

Climate Change Adaptation Strategies of Women in Disaster Prone Khulna Region in Bangladesh

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ABSTRACT

The study was conducted on the adaptation strategy of women to climate change in disaster prone Khulna region of Bangladesh and the main objective of the study is to explore the climate change adaptation strategies of women in disaster prone Khulna region in Bangladesh. The study was conducted through the survey method. Purposive sampling techniques were used and the total sample size was 140. Interview schedule was used for data collection from the study area from three villages: naming jabakhali, pankhali and kodumtola in Burigauinalini Union of Shyamnagar upazila in Satkhira district. Most of the women were married and housewives. Majority of the respondents 70 percent were taken traditional adaptation strategies to adopt with disaster. Majority (62%) percents were taken meal insufficiently and suffered with various health problems. Mainly local adaptation measures like poultry rearing, traditional vegetable cultivation, fish cultivation, day labor, rain water collection etc. were taken by women. Also they have migrated to another place as adaptation measure. Most of them (68%) were faced gender discrimination and violence in family and workplace. Maximum 80 percent of the respondents have no decision making power in family. Maximum (82%) did not participate with community adaptation programme for household workloads and husband apathy. About 70 percent of the respondents did not get financial support from government of non-government organization for the lack of communication and political aggression. This study also found some significant correlation (Pearson $\chi^2=17.222$; Df= 6, $p < .009$) between household Income and level of meal taking, educational status and decision making power, educational status and participate on community adaptation programme. The study recommended that raising high awareness, Creation of employment and economic opportunities, women friendly cyclone centre and empowerment are needed to adopt with disaster of women in the study area. After all, specific attention of government as well as non-government organizations is inevitable for overcoming the awful effects of disaster and improving socio economic condition of women in south western region of Bangladesh.

Key Words: Adaptation, Women, Disaster, Empowerment, Strategy, Decision.

INTRODUCTION

Bangladesh is vulnerable to disasters mainly due to her geographic location. Disasters such as floods, river bank erosion, cyclone, tornado, cold waves, arsenic contamination in ground water, water logging, salinity intrusion etc. are gradually intensified by climate change and composing risks for the coastal people in Bangladesh (Nasreen, et al, 2012). Half of the people of the country are women and they are more vulnerable rather than men. The Women of our country suffer various problems during disaster and the suffering is being double in the time of disaster. The combination of a high level of poverty, and a depleted ecological system increase the country's vulnerability to the impacts of climate change (Khan, et. al., 2010).

Women are generally more vulnerable than men to climate-related impacts due to their social status, cultural

norms, lack of access to and control over resources, and lack of participation in decision-making processes in the developing countries. It is evident from a number of studies that women especially the poor, destitute and vulnerable women in Bangladesh bear multiple responsibilities at home, including food preparation, provision of cooking fuel, health care, and caring for children and their education (Alam, 2010).

Climate change has added a new dimension to the relational analysis from gender perspective. Women are not only the mere victims of climate change but are also playing crucial roles for household's sustenance. Women's contribution to rural production activities include raising seedlings, gathering seeds, post-harvesting, cow fattening and milking, goat farming, backyard poultry rearing, pisciculture, agriculture, horticulture, etc. It is evident that women's own adoptive techniques and initiatives become crucial for their family sustenance and ensuring food security (Nasreen, 2011).

OPERATIONAL DEFINITION OF THE CONCEPTS

Climate change: Climate change may refer to a change in average weather conditions, or in the time variation of weather around longer-term average conditions (i.e., more or fewer extreme weather events). Climate change is caused by factors such as biotic processes, variations in solar radiation received by Earth, plate Tectonics, and volcanic eruptions.

Disaster: A 'disaster' is a natural or man-made hazard, resulting in an event of substantial extent causing significant physical damage or destruction, loss of life, or drastic change to the environment.

Natural Disaster: A natural disaster is a major adverse event resulting from natural processes of the Earth; examples include floods, volcanic eruptions, earthquakes, tsunamis, and other geologic processes that causes great damage or loss of life.

