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Vulnerability: Bangladesh Perspective**

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Consequences of Climate Change and Gender Vulnerability: Bangladesh Perspective

Zayedda Sharmin and Mohammad Samiul Islam*

Abstract

Bangladesh's geographic location and geo-morphological conditions have made the country one of the most vulnerable to weather and climate induced changes. Bangladesh is a land of wetlands, which occupy around 50 percent of the country. Wetlands play a crucial role in maintaining the ecological balance of ecosystems, but wetland habitats of Bangladesh are under constant threats due to climate induced changes and anthropogenic activities. Climate change is causing a rise in sea levels, which already now put wetlands at risk of excessive calamities. Seasonal irregularities and extremes are the main threats to the wetland ecosystem. Anyway, there are important gender perspectives in all aspects of climate change. Women make up a large number of the poor in communities that are highly dependent on local natural resources for their livelihood and are disproportionately vulnerable to and affected by climate change. Moreover, women's limited access to resources and decision-making processes increases their vulnerability to climate change.

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I. Introduction

In Bangladesh, women are more vulnerable than men generally to all kinds of disasters and climate related impacts due to gender inequalities in various social, economic and political institutions. Men tend to control income distribution, property, access to credit, decision-making processes, and sources of food. Women have limited access to and control over natural resources, or money and more importantly are less mobile and have limited access to information. When a cyclone and floods hit Bangladesh in 1991, the death rate for women was almost five times higher than for men. Men were able to warn each other as they met in public spaces, but they rarely communicated information to the rest of the family. Many women are not allowed to leave their homes without a male relative, and simply waited for their relatives to return home and take them to a safe place. Moreover, as in many Asian countries, most Bengali women have never learned to swim. In saline and drought prone areas where fresh water is in short supply further stress is put on women who have responsibility to supply it to their families; often being forced to walk long distances, risking their health and their safety in the process. In Khulna region women remain more vulnerable than in any other region in Bangladesh to all kinds of disasters and climate related impacts.

II. Objective, Rational and Methodology

The overarching goal of the study is to build information on specific aspects of the consequence of climate change and gender vulnerability in the context of Khulna region. Towards meeting the goal, the following are the specific objectives: a) to explore the consequence of climate change, b) to find out gender vulnerability under climate change in context of Khulna region, and c) to achieve knowledge about climate change and gender vulnerability.

An increasing number of evidences in recent years have clearly established the fact that anthropogenic climate change is a reality. According to the latest findings of the International Panel on Climate Change (IPCC) and other concerned organizations, developing countries are expected to suffer the most from the negative impacts of climate change. This is because climate sensitive sectors such as agriculture and fisheries are particularly important for developing countries' economies.

Many sectors providing basic livelihood services to the poor are not able to cope even with today's climate variability and stresses. This is particularly true for Bangladesh. The frequent occurrence of extreme weather events such as floods and tropical cyclones in Bangladesh can set back development in the country for decades. To many across the globe, Bangladesh is known as one of the most vulnerable countries under climate change.

Initial attempts to link gender and climate change may seem rather far-fetched. There have been only a few publications to establish this linkage. Most of the approaches towards tackling the threats of climate change focus on scientific and technological aspects of the problem, ignoring the social issues. Gender, or the distinct social roles assigned to men and women, is a critical part of all development initiatives. A gender analysis is not a special focus on women, but rather an understanding on how discrimination against women and gender roles interact to shape men's and women's enjoyment of human dignity, rights, as well as quality of life. In the context of climate change, a gender analysis promotes an understanding of the ways that men and women are differently impacted by climate-related hazards through adaptation and mitigation strategies.

The study was conducted on the basis of primary and secondary data, using a case study method. The secondary sources of data cover the relevant documents and publications of national and international government agencies, non-governmental organizations (NGOs), and various research institutions.

III. Conceptualizing Climate Change and Gender

Climate change means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods. Besides, the climate is simply the weather that is dominant or normal in a particular region, though it also includes temperature, rainfall and wind patterns. Geography, global air and sea currents, tree cover, global temperatures and other factors influence the climate of an area, which causes the local weather (Pender, 2008, p. 4).

