



Norms, practices, and gendered vulnerabilities in the lower Teesta basin, Bangladesh



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ABSTRACT

Bangladesh is one of the countries most vulnerable to climate change. Gendered vulnerability and its implications for people's ability to cope with and adapt to climatic stressors was investigated in four poor rural communities in Dimla, Kaunia, Hatibandha, and Patgram upazilas (sub-districts) in Rangpur division in the lower Teesta basin area in northwest Bangladesh. These areas are strongly affected by seasonal floods, flash floods, river bank erosion, and drought throughout the year. Socioeconomic stressors coupled with these climatic stressors lead to a high level of gendered vulnerability among the villagers, which is likely to be exacerbated in extreme climatic situations. Asymmetrical gender divisions make women disproportionately vulnerable and decrease their coping and adaptive capacity in changed situations. The study showed that women are the most vulnerable amongst vulnerable groups, not simply as a result of their gender roles and responsibilities, but more as a result of discriminatory social norms and practices such as lack of property ownership, lack of education, early marriage, the dowry system, and acceptance of domestic violence against women, which further create barriers to women's mobility and economic empowerment. Women are conditioned to remain at home and not participate, or to wait for men to accompany them to most activities taking place in the public space. Although significant numbers of women have been engaging in income generating activities, creating co-operative funds, and saving money, this is still within the confines of their private space. Government policy to empower women through free education is partly effective but the dominant patriarchal practice of early marriage and dowry discourage women from coming forward. The study concludes that the prevalent gender discriminatory norms and practices must be addressed to achieve gender transformative change, which is an essential requirement for gender equity and inclusive social development. Government policies and programs should be revised to address women's practical and strategic needs for gender transformative change.

1. Introduction

Bangladesh is a low-lying riverine country in South Asia with the greater part of the land area covered by the delta plain of the Ganges, Brahmaputra, and Meghna rivers. As a result of its geophysical position and socio-economic conditions, the country is highly prone to natural disasters and the impacts of climate change (MoEF, 2008). Floods, river erosion, drought, cyclones, thunder storms, hailstorms, heat waves, and cold waves are common throughout the year (Ali, 1996). The intensity of these events has increased with the changing climate and Bangladesh is now ranked fifth of 170 countries in the Global Climate Risk Index (Dastagir, 2015).

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The Teesta is a torrential river that flows across northwest Bangladesh; flash floods are a common annual occurrence. Local livelihoods in the Teesta basin area are based primarily on natural resources and especially agriculture. But flash floods, riverine floods, and other climatic events destroy farmland and other property and markedly affect the availability of natural resources for fuel, fodder, and food, thus reducing people's livelihood options. Furthermore, the area is beset with a range of socio-economic problems including poverty, inequality, superstition, prejudice, unemployment, poor education, and discrimination. These factors impact heavily on the poor and marginalized communities in the lower reaches of the Teesta. Especially women suffer as a result of the combination of climatic stressors with socio-economic factors.

Vulnerability is a complex characteristic related both to exposure and sensitivity to climate-related and other natural hazards, and to the capacity to cope with, resist, and recover from or adapt to the impacts. The International Panel on Climate Change (IPCC) describes it as the degree to which a system is susceptible to or unable to cope with the adverse effects of climate change (IPCC, 2007). Vulnerability is intricately connected to social structure such as gender, class, caste, and ethnicity (Blaikie et al., 2004). Those who are poor are at higher risk due to their limited access to and greater dependence on climate sensitive resources such as land, water, and food supplies. The impact of climate change is also higher among poor groups who face gender disparities and discrimination. Women play multiple roles and have a range of responsibilities as food producers, collectors, providers, and care givers. But uneven gender structures tend to make women the poorest among the poor and the most powerless among the marginalized, and thus less capable to cope and more vulnerable than men when faced with climate-related risks and climate change situations (Islam, 2017). The socially attributed roles, responsibilities, behaviors, and attitudes of men and women result in an unequal power relationship and unequal distribution of resources between men and women (FAO, 2011; Nellesmann et al., 2011; Ribeiro and Chauque, 2010), with women in a subordinate position and less able to access resources and opportunities and achieve equal participation (Enarson, 2000).

River erosion and floods are the most severe climatic hazards faced by villagers in the lower Teesta basin. Previous studies have suggested that women face particular difficulties as a result of climate stressors as they are the main collectors and managers of household resources, especially food, fuel, and water. The interface between climatic and social factors exposes women to a higher level of threat to survival because of their close dependence on the environment (Nasreen, 2008). Floods increase women's work burden and make them physically and mentally more vulnerable than men, who tend to leave the villages in search of alternative sources of income (Tanny and Rahman, 2016).

