A Gender Sensitive Policy Framework for Disaster Management in Bangladesh

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DECLARATION

"I, Shammi Ahmed, declare that the PhD thesis entitled "A Gender Sensitive Policy Framework for Disaster Management in Bangladesh" is no more than 100,000 words in length including quotes and exclusive of tables, figures, appendices, bibliography, references and footnotes. This thesis contains no material that has been submitted previously, in whole or in part, for the award of any other academic degree or diploma. Except where otherwise indicated, this thesis is my own work".

Signature

02/05/2019
Date

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I fondly remember my parents Mohiuddin Ahmed and Farida Begum, whose dream that I am fulfilling by completing this dissertation they have left this world but I can feel how happy they would have been to see me accomplish this academic feat.

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Finally, this research made me realize how much development work still needed to be done to take my country to the next stage of progress. I hope my research will make humble contribution to the betterment of flood affected victims. I hope to continue my work.

ABSTRACT

Bangladesh has been hit by many catastrophic natural disasters where flooding has become a recurring phenomenon. Such flooding events have particularly severe consequences for relatively poor communities and within these communities' women tend to be more vulnerable than men. Women's development and gender issues have increasingly gained prominence and realization of importance (King and Mason 2001). It's been recognized that empowerment of women is essential in addressing poverty and advancing development. The governments often are, however, shy on placing priority on women's development and welfare. This particularly applies to times of crisis or disasters, where gender concerns are argued to be a luxury that can only be addressed after the more important matters (IFRC 2006). The socio-economic context in Bangladesh has created a situation where women's status and roles in a patriarchal society puts them in more vulnerability during the natural disaster as women face particular challenges in fulfilling their traditional roles in regard to gathering food, water, fuel; childcare, livestock as well as pursue diverse sources of income to sustain their households. Several international scholars have noted that a lack of sensitivity to the needs of women has meant that disaster relief and recovery operations have sometimes made things worse for women in the wake of natural disasters.

The research aim is twofold: First to investigate the challenges that women face during flooding events and the effectiveness of disaster relief and recovery work of government and non-government agencies and reflect on their disaster relief policies and its implications. Second, to investigate whether rural community women are disadvantaged compared to urban community women and address the gaps that may exists.

The study focuses on the experiences of women living through natural disasters in two different flood-prone communities in Bangladesh; a remote rural community in Munshigonj and an urban community living in Tongi Area, within the vicinity of Dhaka. Predominantly, a qualitative methodology using case study approach was applied. Two modes of data were collected: a survey questionnaire that provided the details of economic conditions (agricultural activities) and demography of the two selected districts; individual face-to-face interviews and focus groups with rural and urban women that have been affected by the floods. In-depth face-to-face interviews were also conducted from the relief agencies as well as government employees and local district leaders.

The findings of the study show that the rural-urban divide is less important than many have predicted and that other factors such as the duration of the flood—is more significant. For example, the study found that lack of money and other resources makes it extremely difficult for women to sustain their coping mechanisms for the duration of a major flooding and the exhaustion of their meagre resources makes it hard for them to rebuild their home and their livelihoods after the flood waters have subsided.

This has implications for how and when disaster relief and recovery should be delivered, and the study draws on its case study findings to suggest ways in which government and non-government disaster relief and recovery work in Bangladesh should be made more gender-sensitive.

The findings also showed that the number of agencies involved in disaster relief and recovery work in Bangladesh has multiplied in recent years and this makes it harder to ensure that consistent policies and practices are followed. Despite the participation of various organizations in disaster prevention, survival and recovery, there is absence of women sensitive policies that addresses women's specific challenges. These findings not only have implications for Bangladesh but draws attention for international significance. Several future directions for research are developed based on the findings.

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LIST OF SYMBOLS AND ABBREVIATIONS

NGO	:	Non-Government Organization
SSP	:	Swayam Shikshan Prayog
GoB	:	Government of Bangladesh
ICG	:	International Crisis Grou
IDB	:	Islamic Development Bank
CRS	:	Catholic Relief Services
IRW	:	Islamic Relief Worldwide
ASA	:	Association of Social Advancement
DFID	:	Department for International Development
BRAC	:	Bangladesh Rural Advancement Committee
SOD	:	Standing Orders on Disasters
DMA	:	Disaster Management Act
SAARC	:	South Asian Association for Regional Co-operation
FGD	:	Focus Group Discussion
FFWC	:	Flood Forecasting and Warning Centre
BWBD	:	Bangladesh Water Development Board
FAP	:	Flood Action Plan
CPP	:	Compartmental Pilot Project
WUG	:	Water User Groups
NDMC	:	National Disaster Management Council
IMDMCC	:	Inter-Ministerial Disaster Management Coordination Committee
NDMAC	:	National Disaster Management Advisory Committee
BDRCS	:	Bangladesh Red Crescent Society
CPP	:	Cyclone Preparedness Program

CBOs	:	Community-based Organizations
BDPC	:	Bangladesh Disaster Preparedness Centre
IPCC	:	Intergovernmental Panel on Climate Change
PTSD	:	Post-Traumatic Stress Disorder
SPSS	:	Statistical Package for Social Science
WEP	:	World Food Program
BRRI	:	Bangladesh Rice Research Institute
BARI	:	Bangladesh Agricultural Research Institute
CERDI	:	Central Extension Resources Development Institute
BIT	:	Bangladesh Institute of Technology

ABBREVIATIONS

$	Dollar
AR5	Fifth Assessment Report
ft	Feet
kg	kilogram
Km	Kilometer
Km2	Square Kilometer

GLOSSARY OF TERMS

1 US$: 84 BD taka

Apa: Sister

Aus and aman: Two different kind of rice

Azan: Call for prayer

Bazar: village market

Begun: Eggplant

Bhabi: Brother's wife, common norm for addressing women (married) the same age.