Gender refers to the socially constructed roles of and relations between men and women, while sex refers to biological characteristics which define humans as female or male. These biological characteristics are not mutually exclusive, as there are individuals who possess both. Gender relations are characterized by unequal power. Gender norms assign specific entitlements and responsibilities to men and women. For example, women might be expected to take on caring or domestic duties and remain close to home, while men may be expected to be the main bread winner, working outside the home, with greater freedom to move around in public places. This is known as the gendered division of labor.

In all countries of the world, women continue to exist in roles and relationships that often make them subordinate to men, because they are paid less than men for the same work, because their movements are restricted, or because they are not permitted to take on higher status work. Gender issues focus on women and on the relationship between men and women, their roles, access to and control over resources, division of labor, interests and needs. Gender relations affect household security, family well-being, planning, production and many other aspects of life (Bravo-Baumann, 2000).

The gender approach is distinct in that it focuses on women and men and not on women in isolation. It highlights

- the differences between women's and men's interest even within the same household and how these interact and are expressed;
- the conventions and hierarchies which determine women's and men's position in the family, community and society at large, whereby women are usually dominated by men;
- the differences among women and among men, based on age, wealth, ethnic background and other factors; and
- the way gender roles and relations change, often quite rapidly, as a result of social, economic and technological trends.

Vulnerability refers to the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of a community to the impact of hazards (Dankelman et al. 2008). This means that there is a need to identify, delineate, and understand those driving forces that increase or decrease vulnerability at all scales (Cutter, 2003).

Climate change is not gender neutral, and gender is an important determinant in climate change mitigation and adaptation. As climate change tends to magnify existing inequalities, with gender inequality being one of the most pervasive, it has major impacts particularly on women. Women are likely to experience worsening inequalities of different magnitudes as a result of climate change impacts through their socially constructed roles, rights and responsibilities, and because they are often poorer.

It is now widely acknowledged that negative effects of climate change affect women the most because they depend on natural resources and the environment for all their activities and the basic needs of their families (Diagne Gueye, 2008). As a result of climate change, women face specific risks and vulnerabilities in a range of sectors. Gender-specific climate change vulnerability and adaptive capacity are place and context specific. Already in several countries, women experience the impacts of climate change through increased frequency, intensity and impacts of floods, droughts and cyclones. This changing nature also has an impact on their ability to cope, and therefore has major consequences on their security and that of their families. Climate change not only affects women's health and wellbeing directly, but it also impacts negatively on their work burdens, opportunities and capacities through changes in their livelihoods. Apart from changes in their livelihoods that result from climate change, other important factors are lack of access to adequate (early warning) information, education, training and facilities to cope with these disasters.

IV. Impact of Climate Change in Bangladesh: An Analytical View

IV.1. Floods

Flood is almost an annual event in Bangladesh. It is the most severe during July and August. Regular river floods affect 20 percent of the country. There are past incidences of its increase up to 68 percent. Approximately 37 percent, 43 percent, 52 percent and 68 percent of the country is inundated with floods with of return periods of 10, 20, 50 and 100 years, respectively (Das, 2010, p. 26). Floods in Bangladesh are categorized as (i) monsoon floods, which increase slowly and decrease slowly, inundate vast areas and causes huge loss to the life and property; (ii) flash floods from sudden torrential flows, following a brief intense rainstorm; (iii) tidal floods, which are of short duration but are generally 3 to 6 meter high; and (iv) rain floods caused by drainage congestion and heavy rain.

According to Bangladesh's National Adaptation Programmes of Action (NAPA) of 2005, all land types except highlands are exposed to monsoon flooding for part or whole of the year.¹ It shows that 34 percent of Bangladesh's land area experience flood-water depth between 1.8 meters to 3 meters, which is very high for the safety of the people. About 60 percent of Bangladesh's total land area experience flood-water depth between 0.4 meter and 0.9 meter (Das, 2010, p. 26). It may be noted that 6 percent of the total land area of Bangladesh is permanently flooded. During floods, people are constrained to take shelter in nearby safe buildings since many live in weak buildings. Any building placed on highland is a possible flood shelter.

In general, primary schools are easily available shelters for the flood affected people. They stay in the refuge for a while and get back to their homes as soon as flood water recedes. It may be

¹ See Government of the People's Republic of Bangladesh, Ministry of Environment and Forest (MoEF) (2005).

noted that the use of school as flood shelter is not unique to Bangladesh. The neighboring countries such as India, Pakistan, etc. also face the same problem. It will be morally indefensible to deny the flood affected people from using the school as a shelter during disaster.

