-government officials of the study area. The secondary data were collected through documents survey from various reports, research journal articles, booklets, planning documents and journals of respective Government organizations like Water Development Board, different publications of different researchers, Meteorological Bulletin and publications of different disaster-based nongovernment organizations. It is so difficult to study all the people of the study area in terms of time and resource difficulties. The sample is proportionate to the population, which is taken to justify and make generalizations about the population. Statistically, it is recommended not to use less than 30 people for each group of experiment. The total of 150 samples was taken out of 783 households.

Results and discussion

The current research finds the nature of vulnerability and the difficulties women face during and after floods in Baradul Union. What is following is the outline of women's vulnerability and problems of their involvement in taking coping strategies in flood prone areas in Baradul Union over the last ten years.

Socio-economic and demographic characteristics of the flood affected women in Baradul Union

The research shows the age structure, educational level, occupation with household and personal monthly income, household monthly expenditure, ownership of land, and control over resources etc., which is based on the primary data collection from the respondents through the semi-structured face to face interview with a questionnaire, FGD and observation.

Among the 150 female respondents, 12% are more than 60 years old, 48% are 45 to 59 years old, 25% are 30 to 44, 8% are 20 to 29 and 7% are 15 to 20 years old. Fifty-six percent of respondents are housewives and 8% are involved in small business. A significant percentage of respondents (about 25%) are involved in day labor whereas just 5% are engaged in harvesting livestock. Only 30% have completed the primary education, 19% have completed secondary school and totally 58% respondents are literate whereas 42% are illiterate. About 12% of respondents are widows, more than 84% are married, 3% are separated and only 1% is unmarried in Baradul union. The ownership of land is limited in Baradul union; only 49% households have their own homestead land ranging from 1 to 10 decimal, 13% live on the neighbor's land, 26% live on the government land, whereas 12% live on the pawned land and have to pay rent for using the land. Women have less ownership on the land, only 4% of the respondents have ownership on homestead lands. Women spend most of the income (nearly 91%) on family sustenance; only 2% save for emergency, whereas

7% of money is spent on personal use such as purchasing cloth, medicine and other things. Women have less access to the resources than men, 94% of men own the land and resources, whereas only 6% of women own the land and resources.

Flood intensity and its damages

The geographical location and geological settings of Bangladesh are a suitable place for natural disasters. Floods are very common due to the low elevation of land and poor drainage capacity of rivers. Each year about 844,000 million cubic meters of water flow into the country's three major rivers, the Padma, the Brahmaputra and the Meghna during the wet season (May–October) and inundate about 26000 square kilometers of land.

The study area lies on the bank of the most treacherous river Jamuna (Brahmaputra). Sirajganj district is an area of perennial floods and Belkuchi is the most vulnerable among all nice upazillas. The flood in Bangladesh always strikes in Sirajganj district. Some of the severe floods and their destructive nature are shown in the following table.

Table 3. Damage and losses due to the last four severe floods in Sirajganj District [25].

Year	Duration (days)	Highest water level	Affected Area		Affected population		Death of causalities recorded
			Upazilla	Union	Family	Population	
1988	28	15.12m	9	82	268000	966000	512
1998	90	14.76m	9	82	312595	1809968	1038
2004	23	14.81m	9	82	430197	191565	43
2007	42	14.95m	9	80	229787	961314	34

Problems women faced due to floods in the study area

The major impact of floods is death in Bangladesh caused by drowning, snake bites, water-borne diseases and diarrhea. Women of the study area faced lot of problems due to floods. The study reveals that flood damages agricultural land and crops, cattle herbs, poultry, fruit and vegetable gardens, fisheries, dwelling places, food supply, transport networks, drinking water sources, sanitation etc.

Table 4. Types of flood-induced vulnerabilities for women (n = 150).

Type	Nature of vulnerabilities	Yes	No
Human vulnerability	Physical injury	24.9	75.1
	Shortage of food	88.6	11.4
	Diseases	84.9	15.1
	Malnutrition	91.4	8.6
Social vulnerability	Unemployment	64.3	35.7
	Harassment	34.6	65.4
	Crime (burglary, robbery)	16.2	83.8
	Lack of clothing	89.2	10.8
	Problem with finding fuel wood	83.8	16.2
Structural vulnerability	Eviction from dwelling place and destruction of house	60.5	39.5
	Damaged sanitation facilities	21.1	78.9
	Damaged roads, culverts, embankment, and communication system	98.9	1.1
	Unavailability of clean drinking water	84.3	15.7
Agricultural vulnerability	Damaged crop production	24.9	75.1
	Damage of poultry	71.4	28.6
	Damage of cattle herds	64.9	35.1
	Damaged homestead garden	74.6	25.4