Adaptation Strategies: Adaptation is the evolutionary process whereby a population becomes better suited to its habitat. It means mechanism and techniques where people getting their expected result by using their property. It is very much related with capacity. Strategies can be defined as a set of activities or mechanism by which people try to survive in disaster, recover their situation and develop their conditions after disaster.

Coastal Area: A coastline or seashore is the area where land meets the sea or ocean. The term "coastal zone" can be used instead, which is a spatial zone where interaction of the sea and land processes occurs both the terms coast and coastal are often used to describe a geographic location or region.

REVIEW OF RELATED LITERATURE

Aftab (2007) mentioned in a study that Women in the coastal areas are more vulnerable, because they live in an extremely dynamic environment facing many natural threats. Besides, there are threats of climate change and upstream land and water uses. These threats affect almost every aspect of life and limit livelihood choices of the people. Besides, women are also engaged themselves in additional activities outside regular domestic works. **Mallik (2012)** identified to the community adaptation process of the coastal people is more effective. Community has now managed to identify suitable tree species for their changed condition and have started to plant three types of trees like tan, sour and bitter fruit bearing trees which do well in saline area. Alternative livelihood options may reduce the economic vulnerabilities. NGOs help people to develop livelihoods through improvement plans and activities with the local community to reduce their disaster risks and to adapt to climate change.

Nasreen (2012) explored that during and aftermath of disaster, women suffer more than men from poverty, hunger, malnutrition, economic crises, environmental degradation; health related problems, insecurity and become victim of violence and political crises. The gendered division of labor becomes critical as gender

roles are often re-enforced and even intensified – due to the additional work and changes in environment brought on by a disaster.

Sultana (2015) identified that People of costal area have been living in houses made of mud walls and golpata roof which is a type of palm leaf. Houses made of golpata are not cyclone resistant. As the cyclone shelters are far away, people often did not want to go there unless severe cyclone warnings were issued. During Aila many people died staying in their houses because the mud walls of their houses were not cyclone resistant. After Aila most of the people built the houses with a new technique. They made sticks from Goran trees or bamboo and made fences with these sticks. Then they applied the mud layer over the fence to make the walls of their houses. This house is more durable than the normal muddy house.

OBJECTIVES

The broad objective of the study is to explore the climate change adaptation strategies of women in disaster prone Khulna region in Bangladesh. The specific objectives were to:

1. To explore the living adaptation strategies of women
2. To find out occupational and health adaptation of women;
3. To identify the major barriers faced by women to adopt with disaster;

THEORETICAL FRAMEWORK

Eco Feminist Perspective: Ecofeminism describes movements and philosophies that link feminism with ecology. The term is believed to have been coined by the French writer Françoise d'Eaubonne in her book *Le Féminisme ou la Mort* (1974). From arguments that there are particular and significant connections between women and nature, ecofeminism interprets their repression and exploitation in terms of the repression and exploitation of the environment (Wikipedia, 2016). Women's roles as primary resource users and managers, their dependence on natural resource based livelihood and they have to depend on household and community are central concern. Building on feminist, environmental, and ecological perspectives, ecofeminism explores the relationship between nature and humanity, striving to move beyond the domination both of women and nature (Warren, 2000). So, women are viewed as especially sensitive to natural disaster. They are more vulnerable, marginalized and disastrous situation creates more vulnerability and loss of adaptability. Poor women have a more difficult time recovering from disastrous situation. Because, they are mostly depends on natural resources. So, for adapting with hostile social as well as natural environment women suffer more and more and cannot easily cope with disastrous situation.