IV.2. Cyclones and Tidal Surges

Bangladesh is well known for its tropical cyclones from the Bay of Bengal. These are one of the major causes of disaster in Bangladesh. The country is one of the worst sufferers of all cyclonic casualties in the world. The high number of casualties is due to the fact that cyclones are mostly associated with storm surges. Especially the coastal belt of Bangladesh is frequently hit by devastating cyclones. These are usually high-speed winds, sometimes reaching 250 km per hour or more and 3 to 10 meter-high waves, causing extensive damage to life, property and livestock (Das, 2010, p. 27). While cyclones destroy most of the vernacular buildings, very few permanent brick structures are destroyed by the wind load. However, tidal wave sweeps away even such structures unless they are specially designed for water load, which is highly expensive. A careful site selection by considering the tidal surge map supplied by Bangladesh's Meteorological Department is the most prudential way of protecting buildings from tidal waves.

IV.3. Tornados

Local severe storms take place mostly during the two transition periods between southwest and northeast monsoons over the Indian sub-continent. These are referred to as pre-monsoon (March-May), and post-monsoon (October- November) incidences. During the pre-monsoon period most of the abnormal rainfall or drought conditions frequently occur in different parts of Bangladesh. Also there are severe local seasonal storms, popularly known as nor'westers. Some of these are associated with tornadoes. While wind-speed in a nor'wester may exceed 162 km per hour, they are generally within 113-130 km per hour. When the winds become whirling with funnels, they are called tornados. They typically cause a lot of destruction. Tornados are suddenly formed and are extremely localized in nature and of brief duration. Thus, it is very difficult to locate them or forecast their occurrence with the techniques available at present.

IV.4. River Bank Erosions

The impacts of river erosion are long term. It takes a few decades to make up the losses for a family. In Bangladesh, there has been inadequate progress towards improving the erosion-affected people primarily due to resource constraint. While community wisdom on responding to the disasters is a proven fact, this has reportedly been failed in the context of river erosion in the recent past. In Kurigram (North Bengal), Solidarity and Esho Desh Gori (two local NGOs), reported that community wisdom to determine safe school location has been observed to fail since the river erosion was faster than envisaged (Das, 2010, p. 29). River erosions have a deep and profound impact on primary education, as they may cause a total destruction of the school infrastructure. Since the school infrastructure is designed for at least fifty years, a premature loss poses an additional burden on the education department in its already constrained budget. Sometimes a delay between the occurrence of such incidence and replacement of the school leads to increased dropout.

IV.5. Droughts

Climate change also has a direct impact on more droughts, especially during the dry season. According to the United Nations World Food Programme (WFP) the poorest upazilas (sub-districts) can be found in the north-west, the coastal belt, Mymensingh, Netrakona, Bandarban and Rangamati. In terms of absolute numbers, districts with more than one million people living in extreme poverty include Sirajganj, Naogaon, Bogra, Mymensingh and Chittagong (Das, 2010, p. 31). Since the children will be affected both by heat wave and food shortage, there will be immediate and long term negative impacts on the primary education in these areas.

IV.6. Sea Level Rise

In 2000, the Intergovernmental Panel on Climate Change (IPCC) completed a Special Report on Emissions Scenarios (SRES) that projected that global mean sea level is expected to rise between 9 and 88 centimeters by 2100,² with a best estimate of 50 centimeters. A warmer world will have a higher sea level. The study shows that the rate of sea level rise during the last 22 years is many times higher than the mean rate of global sea level rise over the last 100 years.

As shown in Table 1, in Bangladesh, the trend in tidal levels have been 4.0 millimeter (mm) per year at Hiron Point, 6.0 mm/year at Char Changa, and 7.8 mm/year at Cox's Bazar. The southern part of the country will be the worst hit by sea level rise. It may be noted that all the coastal districts are already highly vulnerable against cyclone, tidal wave and flood.

Table 1: Trend of Tidal Level in Three Coastal Stations

Tidal Station	Region	Latitude (N)	Longitude (E)	Datum (m)	Trend (mm/year)
Hiron Point	Western	21° 48'	89° 28'	3.784	4.0
Char Changa	Central	22° 08'	91° 06'	4.996	6.0
Cox's Bazar	Eastern	21° 26'	91° 59'	4.836	7.8

Source: Das (2010), p. 32.