Gender differentiated vulnerabilities result from norms that define roles and responsibilities, access to and control over resources, decision making, mobility, and opportunity to participate in public forums. When women are poor, their rights are not protected and they face multiple socio-cultural and economic obstacles (Kabeer, 1994; UN-Women, undated). Norms, practices, and gender differentiated vulnerability were investigated in four villages in the lower Teesta basin in northwest Bangladesh, an area where gender norms and values are major determinants of vulnerability.

2. Materials and methods

2.1. Study Area

Bangladesh is divided into eight divisions – Dhaka, Chattagram, Barishal, Khulna, Rajshahi, Sylhet, Rangpur, and Mymensingh – with 64 districts (zila), and below this a tiered system of local government with 492 sub-districts (upazila), and 4573 union parishads (rural councils/union councils) and three hill district parishads, and 329 town councils (paurasabhas) and 11 municipalities (http://www.clgf.org.uk/default/assets/File/Country_profiles/Bangladesh.pdf).

The study area was located in Rangpur Division in northwest Bangladesh in the three districts that cover the greater part of the lower Teesta basin. This area is characterized by charlands, riverine sand and silt landmasses that emerge as lands within river channels or as land attached to the riverbank and are used for both agriculture and dwellings. One village was selected in each of four upazilas (Fig. 1) taking into account the level of exposure to climatic hazards, (geophysical location) and socio-economic drivers (level of development, occupational diversity, and socioeconomic conditions): Jharshingershar village from Purba Chatnai union, Dimla upazila, in Nilphamari district; Panjorvanga village from Balapara union, Kaunia upazila in Rangpur district, and Char Dhubni village from Shingimari union, Hatibandha upazila and Dahagram village from Dahagram union, Patgram upazila both in Lalmonirhat district. Jharshingershar village in Dimla and Panjorvanga village in Kaunia are on the right bank of the Teesta River, while Char Dhubni village in Hatibandha and Dahagram village in Patgram are on the left bank. Panjorvanga is comparatively safe from river bank erosion and floods because there are spurs and embankment protection around the village. The other three villages do not have spur and embankment protection and are more vulnerable as they are threatened by direct hits of surging water and floods (Fig. 1).

2.2. Methods

Details of the overall study concept and methodologies of this multi-location research project are provided in the introductory paper in this special issue. Briefly, qualitative information was collected using a range of participatory research tools including hazard mapping, a seasonal calendar, and a vulnerability assessment. Twenty-four focus group discussions (FGD) were carried out with women and men groups (farmers, day laborers, fisher people), eleven key informant interviews were held, and six case studies were conducted at different times of the year in 2017. A gender analysis framework was used to examine gendered norms, practices, vulnerabilities, and capabilities. The framework included a gender needs assessment; activities profile; resources, access, and control