Social Vulnerability Theory: In disaster literature, social vulnerability refers to how certain social, economic and political forces influence the extent to which various peoples and communities experience the impact of a disaster. A growing body of research from the social sciences, including anthropology, sociology, geography, and urban planning documents how various attributes and conditions such as poverty, race and ethnicity, gender, age, health and physical ability and housing conditions, place human populations at risk of adverse consequences from a disaster. These social vulnerability factors are often interrelated and operate through the primary mechanism of unequal access to social, economic, and political resources and the decision structures that govern them. In other words, disasters may be “natural” events but the impacts of disasters are “social and political events that are linked to who we are, how we live, and how we structure and maintain our society (Enarson and Phillips, 2008). So, on the basis of the theory it is said that, economic insecurity and patriarchal social structure both contribute to increased vulnerability for women in the time of disaster.

METHOD AND MATERIALS

The study was explanatory in nature. Survey method was used in this study. The study area was selected purposively on the basis of objectives of the study. Shyamnagar upazila in Satkhira district was selected purposively, because it is the most disaster prone areas of Bangladesh. As the study area, three villages that include: naming jabakhali, pankhali and kodumtola in Burigaulini Union of Shyamnagar upazila in Satkhira district were selected purposively. The women in the study area who were above 25 years old and had the experience of facing natural disaster were selected as the unit of analysis. In this study, according to the criteria of unit of analysis, all the women in three villages naming jabakhali, pankhali and kodumtola in Burigaulini Union of Shyamnagar upazila were selected as the population of the study.

Instrument and Procedure

Purposive sampling was used in this study. An interview schedule was developed to collect data. The data were collected from two types of sources that are primary and secondary sources. The Data were collected from field through interview schedule that contained both open ended and close ended items and finally the data were processed and analyzed according to the objective of the study.

Statistical Analysis

Data were analyzed by using SPSS 20 program. Correlation between various variables was presented through Pearson’s test. Results on the variables were presented with cross tables and figures. The statistical analysis was conducted at 95% confidence level. P value less than 0.05 was considered statistically significant. Besides, some relevant secondary information was used for this study as well. The raw data were edited, coded, classified and cleaned by the researcher by using different computer software’s like SPSS, MS Excel, and MS Word etc.

RESULT AND DISCUSSION

In this section, empirical results are presented that contain the information of coping strategies in the aspects of adaptation strategies, socioeconomic condition, health and sanitation status of women living in disaster prone Khulna region of Bangladesh.

Knowing Information about Climate Change

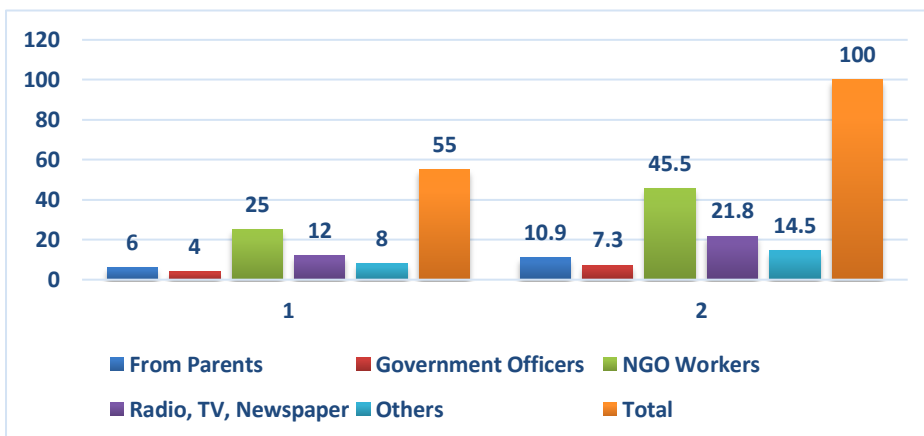


Figure-1: Showing the Knowing information about climate change (N=140)

Figure-1 shows the information knowing information about climate change from different sources. The above figure illuminates that majority 45 percent of the respondents (25) informed about the climate change from the NGO workers, following 22 percent of the respondents (12) informed from electronic and print

media, and (15%) informed others sources. The figure also indicates that among them 11 percent informed about the climate change from their parents and only (7%) informed government officers.