IV.7. Landslides

All across the world landslides (large/small) occur almost every year. In the past, landslide was not considered to be a major hazard in Bangladesh. However, recently landslide has emerged as a major hazard, particularly after the Chittagong landslide in 2007. Due to heavy rainfall during June 10-11, 2007, landslides and collapsed walls caused widespread damages in six areas of Chittagong city and in different upazilas of the district (Das, 2010, p. 33). More than 120 people have been reported dead due to landslides in Chittagong. Landslides are a complex-disaster phenomenon that can be caused by earthquakes, volcanic eruptions; heavy rainfall (typhoons, hurricanes) sustained rainfall, heavy snowmelt, unregulated anthropogenic developments,

² See: <http://www.ipcc.ch/ipccreports/tar/wg2/index.php?idp=29>.

mining, and others. In Bangladesh, landslides are mostly triggered by heavy rainfall. However, underlying causes of landslides include deforestation, hill cutting, unregulated development work, etc. Moreover, poverty and landlessness force poor people to live in the risky hill-slopes.

V. Climate Change and Vulnerability of Women

Cyclonic storm surge is a natural hazard in coastal Bangladesh for which strong warning system has already been in place. Women in the coastal areas are aware of the issuance of warnings but the design and the insecure environment of the cyclone shelters in Bangladesh is not found gender-friendly. The capacity of these shelters is found to be inadequate and gradually decreasing with increasing population. The inadequacy of shelter capacity is translated into self-denial to save lives for those who decide against taking shelter, it also has caused occasional abortion and/or miscarriages while advanced stage would be mother is cramped into a crowded shelter. Women report that there are cases of sexual harassment on the way to shelters. The very design of the shelter does not often provide minimum gender-friendly sanitation facility. During post cyclone period, Intra-household food insecurity and sanitation become the major concerns for the women.

Water logging disrupts land based productive system, which in turn aggravates women's malnutrition in affected areas due largely to gender-based intra-household food distribution. Water logging compels women to stay in marooned conditions for several months a year. Prolonged exposure to filthy water cause severe skin diseases and gynecological problems to women. Collection of fuel and potable water become extremely hazardous. However, because of patriarchal nature of gender-specific roles as care givers, women cannot avoid being exposed to hazardous living conditions. Women cannot send their children to schools during prolonged water logging. Males often leave their families back home in search of employment, leaving the responsibility to 'take care' of the family members on the shoulder of women, thereby adding to their vulnerability. Female headed households are common in water logging affected areas. In absence of land based productive system and incidence of acute poverty, women often are forced to go for anti-social works just to feed their child and their family as a desperate effort.

Under the present climate change variability, salinity ingress becomes a major hydro geophysical as well as social problem in the south western region of Bangladesh. During the dry season, salinity is more intense and lack of suitable drinking water becomes an acute problem for affected communities. Women and adolescent girls are usually required to fetch drinking water from distant sources, even 5 to 6 kilometers each day in some southern areas. Young girls often sacrifice their academic activities in a bid to fetch no saline water. Even during their pregnancy women are forced to fetch water irrespective of the distance between the source and their dwellings. Women and girls suffer from various gynecological problems in the long run for taking over extra hurdle of work in their daily life and by using saline water during menstruation. Premature birth, abortion and still birth (blue-baby syndrome) are reported in alarmingly high numbers in these areas.

As a floodplain, a considerable part of the country becomes inundated in every peak monsoon. For the same hydro-geophysical hazard, however, women face flood differently than males. Among those affected by flood and related problems, women and children are usually the most helpless and disadvantaged. Flood related deaths are often caused by drowning and snake bites, which, tend to occur in increasing numbers for children, following by adult women. Destitute

women, without any employment, and compelled to migrate elsewhere, face the most acute conditions of physical and social insecurity. Poor women find it extremely difficult to ensure food and drinking water security when they struggle to live in flooded condition. In deeply flooded areas young girls are reportedly scrounging for edible reeds and roots, while women of all ages travel long distances by boat or raft to fetch drinking water. In most cases, water sources become contaminated with pathogens. Moreover, due to lack of fuel water cannot be boiled to make pathogen free, which in turn triggers wide-scale spread of water borne diseases.