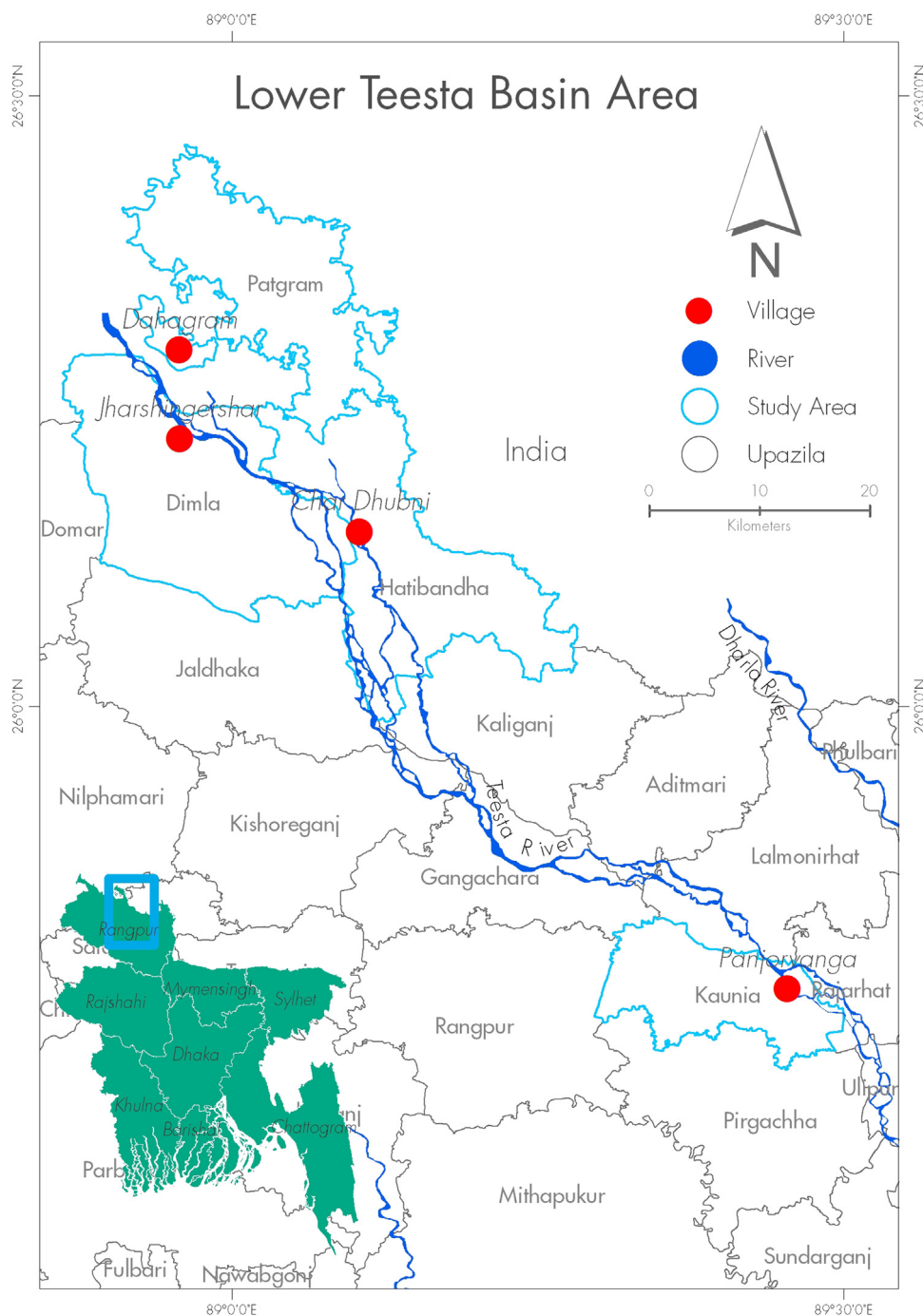


Fig. 1. Map of the study area (Lower Teesta basin area).

profile; benefits and incentives analysis; and institutional constraints and opportunities analysis. A capacity and vulnerability analysis framework was used for livelihoods analysis.

3. Results and discussion

The study sites in the Teesta basin area were chosen for their low socio-economic status and disaster prone characteristics to enable investigation of the norms and practices contributing to these. Agriculture is the major source of income in all four upazilas (Dimla 75%, Kaunia 51%, Hatibandha 78%, Patgram 74%) but there is a fairly high rate of landlessness (Dimla 43%, Kaunia 26%) and many people work as agricultural laborers (Banglapedia, 2014). The field study found that majority of the people in

Jharshingershar, Panjorvanga, Char Dhubni and Dahagram villages were living under the poverty line, with 20%, 40%, 70%, and 21%, respectively (of 125, 918, 596, and 261 households) in extreme poverty with a maximum monthly income of only USD 20–35 (2000–3000 taka). These very poor people mostly work as day laborers or migrate to other places temporarily for work.

3.1. Gendered norms and vulnerabilities

3.1.1. Roles and responsibilities

The field study showed that women's work continued from early morning to late at night. Female wage laborers in Jharshingershar village said, *"We wake up in the early morning and prepare the morning meal for the family, keeping aside some food for the family lunch. Then we leave home around 8.00 a.m. to work in the fields together with our husbands. After working all day, we come back home and start the second round of household chores, i.e. sweeping, preparing the evening meal, tidying up the house, and feeding the livestock and getting them back in their shed. In contrast, men take a rest or go to the local market, or wander here and there, passing time talking"*. Harvest time is the busiest period. Women laborers can neither give up their paid labor work nor reduce their unpaid household work as both are important for family wellbeing. Unless women ask for help, men never join in with the household chores as these are taken for granted as women's work. Thus women fall under extreme time pressure which leads to both mental and physical stress and threatens their wellbeing (Leonard, 2001; Warren, 2003). The study showed that when asked men can help to take care of livestock but they lack the skills for other domestic work such as cooking, cleaning, and tidying up. If women are away for work or visiting a relative's house, men find it difficult to provide food and other care for the family and women must request neighbors to support their men and children. If women fail to organize support, they can suffer mental stress and may have to cancel their time away.