Women are suffering from human vulnerability (physical injury 24.9%, shortage of food 88.6%, diseases 84.9%, and malnutrition 91.4% of women in the study area), social vulnerability (unemployment 64.3%, harassment 34.6%, crime 16.2%, shortage of clothing 89.2% and fuel shortage 83.8% of women), structural vulnerability (Eviction from dwelling place and destruction of house 60.5%, Damaged sanitation facilities 21.1%, Damaged roads, culverts, embankment, and communication system 98.9% and Unavailability of clean drinking water 84.3% of the women in the study area) and agricultural vulnerability (Damaged crop production 24.9%, Damage of poultry 71.4%, Damage of cattle herds 64.9% and Damaged homestead garden 74.6% of the women faced this kinds of problem). Women have less access to the ownership of resources and also less power in the family decision making process in the study area. Poor decision making power of women is one the main reasons for flood vulnerability.

Table 5. Role of women in household decision making

Items of decision making power	Wife alone (%)	Husband alone (%)	Both (%)
Education of sons and daughters	16	24	60
Family health care and treatment	38	21	41
Family planning			
Loan Received and Use of loan	4	52	44
Purchase goods	21	35	46
Participation in society	12	60	28
Going alone outside	2	94	4
Choosing profession on their own	6	82	12
Inviting guests and entertainment	2	89	9
Repairing the house	0	98	2
Marriage of sons and daughters	0	94	6
Family expenditure	11	83	6
Involvement in cooperative or NGO	4	82	14
Vaccination of children	68	12	20
Casting vote	8	52	40

The root causes of women's vulnerability in the study area are summarized by the following table, which states the reason for flood vulnerability of women. Indeed, the vulnerability of people from the consequences of natural disasters affects a large number of demographic, socio-economic and psychological factors [26–35].

Table 6. The root causes of women's vulnerability in Khidrachappur, Baradul.

Root Causes	Dynamic Pressures	Unsafe Conditions
Limited access to: – decision making power, – social sectors and structures resources.	Lack of: – strong local institutions, – confined training – inappropriate skills and knowledge of women, – home based industry: cottage, threads, food processing etc., – absence of local markets (bazar), – implementation rules and regulations, – proper attitudes and ethical standards of people.	Fragile physical environment: – dangerous location, – river bank erosion, – unprotected house made by soil and bamboo.
Ideologies: – lack of strong political systems at the community level, – imbalanced distribution of economic resources.	Macro-forces: – increasing population due to the lack of awareness, – lack of forestation, – lack of available soil for building houses, – lack of productive land.	Fragile local economy: – low income, – unemployment, – food crisis, – limited job, opportunity. Vulnerable society: – special groups: women, children, elderly, disabled people.
Geographical location: – located in river area, – frequent flood, – increasing Intensity of flood.	Public actions: – lack of disaster preparedness or community participation, – lack of cooperation of family members and community people, – prevalence of diseases.	

Conclusion

Bangladesh is frequently affected by disasters, out of which floods are the most common; and Khidrachappur, Baradul is one of the most flood affected areas of Sirajganj district. Large portion of women in the study area are affected by flood-induced vulnerabilities, experiencing deficits in food, clothing, communications, fuel wood, and increases in disease exposure, water quality problems, and sexual harassment. During floods some women face various difficulties and challenges. Particularly, women have to go through hardships because they need fuel and food for their regular activities. Significant amount of respondents suffer from increased incidence of disease, including cholera, dysentery, skin diseases, diarrhea, and others. Apart from these difficulties, women experience specific types of economic crisis, poverty, and insecurity in Khidrachappur, Baradul.

Women's coping mechanisms during floods in the study area found that women's contributions are vital to the sustenance of their families; these roles have not been fully recognized. It is also found that women are not only vulnerable but also resilient in the face of disasters. Most of the women in Khidrachappur, Baradul have developed their own mitigation and adaptation strategies like selling assets, storing food, collecting safe drinking water, moving to flood shelters and other places, securing livestock to reduce flood risks and rebuild homes, protect property, and ensure livelihood security. But these efforts cannot produce the expected positive results without adequate support from government and society at large.

The reality women face during floods is gloomy in the region. It was found that despite their heroic efforts, women's contributions are not given due recognitions as they continue to fight with challenges. Though it appears obvious that simple coping would not help women much to reduce their vulnerability, raising awareness regarding the anticipated elements of risks and early warning could facilitate them to strengthen their approaches to coping with floods in Khidrachappur, Baradul of Belkuchi Upazilla.

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