During flood women's privacy seems to be completely challenged. Sanitation becomes worse especially in case of pregnant women. In absence of freshwater, adolescent girls cannot maintain hygienic reproductive health care and often report perinea rashes and urinary tract infections. Moving on the embankments or road side high lands often put the adult and young women in constant dangers of sexual harassment and assault. Women headed household in flood affected areas are increasing in numbers as the male counter parts leave the flooded area to a higher land for employment opportunities, and often they never come back to the family. In case of flash floods, food insecurity and sanitation are considered to be major issues for the affected women.

Urban flood coupled with drainage congestion has been emerging as one of the major concerns these days. The slum dwellers are the worst victims of urban drainage congestion. Collecting safe drinking water appears as the biggest challenge for women as they are the responsible actors for this. Slum dwelling women make their living mostly by finding self employment as temporary housemaids (*thika jhee*). If the shanty dwelling is inundated, it becomes difficult to join in daily activities in employers' household while trying to safeguard her belongings. Creating an alternate temporary safe haven for the kids also becomes a necessity. Delay or absence in the job often is translated into loss of employment, with counterproductive results on food security. Many slum dwelling women are self employed as food producers and /or food vendors, especially targeting rickshaw pullers as their customers. They face enormous hardship during periods of torrential rainfall followed by temporary water logging, when their prime customers do not ply on city roads.

River bank erosion, char land erosion, and coastal bank erosion is quite common in Bangladesh. Erosion leaves nothing for the affected people. In erosion prone areas, women are concerned regarding loss of homesteads, loss of housing for months and years, physical insecurity, loss of self as well as family esteem, lack of production opportunities, and lack of food security in the aftermath of the event. Since men tend to leave the area in search of employment, the onus of household well being falls on to rather weak shoulders of women. Often males never come back, causing enormously extra burden and vulnerability to the women with little kids. It is the women in the family who cannot leave her family unfed and unguarded. In the dire poverty situation, trafficking is very common. Out migration is the only coping in erosion, if this desperation is titled as 'coping'.

Bangladesh regularly faces agricultural drought. The entire western part of the country is drought prone, though the problem is acute in central-western and north-western regions. In the drought prone areas the major concerns of local women include food insecurity, problem in collecting drinking water, and outbreaks of diseases. However, none of these problems appears to be as acute as in case of water logged and saline affected areas. Women's lives are adversely affected due to difficulties towards maintaining homestead vegetable garden and managing water and fodder for the livestock. Although drought is well managed by means of groundwater irrigation,

women have little or no option to cope with drought-induced adverse conditions around them. The most observed survival mechanism against drought-induced food insecurity is to sell whatever assets that women own, such as jewelry, poultry, livestock, etc. Sometimes women take part in pre-harvest and post-harvest activities as day laborers, in addition to taking full responsibility of household's activities, in a bid to increase monetary flow. They also try to grow various types of vegetables in their courtyard which are moderately drought tolerant.

VI. Results and Discussion

The contexts of vulnerability to climate change are somewhat different for women, since they have lesser financial means and decision-making power than their male counterparts to respond to climate-driven stresses. Moreover, as being the household manager women have to bear the burden of meeting the needs of the family, even when fighting against adversities. Most climate change issues, policies and programs are not gender neutral. In light of this, several areas deserve attention, specifically: gender specific resource-use patterns; gender specific effects of climate change; gender related patterns of vulnerability; women's capacity to cope with climate change; gender and decision-making on climate change; and gender aspects of mitigation and adaptation.

In natural disasters that have occurred in recent years, both in developing and in developed countries, it is primarily the poor who have suffered — and all over the world, the majority of the poor are women, who at all levels earn less than men. In developing countries like Bangladeshi women living in poverty bear a disproportionate burden of consequences of climate change. Because of women's marginalized status and dependence on local natural resources, their domestic burdens are increased, including additional work to fetch water, or to collect fuel and fodder. In some areas, climate change generates resource shortages and unreliable job markets, which lead to increased male-out migration and more women left behind with additional agricultural and households duties. Poor women's lack of access to and control over natural resources, technologies and credit mean that they have fewer resources to cope with seasonal and episodic weather and natural disasters. Consequently traditional roles are reinforced, girls' education suffers, and women's ability to diversify their livelihoods (and therefore their capacity to access income-generating jobs) is diminished (Masika, 2002; Denton and Parish, 2003).