Significant numbers of women in the poorest groups in the study area engaged in income generating activities, mostly as agricultural laborers, but women from middle income and wealthy families were not encouraged to work outside as it is seen to be a matter of social prestige. Women's decision making and choices are strongly limited by the patriarchal social norms. Even the women who work cannot choose the type of work they do freely; most sectors like fishing, tailoring in an open market, pulling vans and rickshaws, and business are male dominated. The male fishermen in Char Dhubni village said that *"Women are completely prohibited to work outside of the home in the fishing community. If women work outside for income then we will lose our prestige and dignity in society"*. Moreover, even those women who are involved in farming and agricultural production are usually prohibited from participating in market-based activities, which is another male dominated sector. Men carryout market-based buying and selling and handle cash and thus have more assets.

When women work as agri-laborers they are paid less than men. Wage discrimination is common in all the study areas, although the actual amount paid varies depending on the working conditions, workload, and approach of the employer. The limitation of women's freedom of choice by patriarchal norms and practices reduces their bargaining power and ability to demand equal wages (Agarwal, 1997). In Jharshingershar village, the women laborers explained that they are paid half the amount earned by men. *"We get USD 1.17–1.76 (100–150 taka) per day whereas men get USD 2.93–3.5 (250–300 taka) for similar work. We cannot bargain in the same way as men because our mobility is restricted, whereas men can search for work further away"*. Working women suffered both as a result of the natural disasters affecting agriculture, the main occupation open to them, and from male domination in the labor market, both of which result in disempowerment.

3.1.2. Access and control over resources and opportunities

Vulnerability is multi-dimensional and derives from inequalities and discriminatory practices related to resource distribution and patterns of access to and control over resources that are shaped by a history of social dimensions and marginalization (Goodrich et al., 2017). In the study areas, women are the poorest of the poor and more vulnerable to the impacts of climate than men because of normative gender differentiated access and control over resources (ownership of property and land) and opportunities (education, employment, health services).

3.1.2.1. Land ownership. Land is usually owned by men, which gives them more power as well as socio-cultural, economic, and political status. In many of the poor and marginalized groups in the study area, women do not own land or other property, have limited access to other resources such as cash, livestock, and poultry, and may have access to but have no control over agricultural land or homestead areas for vegetable gardening. Women's access to and ownership of resources are shaped by the patriarchal norms. Lack of access and ownership disempowers them economically and makes them socially insecure as resources offer the main form of financial security in times of crisis and are powerful assets (Verma, 2007). As Hertel et al. (2010) state *"People who do not have their own land for their own living are more vulnerable to climate change impacts"*. The field study found that women are discriminated against and deprived of ownership of family property and access to resources because of poverty and patriarchal norms and practices.

"We are poor; we have difficulty to enhance our asset base. So if we give our property to our girls, how can we survive? After marriage, girls leave their maternal home and become more responsible for their husband's family than for their maternal home. Additionally, to arrange our daughter's marriage we have to pay a lot of money as dowry. That is why we do not give land to our daughters" – FGD participants.

The gender norms define men as the caretakers of women. The men said *"Women do not need ownership of family property because we are enough for them"*. This norm deprives women of directly owning land, but owning land is the basic resource for food production and confers power in terms of socio-economic status and security. Women can only become users of land and laborers, not land owners. Land ownership passes from father to son or man to man. Although Muslim law says that women or girls possess half of their brother's possessions this is not put into practice, with marriage expenses given as the reason.

Table 1

Literacy rate of males and females as a percentage of the total male/female population.

Source: BBS (2011)

Village	Upazila	Male	Female
Jharshingershar	Dimla	34.5	27.0
Panjorvanga	Kaunia	37.0	32.6
Char Dhubni	Hatibandha	2.8	0.0
Dahagram	Patgram	38.4	32.5