Levels of Meal Taking during Disaster

Table-1: Levels of Meal Taking during Disaster

Levels of Meal Taking	Number(f)	Percentage (%)
Insufficient	87	62.1
Sufficient	15	10.7
A Little Bit	29	20.7
Not Taking	9	6.4
Total	140	100.0

Pearson Chi square value: 17.222, $p < .009$

Data in the Table 1 explains that majority 62 percent was insufficiently, following 21 percent was a little bit, 11 percent was sufficiently and rest of them was not taking meal properly during disaster. It was found that respondent's income is a closely associated with their level of taking meal during disaster strengthened with Pearson Chi square test, where obtained value is 17.222, degree of freedom is 6 and assuming significance is .009.

Occupation after Disaster

Table-2: Occupation after Disaster

Change Occupation	Number(f)	Percentage (%)
Housewives	25	17.9
Agriculture	23	16.4
Fisheries	34	24.3
Day Labor	35	25.0
Poultry or Livestock Raring	19	13.6
Others	4	2.9
Total	140	100.0

The above table 2 shows that (25.0%) respondents prefer day labor as the occupation after disaster. Among them 24 percent respondents change their occupation as fisheries in post disaster. The table also represents that 18 percent are housewives, 17 percent involve in agriculture, 13 percent subsume in poultry or livestock rearing and 3 percent entangle with other types of occupation after disaster.

Strategies to Overcome the Health Problems

Table-3: Strategies to Overcome the Health Problems

Region	Number(f)	Percentage (%)
NGO Doctor	12	8.6
Local Health Centre	84	60.0
Kabiraj	29	20.7

Others	15	10.7
Total	140	100.0

Data from the above table 3 console that 60.0 percent respondents overcome their health problem through health services from Local Health Centre. It also bring to light in the table that 21 percent get treatment from Kabiraj, 11 percent solve their health problem with the help of others and 9 respondents get health service from NGO Doctor.

Maintain Sanitation Mechanism

Table-4: Maintain Sanitation Mechanism

Maintain Sanitation	Number(f)	Percentage (%)
In Bush	21	15.0
In Open Place	7	5.0
Sanitary	30	31.4
Hanging	60	42.9
Toilet of Cyclone center	22	15.7
Total	118	100.0

Data from the above table 4 penetrates the proposition that utmost of the respondents as 15 percent maintain sanitation mechanism by using in bush. 5 percent choose the open place. 31 percent prefer their sanitation in sanitary latrine, following 43 percent use hanging toilet, 16 percent have intend to use the toilet of cyclone centre.

Participation with Community Adaptation Program

Table-5: Participation with Community Adaptation Program

Participate with Community	Number(f)	Percentage (%)
Yes	25	17.9
No	115	82.1
Total	140	100.0

Data revealed in the table 5 that, 82 percent respondents have not participate with community adaptation program. It is also significant proposition that less of the respondents participate with this community program and their number is estimated as 18 percent.

Decision Making Power before and after Disaster

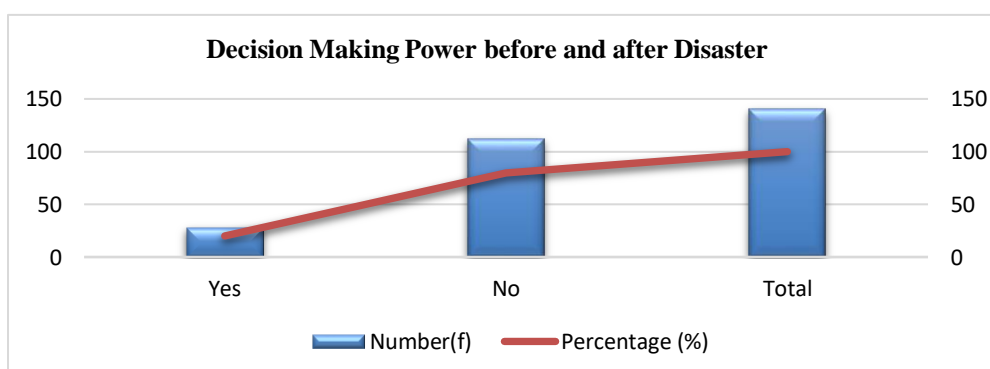


Figure-2: Decision Making Power before and after Disaster (N=140)