Following the cyclone and flood of 1991 in Bangladesh the death rate was almost five times as high for women as for men. Warning information was transmitted by men to men in public spaces, but rarely communicated to the rest of the family and as many women were not allowed to leave the house without a male relative they therefore perished waiting for their relatives to return home and take them to a safe place. Moreover, as in many other Asian countries, most Bengali women have never learned to swim which significantly reduces their survival chances in case of flooding.

As stated in a report of an expert group meeting on disasters and gender in Ankara, Turkey, in 2001:

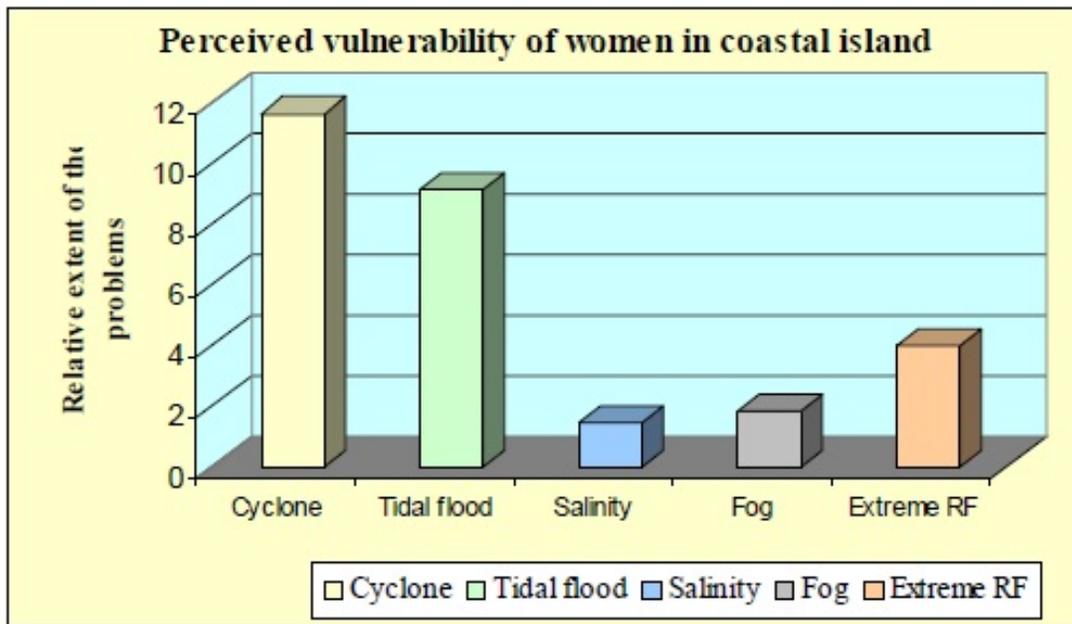
Women's human rights are not comprehensively enjoyed throughout the disaster process. The economic and social rights are violated in disaster processes if mitigation, relief, and reconstruction policies do not benefit women and men equally. The right to adequate health care is violated when relief efforts do not meet the needs of specific physical and mental health needs of women throughout the life cycle, in particular when trauma has occurred. The right to security of persons is violated when women and girls are victims of

sexual and other forms of violence while in relief camps or temporary housing. Civil and political rights are denied if women cannot act autonomously and participate fully at all decision-making levels in matters regarding mitigation and recovery.³

Furthermore, the report notes that women's role in communities is not formally recognized or accounted for in mitigation, adaptation and relief efforts. Women's knowledge about ecosystems and their strategies, experiences and skills for coping with natural disasters and water shortages, are often ignoring in Bangladesh. Strategies and policies to cope with climate change often neglect the gender dimensions of climate change and the current gender-climate change agenda. Women are poorly represented in planning and decision-making processes in climate change policies, limiting their capacity to engage in political decisions that can impact their specific needs and vulnerabilities (UNDAW-UNISDR, 2001, and UNEP Gender Unit, 2010).