3.1.2.2. Education. Education is an important component in enabling an individual to acquire skills and become empowered and develop the capability to adapt to extreme situations, but girls face more difficulty than boys in accessing education in the study areas due to cultural constraints and climatic stressors. The most recent Population Census (BBS, 2011) showed consistently lower literacy rates for women in all the villages, with no literate women in the low literacy village of Char Dhubni (Table 1). The research showed that in the five years following the census, the education rate for girls had increased as a result of the recently implemented government program with free education for girls up to grade 10, stipends for female students, and free distribution of national curriculum books from class 5–12 among all students (Jahan, 2011), which was introduced to meet the Constitutional mandate of free and compulsory education (http://bdlaws.minlaw.gov.bd/print_sections_all.php?id=367). Nevertheless, the practice of dowry and early marriage, and hard core poverty still act as barriers to girls' education. In the words of one FGD participant *"If we keep unmarried girls at home, society looks down upon us. In addition, unmarried girls are not allowed to work outside in the community and cannot help in family income because this would be a barrier to finding a match for marriage. It is related to the prestige of family"*. In contrast, unmarried boys can work outside and even migrate to other places for work. The system of dowry – the property or money given by a bride's parents to her husband on their marriage – adds to the financial burden imposed on families by girls and the reluctance to invest in girls' education. Participants disclosed that, *"Whatever the financial condition you have, it does not matter; the poor have to pay a minimum of 587 USD (50,000 taka) as dowry during marriage, if unable to pay, then domestic violence will occur"*. The dowry amount can vary depending on how fair the girl is and her age, with darker and older girls having to pay more. The amount may go beyond the capacity of a family to pay, but they will always try to pay on time to prevent the girls being subjected to domestic violence and physical assault. Boys may also be married young in order to gain dowry for the family. In contrast, married men never pay Mahr or dower, an amount of money or property which is the legal right of a bride to receive after marriage according to Muslim law (<http://www.assignmentpoint.com/arts/law/definition-dower.html>). Disasters also increase the difficulties for girls to access education, both physically – poor families are the most affected by floods and river erosion – and economically – loss of income, livestock, and dwellings can encourage poor families to marry off their daughters before they complete school as a way to reduce food intake in the family and ensure food security, social security, and economic security for their daughters. Thus notwithstanding the efforts of government, girls education is hindered by poverty and disaster, both of which encourage early marriage and reduce school attendance.

3.1.2.3. Access to services. The research showed that poor women in the villages have better access to international, national, and government (I/NGO) services than men and wealthy groups. The majority of the people in the char area are marginalized, landless, and poor and thus unable to access government and banking services. As a result, NGOs have widened their support for these people to help them survive with dignity and improve women's agency. NGO interventions, particularly from outside Bangladesh, have been expanding in Rangpur division since the late 1970s, as well as elsewhere in the country (Zohir, 2004). Grameen Bank, BRAC (Bangladesh Rural Advancement Committee), RDRS (Rangpur Dinajpur Rural Service), Oxfam Bangladesh, POPI (People's Oriented Program Implementation), PLAN Bangladesh, TMSS (Thenga Mara Mohila Sabuj Sangha), ESDO (Eco Social Development Organization), ASA (Association for Social Advancement), Padakhep Manabik Unnayan Kendra, Shanirvar Bangladesh, and many other NGOs and INGOs are working in the Teesta flood plain area to support poor people, especially those vulnerable to climatic hazards. The main programs focus on micro-credit and livelihoods, especially training on rearing livestock and poultry and tailoring and loan support, and target women as the primary beneficiaries. They are trying to create a collective agency of women to play leadership roles in the community. Two groups of women in the study area, in Jharshingershar and Panjorvanga villages, have developed a community fund. Only women have access to the saved money, but in practice men usually take the decisions on where it will be spent. Thus women's agency is effective at the collective level, but at the individual level the rigid social norms limit women's decision making and choice. Both men and women said that men take loans from the NGOs in the name of their wives because cash is controlled by men. Women are not only restricted to access and control over money, they also have limited access to information services. The FGD participants said *"Agricultural officers at upazila level mostly pay less attention to women if they go with any query because women are not recognized as farmers"*. A female union parishad (UP) member in Char Dhubni village said, *"I cannot do so much for my villagers; I get fewer facilities, reliefs, and opportunities compared to male UP members because of being female"*. These factors limit women's adaptation and coping capacity during disasters. Although they are important actors in terms of family income they have no control over expenditure and cannot take decisions even when needed. The problems worsen during floods and when a household head migrates for work. Women must wait for permission or instructions from their breadwinner and may have to become indebted to maintain food, clothing, education, and health care for their family members.

3.1.2.4. Health. Health is another area where women are at a disadvantage due to cultural constraints, with problems worsened by climatic extreme events. Often, if women need medicine they get it from the local pharmacy without seeing a doctor. Women and girls generally seek health care services from a community clinic, which has limited services, rather than go to a hospital because of social stigma and poverty. Villagers in general only go to a hospital in extreme cases. Midwives are generally called on for delivery because of the low cost and easy availability, and because married women prefer support and comfort from another woman and feel safer away from a male doctor. During floods, villagers are often unable to move outside the local area as a result of the poor roads and remoteness, which further limits access to health services. Although government and other institutions provide saline and other medicines for the affected villages, these are not sufficient and not distributed equally. FGD participants said that, “*low numbers of people can take this relief and mostly men take advantage because it is not always possible for girls and women to leave their homes empty*”.