The data represented in the Figure-2 shows that, about 80.0 percent of the respondents especially women have no decision making power before and after disaster situation. As women have less empowerment situation in Bangladesh and that's why they don't take part in decision making process. Approximately, (20.0%) of the respondents has decision making power before and after disaster situation and their number is very rare.

Barrier of Getting Support from Govt. and Non Govt. Organization

Table-6: Barrier of getting support from Govt. and Non Govt. Organization

Causes	Number (f)	Percentage (%)
Lack of Communication	25	25.5
Not husband Responsibility	17	17.3
Political problem	48	49
Not necessary	8	8.2
Total	140	100.0

The data from the above table 6 shows that majority 49 percent of the respondents faced political problem for getting support and 26 percent had the lickings of communications with donor agencies, where 17 has not any responsibilities of their husband. Among the respondents 8 percent said that they did not have any support of GO and NGO.

Relationship between Household Income and Levels of Meal Taking during Disaster

Table -7: Relationship between Household Income and Levels of Meal Taking during Disaster

Income	Levels of Meal Taking during Disaster				N
	Insufficient	Sufficient	A Little Bit	Not Taking	
5000 and below	31.0%	33.3%	13.8%	0.0%	36
5001-8000	35.6	40.0	69.0	88.9	65
Above 8000	33.3	26.7	17.2	11.1	39
Total	87	15	29	9	140

Pearson $\chi^2=17.222$; Df= 6, $p < .009$

Income is one of the most important factors for level of meal taking during disaster. The findings here visibly prove that, respondent's income is a closely associated with their level of taking meal during disaster. These findings were farther strengthened with Pearson Chi square test, where obtained value is 17.222, degree of freedom is 6 and assuming significance is .009. Therefore it implies that level of meal taking in most cases depends on respondents household income.

Relationships between Understanding Disaster Signal and Shelter Preparation for Disaster

Table-8: Relationships between Understanding Disaster Signal and Shelter Preparation for Disaster

Understand Disaster Signal	Shelter Preparation for Disaster		N
	Yes	No	
Yes	59	32	91
No	42	7	49
Total	101	39	140

Pearson $\chi^2=6.909$; Df=6, $p < .009$

Individual response to disaster in most cases depends on his or her knowledge. The findings here visibly prove that, respondents understanding power on disaster signal is closely associated her shelter preparation for disaster. These findings were farther strengthened with Pearson Chi square test, where obtained value is 6.909 assuming significance is .009. Therefore it is implies that shelter preparation of disaster in most cases depends on respondents understanding power of disaster signal.

Relationship between Educational Status and Strategies to Overcome Health Problem

Table-9: Relationship between Educational Status and Strategies to Overcome Health Problem

Educational Status	Strategies to Overcome the Health Problems				N
	NGO. Doctor	Local Health Centre	Kabiraj	Others	
Illiterate	3	27	7	6	43
Literate (can sign only)	2	17	8	2	29
Primary	4	21	12	1	38
Junior Secondary	3	8	1	6	18
Secondary and above	0	11	1	0	12
Total	12	84	29	15	140
Pearson c2=24.869 ; Df= 12, p< .015					

Educational status often determines to decide of taking treatment centre. The findings here visibly prove that there is a close relationship between educational status and strategies to overcome health problem. These findings were farther strengthened with Pearson Chi square test, where obtained value is 24.869 and assuming significance is .015 and the degree of freedom is 12. Therefore it is implies respondent's choose of health care centre in most cases depends on respondents, depends on their educational status.