Women in the coastal areas are aware about issuance of warnings. However, they have informed that their male counterparts receive the warning first and sometimes do not pass on the information to their respective family members. Consequently, women generally fall victim to delayed response to such warnings. Even if the warnings are conveyed quickly enough, the male members often rapidly quit after giving the warning, but the women cannot act as promptly as their respective counterparts. They manage the whole household and take precautionary measures to safeguard all the assets including livestock before taking temporary refuge to cyclone shelter.

Figure 1: Climate Driven Problem Prioritization



Source: Figure 15 of Ahmed et al. (2008), p. 33.
(Note: Extreme RF stands for extreme rainfall.)

³ UNDAW-UNISDR (2001), p. 10.

Women often do not go to the cyclone shelters due to an insecure environment there and hence, they prefer to stay back during a cyclone. Such deliberate actions are results of social insecurity. The design of cyclone shelters in Bangladesh is not found to be gender-friendly, as reported by coastal cyclone vulnerable women. Multi-purpose cyclone shelters are generally built on high stilts, deliberately so in a bid to avoid tidal surge. However, the stairs are reportedly steep and unfriendly for the elderly women, children, disabled women and pregnant women. Almost no cyclone shelter has a ramp to safely carry the disabled persons and pregnant women. During cyclone, it is a common scene that people are taking their pregnant members on their laps and moving upwards by the sharp stairs with heavy risk. There is hardly any designated space for lactating mothers and pregnant women to either serve the infant or have a breather. Adequacy of privacy for women for the few hours of staying at the cyclone shelter seems to be a socially important criterion, which however appears to be missing in current practices.

Capacity to face the disasters becomes low because they lose their economic capability due to destruction of livelihood. As a result, food insecurity occurs and most of the time women have to face the harsh effect of intra-household food insecurity. Women become socially insecure as they lose their houses. Young girls and women become more vulnerable when they are forced to live under open sky. Sanitation becomes a major problem, especially as tube wells are often damaged in cyclones. As a result, fetching water from a long distance and defecating in unsafe environments lead women towards vulnerable living conditions in the post phases of a cyclone. Surviving the aftermath of a cyclone becomes a nightmare for women.

Water logging compels women to stay in marooned conditions for several months in a year. Women of the waterlogged households face different problems than other women of the society. In rural areas in Bangladesh, most of the mud-built houses are destroyed in water logged condition. This leads to social vulnerability of women who have to take shelters on embankments. Often families take shelter on the roof top of the house. In a bid to avoid sudden slipping of young children into chest high stagnant water, women take every precautionary measure and often curtail the slightest opportunity to rest during the day. Collection of fuel and potable water become extremely hazardous.

In rural Bangladesh, most of the kitchens as well as latrines are situated outside the main dwelling unit and during floods, they become difficult to reach. All family members, especially women, cross the water logged courtyard several times a day in chest-high water. Waterlogged situations often increase diarrhea, dysentery and skin diseases. Pregnant women cannot stroll in marooned condition, they are forced to stay back inside the house and ultimately fall victim to unhygienic reproductive health conditions. In many cases, it has been observed that people are not keen to establish a marital relationship with the women from water logging affected areas because those women generally suffer from skin diseases. Water logging has a far reaching effect on the social and economic status of women. In inadequacy of fodder, livestock rearing cannot be sustained which is often the means of livelihood of many women at rural areas. Homestead vegetable production also becomes difficult in waterlogged condition and therefore, women cannot plan quickly to upgrade their economic situation.

Besides, women are differently vulnerable than men in an event of a flash flood in numerous ways. First of all, flash flood often washes away latrines of the family. In such cases it becomes difficult for women to go outside for defecation. They also face sanitation problems at places where they take shelter, especially if it is an embankment. The responsibility of providing pure

drinking water generally falls upon women and it becomes difficult for them to fetch water from a far distance in flooded condition. An outburst of epidemics is common as people hardly manage safe sanitation and pure drinking water during post-flash-flood conditions. Preservation of fuel is a significant responsibility of women which becomes difficult. Many households suffer from hunger during post-flash-flood if they cannot manage dry foods. Also, flash flood washes away means of livelihood like poultry, livestock etc. which are the main sources of income for many rural women in Bangladesh.