3.1.3. Power and decision making

According to traditional practice, men are considered to be the household head and family decision maker, while women, children, and other family members must obey their decisions and respect their choices. This form of patriarchy defines a form of power relations between men and women in which men dominate, oppress, and exploit women (Walby, 1989). Almost all the families in the four villages were headed by men and men take the major decisions on family matters, regardless of women's educational or financial status. Poor and marginalized women are even less able to take decisions on family matters and have less personal choice than wealthy and educated women. They cannot break the social rules and exercise their rights to power. They are likely to be scolded and sometimes beaten for even small reasons; this is considered to be manly behavior. The normative practice of a gendered hierarchy is for men to be the guardians of the family and to have the right to dominate women (Kabeer, 1994). The field study indicated that the key reasons for women's subordination and limited capacity are low income and education, restricted mobility, unemployment, misconceptions about divorce, financial and social insecurity, and domestic violence or physical assault. The dominant perception among both women and men is that men are more intellectual and socialized and have a better understanding about the outside world than women. Hence, women are not allowed to participate in village arbitration or any decision-making process except as a witness or to attend cultural gatherings. Women can participate when there is a call from the union parishad on special issues. These restrictions limit development of women's mental capability and decision and choice making abilities, and teach them that they are less capable than men. This gender bias perception was visible even in accessing and using modern amenities like mobiles. Unmarried girls are not permitted to use a mobile phone because they could be influenced, which is perceived as bad, and even married women are not encouraged. Only 18 out of 120 women respondents, all married had their own mobile phones. In contrast, 115 of 120 male respondents had their own mobile phone, including all the unmarried respondents; the five who did not have a phone were all elderly and unable to operate one. These attitudes pose a considerable barrier to women's development and ability to combat adverse situations. The inability to use modern technology also means that women are more vulnerable to disasters. When women are on their own during floods, they cannot get early warning information, cannot communicate with others about being rescued, and are unable to take action for family security. Sometimes neighbors may help, but this depends on having good relationships.

3.1.4. Mobility and participation

Men have greater access to power and mobility in village society. They can easily migrate to other places and take decisions without discussion, while women's mobility is restricted by the normative gendered roles and responsibilities. Girls and women are not allowed to go anywhere alone outside of their home and village as a result of considerations of both security and social prestige. Even in extreme events, women are not allowed to move to another place to save themselves due to the lack of security, and cannot leave their family members behind because they are considered to be the providers of family wellbeing. When men migrate to other places to work, women have to take all the responsibility for agricultural and household activities, including taking on some decision-making authority. But due to restrictions on their mobility and the type of work they are allowed to do, women face problems in managing these responsibilities and in coping with extreme climatic events. In addition to the cultural constraints, several factors combine to increase women's vulnerability including poor education, lack of skills, and lack of freedom of choice, and financial stresses become extreme when their livelihood options are reduced by disaster.

3.2. Extreme natural hazard events – risk and vulnerability

The northwestern region of Bangladesh is facing climate variability characterized by temperature rise and change in seasonality, slow onset changes like drought and desertification, and an increase in extreme events like floods and river bank erosion. These kinds of natural hazards are likely to increase, leading to large scale damage to farmland and crops, livelihoods, employment, and the national economy (MoEF, 2008). Rangpur region already suffers regularly from river bank erosion, drought, heat stress, and cold waves consistent with the tropical wet and dry climate (Ferdous and Baten, 2011). All four study villages reported the occurrence of flash floods, riverine floods, riverbank erosion, droughts, storms, hailstorms, heat stress, and cold waves. The villagers at each site ranked these disasters in terms of frequency of occurrence and the impact on lives and livelihoods. The major disasters identified are shown in Table 2.

The impacts of river bank erosion are long term because land is irrevocably lost, and it can take decades for a family to recover. The rural population depends on farming for food security, thus loss of land has a direct impact on food security and nutrition (Khan et al., 2010). Villagers ranked river bank erosion as the most devastating disaster and a major cause of poverty. Almost all the villagers living adjacent to the river bank had lost some or all of their land and property due to erosion, and many people in the study

Table 2

Major climatic stressors in the Lower Teesta basin.

Source: FGDs for Gendered Vulnerability, 2017.

Study Site	Climatic stressors and environmental extremes
Jharshingershar in Dimla upazila	Flood and river bank erosion; drought and erratic rainfall; fog and cold waves River bank erosion was identified as the biggest problem in Jharshingershar village, which is not protected by the embankment and exposed to frequent floods every year
Panjorvanga in Kaunia upazila	Erratic rainfall, decrease in the number of rainy days; floods and erosion; water-logging and cold waves Erosion was less prominent because part of the village is protected by the embankment near the Teesta railway bridge
Char Dhubni in Hatibandha upazila	Increased temperature, heat stress, and erratic rainfall; flash floods and severe river bank erosion; drought, fog, and cold waves River bank erosion was very important because the village is located downstream of the Teesta Barrage on the left bank without a protection wall or proper embankment
Dahagram village in Patgram upazila	Flood and riverbank erosion; sand deposits in river beds and on fields; lowering of groundwater level; drought and heat stress; extreme cold waves; change in rainfall patterns