Relationship between Educational Status and Participate with Community Adaptation Program

Table -10: Relationship between Educational Status and Participate with Community Adaptation Program

Educational Status	Participate with Community Adaptation Program		N
	Yes	No	
Illiterate	11	32	43
Literate (can sign only)	4	25	29
Primary	7	31	38
Junior Secondary	1	17	18
Secondary and above	2	10	12
Total	25	115	140

Pearson c2=3.952; Df= 4, p< .212

It is mentionable that participate with community adaptation often depends on educational status of women. But the findings here visibly prove that, educational status of the respondent is not related with related with their participated with community adaptation programme. These findings were farther strengthened with Pearson Chi square test, where obtained value is 3.952 and assuming significance is .212 and the degree of freedom is 4. Therefore it is implies respondent's participation with community adaptation programme is insignificantly related with their educational status.

CONCLUSION

Bangladesh is the worst victim of climate change and global warming in the world. The climate is becoming more variable and creating additional risks. Women are becoming more vulnerable in this changing situation. Actually the social, economic, cultural and political contexts of Bangladesh's women make them overall more vulnerable to climate change and global warming. This study analyzed the mechanisms which were taken by women in different phases of disaster and also explains the effectiveness and barriers faced by women while coping with disaster in southwestern region of Bangladesh. Different types of local adaptation measures like poultry rearing, traditional cultivation, income generating activities, rain water collection etc. are taken by women. Poorer women deposit savings, store food, consume small amount of foods, sacrifice their own resources for their husbands and children. Some were being migrated from one place to another for earning money, security and so on. Women also started to crop diversification, fish cultivation and day labor as strategy to cope with occupation and income loss. The people also reduced taking meal as strategy to cope with food scarcity. Women in southern area face various kinds of discrimination and violence during and after disaster. As if the govt. has started to take infrastructural development but it too small to the demand of the local people. Considering the study findings, it is necessary to recognize the roles and contributions of women in climate change adaptation and thereby strengthen their existing capacities to face the future challenges of climate induced disasters and the strong government and non-government partnership is necessary for improving better life of women in south western region of Bangladesh. Majority of the respondents sometimes fall on gender discrimination in work place. The respondents not only face rarely gender discrimination in work place but also respondents feel it always. Majority, members of the family don't move to any place due to disaster.

RECOMMENDATIONS

To this end, the following recommendations are made:

Climate change induced disasters affect women and make more vulnerable. Women have to shoulder lot of responsibilities to cope or adapt with climate induced disasters. In respect with all these vulnerability the study assumes the following recommendation which could helpful to adapt or mitigate the future climate change vulnerability of the women in Khulna region of Bangladesh.

1. Government should emphasis on high awareness activities that are required for women on storm surge, flooding and rainfall related to cyclone and the warning message should be allocated among the people through the mass media.
2. Disaster management training at local level should be launched by the government and participation of the women should be ensured.
3. Climate change and adaptation information dissemination should be reached to the women by the local government.
4. Government should be given priorities in all policies, planning and programs related to disaster management about Women.
5. It must be ensured that women should have access to education and training programs so that they can implement adaptation and coping strategies.
6. Increasing women participation at Ward Disaster Management Committee (WDMC) and Union Disaster by the help of local government.
7. Inclusion of climate change issues in curriculum at secondary and tertiary educational institution.
8. Create gainful adaptation techniques for women and thereby ensure their participation in decision making processes within their families and society.
9. Improve water transport facilities during and after disaster by which women can collect drinking water safely and easily.

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11. Inclusion of climate change issues in curriculum at secondary and tertiary educational institution.
12. Create gainful adaptation techniques for women and thereby ensure their participation in decision making processes within their families and society.
13. Improve water transport facilities during and after disaster by which women can collect drinking water safely and easily.
14. Local administration should take strong initiatives to avoid the events of theft, robbery, and hijacking, torturing women and other unexpected events during disasters.

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