Moisture stress leading to drought is a major climate related hazard in the Barind track. Since moisture stress is detrimental to crop production, it affects household food security to a large extent. Women have identified a large number of climate related concerns, which include the following: (a) drought, (b) getting safe drinking water, (c) irregular vegetable production due to inadequate rainfall in the dry season, (d) floods, (e) excess rainfall in a few consecutive days, especially in the month of Ashwin causing water logging, (f) health ailments (mainly during droughts/floods), (g) colder winters and warmer summers, (h) storms and tornado (which have increased in intensity but less in frequency), and (i) excess fog/mist, mostly during winter.

However, when people are asked to prioritize, they come up with two acute problems: (1) moisture stress leading to drought and (2) lack of drinking water during the long dry months. Problem of drinking water become evident during this drought condition. In many areas tube wells cannot support as the layer goes down. In drought condition, due to water stress women have to take burden on their shoulder to collect safe drinking water from a long distance. Pregnant women also have to fetch water from a greater distance in the drought condition. Sanitary hygiene is hampered due to unavailability of water and the inevitable consequence is outbreaks of diseases like diarrhea, cholera and dysentery. In business as usual scenario, women eventually face food insecurity because of economic hardship; these extra elements only add to this endless list their vulnerability context.

As in the case of coastal erosion, women are concerned regarding loss of homesteads, loss of housing for months and years, physical insecurity for the woman, loss of self as well as family esteem, lack of production opportunities, and lack of food security in the aftermath of the event. Char dwellers somehow accept the fact that their living cannot be matched with those living in 'mainland' areas and their social acceptance is bound to be regarded as lower than those in the mainland. However, they do believe that when the 'unacceptable' event just occurs (due to mighty Allah's will, for which they have little to do), they need to accept the fate. The social cost for erosion affected women is extremely high. They lose their dignity and respect in the society, to many women which appear to be unbearable. Loss of housing and living in the open allow miscreants to take undue advantage of the condition of the woman, which often culminate into sexual harassment and abuse. Accustomed with hygienic defecation and all on a sudden losing sanitary latrine can lead to health disorder. Having no homestead at all means the woman can no longer supplement the family diet with home grown vegetables, which the women rate as important food item.

The impact of climate related disasters on women's health is also much worse with deaths, diseases and injuries occur from waterborne diseases, snake bites, drowning, slipping, large trees and structures falling on women, lack of medical facilities, malnutrition, lack of uncontaminated drinking water and lack of proper sanitation facilities. Women and adolescent girls suffer as sanitation systems are destroyed: many women reported that they refrain from using the toilet

during the day and consequently suffer from urinary tract infections. Pregnant women, lactating mothers and disabled women suffered the most, as they found it difficult to move before and after the cyclone hit in Bangladesh (Dankelman et. al., 2008).

VII. Conclusion

The study probed into women's differential vulnerability in relation to men under the same exposure to hydro-geophysical hazards likely to be perturbed under climate change. Women's vulnerability is context specific. The overall vulnerability of marginal people (such as poor, physically/mentally challenged, ethnic minority etc.) in any given hazardous geophysical context is high. However, among any such group of marginal people, vulnerability of women is of the highest order. The contexts of women's vulnerability in an event of cyclone and storm surge have only slightly been changed due to the innovative approach such as the Cyclone Preparedness Programme (CPP). Yes, women can now save their lives, as all the males in the neighborhood. However, many of them do not even get the warning well ahead of time and accept consequences. In many cases they also are forced to accept sufferings due to (a) patriarchal maltreatment and harassment, and (b) prevailing societal norms and practices. For obvious reasons, an opportunity to survive the onslaught alone can be considered as a great advancement.

However, women aspire more from the society, as they deserve to be treated with honor and dignity. Mere survival and subsequent social maltreatment can no longer fulfill the needs of coastal women in quest of adapting to climate change. Women require to be informed adequately and well ahead of time of occurrence of an event. They require training on translating the flag signs, preparatory measures etc. Moreover, they want their respective male counterparts to be responsible enough to take equal part in the preparatory processes before running to the closest cyclone shelter.

Furthermore, a woman asks for freedom to make decisions with regard to leaving the assets and households upon issuance of a warning in a bid to save the lives of herself and her children. It is understood that training can be designed and imparted to equip the coastal women towards responding to cyclone warning better. However, changing patriarchic norms and behavior would certainly require social mobilization and awareness and cannot be achieved with rhetoric in the policy regime.

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