villages had experienced loss of land, property, and livestock many times. One farmer in Dahagram village had lost 120 ha (300 acres) of land due to excessive river erosion. The respondents in Jharshingershar said that river bank erosion is highest when the high water starts to recede. Overall, respondents considered that river bank erosion occurs from April to October, with the most intense erosion taking place at the end of July and from mid-September to mid-October. The devastating character of river bank erosion can turn rich people into poor and poor people into ultra-poor. With few livelihood opportunities in the vulnerable areas, many men opt to migrate to the cities for employment and income.

Flood is the most destructive climatic disaster in the lower Teesta basin. Heavy monsoon rainfall both upstream in India and downstream in Bangladesh led to devastating floods in the lower Teesta in 1988, 1997, and 2017. In 2017, the Forecasting and Warning Centre recorded a water level at Dalia point in Dimla upazila that was 60 cm above the danger level, indicating a high level of threat of massive flooding (Siddique, 2017). More than 100, 000 people were trapped by flood water in Lalmonirhat, and at least 36 villages in 16 unions in the Hatibandha, Kaliganj, Aditmari, and Sadar upazilas remained under water for several days (Dhaka Tribune, 2017). The majority of those affected took shelter on rooftops and embankments. Thousands of people suffered from lack of safe drinking water, sanitation, food, and shelter, and poor local administrative emergency response. Infrastructure such as houses, schools, roads, and overall health systems collapsed and the floods resulted in huge economic and physical losses.

The other hazards encountered in the study area such as drought, storms, cold waves, and heat waves also affect livelihoods and act as barriers to economic development, especially for the poor. People who have sufficient assets to cope with these stressors are relatively less affected compare to those with limited assets.

4. The impact of gendered norms and vulnerabilities on adaptation to climatic stressors

Women and men are affected differently in given climatic situations (Goodrich et al., 2017). This is because gender norms and values define different possibilities for women and men to face, cope with, and adapt to a situation. Different norms on mobility and decision making affect on women's ability to cope with and adapt to climatic and socioeconomic change is making them more vulnerable. Moreover, men and women possess different levels of assets due to the patriarchal social structure on ownership of family property, including land. Women have fewer possibilities than men to access alternative opportunities that could enhance their social, economic, physical, human, and financial capital. Although everyone living in the charlands area faces challenges to physical capital because the land is exposed to floods and droughts, women are more vulnerable than men because of the limited possibilities for them to access other livelihood options, and restrictions on their mobility that hinder them in avoiding floods. As the major contributors to family wellbeing, women in the study areas did carry out different income generating activities such as homestead gardening, livestock and poultry rearing, and wage labor in addition to their household responsibilities. But these are also greatly affected by flood, river erosion, drought, and erratic rainfall. Women often receive less resources and support from the government for loss and damage resulting from climate-induced disasters and adaption to the changes. Hence, the existing social inequality and deprivation are exacerbated by the extreme climatic events. The combined effect of social factors and climate stressors make poor women the most vulnerable group in the flood plain villages of the lower Teesta river basin.

Women, and especially poor women, suffer in many ways during floods including food shortages, disease, unemployment, fuel crises, lack of safe drinking water and sanitation, and breakdown of communication systems. These problems are compounded by several factors which lead to a higher level of vulnerability for women during floods. These include discrimination in the job market and lack of equality in wages, double burden of labor (domestic and nondomestic), discrimination in use of modern gadgets, lack of ownership, early marriage, higher dependency on men, and lack of proper knowledge on strategies for coping with disaster. Even during rescue and relief operations, women must first provide care for children and the elderly, whereas men can move freely (Nasreen, 2012). Traditional women's tasks like cooking, fetching water, and feeding livestock become difficult and time consuming during floods. Women in the field study explained that they try to cook on a raised platform or mobile earth stove, or go to others with more elevated houses nearby to cook. Usually they cook food for the whole day at one time. Sometimes to save food they eat less or depend on dry food if available. If women have to live temporarily on the embankment or roadside, or take shelter in another house, they suffer from lack of proper sanitation, nutrition, dry clothes, and basic securities. A woman in the study area said "10 years

ago when we were living on the embankment, I and my children had to starve for two days. After two days we had food sent by our neighbor". Moreover, where there is only open defecation, they may have to abstain for a long time to wait for darkness. They also have to use flood water to wash their sanitary cloths. Continually walking through flood water for different purposes can lead to urinary problems, abdominal pain, gastric problems, and skin and waterborne diseases, putting women's health at risk. Due to the remote location of the villages, healthcare services are insufficient and difficult for women to access. Although each village has a community clinic, cultural constraints and conservative ideas mean that married women barely go to it during labor and birth. Social constraints and lack of institutional services make women more vulnerable. Women must provide for the family, but during floods have less access to food and fuel and other necessities. In the worst case, households may have to borrow money and goods for survival, but it is not always possible to get a loan as people assess women's ability to repay. Not only money, women also borrow rice, oil, salt, and fuel from neighbors. In stress situations, men expect women to manage the family's immediate food requirements through borrowing from neighbors, which means that women already suffering from physical stress have increased mental stress. The problems are strongly related to their limited capacity and capability for adaptation.

Vulnerability and adaptation strategies vary across the region and between genders (Codjoe et al., 2012). Social constraints and lack of financial capacity mean that women are affected more by climate risks and are more restricted in their response (Terry, 2009). Women have developed different strategies for coping with the socio-economic situation and their restricted access to family cash, including maintaining a secret cache of money. They save this money by selling eggs, vegetables, milk, and others. The respondents said that men may assume that this "secret money" exists but do not attempt to stop it because they recognize that women are the "foundation of their family wellbeing". Women normally spend their secret money during moments of crisis, particularly during floods when both men and women may be jobless. Recurring extreme climatic events are push factors encouraging women to engage in the labor market, particularly in the agricultural sector, despite the unequal wages. But labor also increases women's work burden, with increased responsibilities at home as well as income generating activities outside. As a coping strategy, women who do not have their own livestock or poultry may also share livestock rearing tasks with others to increase the availability of livestock-based food. In order to survive in the charlands, men opt for migration as a coping strategy, leaving the women who remain behind in these vulnerable areas to face the hard reality of economic hardship, food insecurity, health risks, and social insecurity.

5. Conclusion and recommendations

Nielsen and Reenberg (2010) have argued that women's position in society is determined by institutions, ethnicity, and gender rather than individual ability. Individuals' experiences of extreme events and their coping strategies are characterized by their gender identity and social class. When social barriers increase in a society, it becomes more difficult for an individual to survive in an extreme event. Jharshingershar, Panjorvanga, Char Dhubni, and Dahagram villages are naturally vulnerable and have limited natural resources as a result of their geophysical location, and they remain underdeveloped as a result of their remoteness. As a result, the villagers have to face frequent natural calamities without resources which can be extremely hard to bear. Poor and marginalized people have little access and control when resources are limited, and poor women have less or even no access as a result of the uneven gender structure of the society. This unequal access and power make women even more fragile and insecure.

Although this study was conducted at a micro scale, it still showed that women are discriminated against and oppressed by the patriarchal norms and practices in accessing resources and opportunities in every sphere of life, which limits their capacity to respond to both climatic and socioeconomic stressors. In previous times, women only played a role as caregivers in the family, but now they are also playing an active role as income generators. As a result, their responsibilities have increased and become more complex and difficult to maintain during climatic events. The change has not resulted in a breakdown of traditional norms nor increased ability to cope with the environmental hazards, although women have sometimes developed different adaptation strategies within the limited possibilities open to them.

The Bangladesh government has developed a gender policy and is committed to taking the necessary steps to eliminate all forms of discrimination against women. Articles 10, 19, and 28 of the Bangladesh constitution grant equal rights and opportunities to women (DoE-MoEF, 2016). But in reality, the effectiveness of these laws and policies is low at village level because of lack of awareness of women's rights, poor education, lack of women's empowerment, and unchanged patriarchal norms and practices. Many development interventions have been implemented through NGOs and INGOs in this area to support women's development, but very few have been able to address women's vulnerability inter linked with cultural constraints and climatic stressors because they have limited targets and focus on specific goals. Moreover, although many service providers and institutions have opened up to women, inclusive participation is not yet ensured because of male domination in women's lives. Thus it is very important to focus on people and focus on gender at the center of climate change response and inclusive social development planning. Gender transformative change is needed to empower women and enhance their capability to cope with climatic and socioeconomic stressors.

The following recommendations are made to address women's needs based on the results of the study:

- Improve women's position in the community through implementing an awareness-based program that addresses the uneven gender structure
- Improve sanitation, water, and health care facilities and ownership of property, and ensure proper education of girls
- Provide easily accessible and affordable health care facilities and intensive support during periods of extreme disaster
- Provide access to soft loans for farming, livestock rearing, tailoring, and small businesses, which can enhance women's empowerment
- Government and non-government institutions should implement awareness raising programs on equal opportunity and equity for