Bharta : Mashed vegetables/potato

Buas: In Baangladesh who woman working as a house-maid is call not by name but they called bua

Cart pulling: A push cart with three wheels and can be paddled

Char: River Island

Chira/Muri: Parched rice

Chouki: A traditional bed made with bamboo and wood.

Chula : Portable mud ovens for cooking that use biomass/firewood as fuel

Cyclone: A system of winds rotating inwards to an area of low barometric pressure, with an anticlockwise (northern hemisphere) or clockwise (southern hemisphere) circulation.

Cyclonic storm: A tropical cyclone is a rapidly rotating storm system characterized by a low-pressure center, strong winds, and a spiral arrangement of thunderstorms that produce heavy rain.

Dadi: Nanna/grandma, common norm for addressing elderly women.

Dal: Lentils

Dalil: Land ownership paper

Dekchi: Cooking pot

Dublar Ras: Juice of a local herb

Fen: Rice gruel

Fitkiri: Alum

Gur: Molasses

Hydro-meteorological disasters: Process or phenomenon of atmospheric, hydrological or oceanographic nature that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage.

khaas land : Land that is owned by the government, but not used for any purposes

Khala/Chachi: Aunt, common norm for addressing women one or two generations older than oneself.

Khanar bachan: "Khana's words"), among the earliest compositions in Bengali literature, is known for its agricultural themes

Khichuri : Hotchpotch: rice and lentil cooked together

kolmi shak and kochu shak: Arum leaves

Lau: Gourd

Macha: A temporary wooden platform which lies a few feet above ground.

Matabbar : Traditional leaders

Mohajons: Local money lander

Nakshi katha: Handmade quilt with artistic embroidery made by village women.

Padma: Local name for river Ganges in Bangladesh

Parda : Modesty maintained by women by putting on the veil

Piri: One kind of Wooden tool which is normally used to sit.

Roti: Flat bread

Shapla: Water lily

Till: Sesame seed

Tropical inter-convergence region: an area encircling the earth near the equator where the northeast and southeast trade winds come together.

CHAPTER ONE:

INTRODUCTION TO GENDER SENSITIVE POLICY FOR DISASTER MANAGEMENT IN BANGLADESH

1.0 RESEARCH CONTEXT

Women, children, people with disabilities, elderly, and the sick are more vulnerable than other groups to the impacts of natural disasters. Numerous studies have focused on the vulnerability of children in disaster situations because of their particular physiological, psychosocial, and cognitive needs and capacities (Belfer & Saxena, 2006; Brandenburg, Watkins, Brandenburg & Schieche, 2007; Guha-Sapir, Van Panhuis, & Lagoutte, 2007; Javaid, Arshad & Khalid, 2011; Murray & Monteiro, 2012). It is evident from changing global demographics that the proportion of elderly people exposed to disasters will increase exponentially (Barratt, 2007). People with disabilities—including hearing, vision, and mentally impaired people and those with restricted mobility—are clearly vulnerable in disaster situations (Sufiyan, 2014). Both children and elderly people are dependent on women for their daily life necessities. However, literature on specific needs of women during the disaster vulnerabilities is scarce and the challenges are more wide-ranging to mitigate the vulnerabilities that women faces. Yet, many of the other vulnerable groups depend on women for their survival and recovery in the wake of natural disasters. This makes a huge challenge for policy makers and disaster management service providers to effectively address the specific issues and needs that women faces, and how to address them properly. This study aims to focus on women's specific issues in disaster management and how to effectively address them by women sensitive disaster management policies.

The particular impact of natural disasters on women starts with the observation that, generally, more women are killed than men, with (Neumayer and Plümper, 2007) noting that women tend to die at younger ages than men. According to Garcia (2007) women are generally disproportionately affected by significant floods. In the case of Bangladesh, the 1991 cyclone and flooding resulted in women comprising the majority of the 138,000 killed (Dankelman, 2008). Socio-cultural expectation of roles and activities of women—such as caring for children and elderly family members and working in low-paid jobs—makes them vulnerable to natural disasters (Wisner, Blaikie, Cannon, & Davis 2004), however researchers often note that cultural beliefs and practices create rather complex vulnerabilities (e.g. Azad, Hossain & Nasreen 2014; Pelling & Uitto, 2001). The UNDP noted in 2006 that entrenched social structures and cultural beliefs make it harder than expected to implement gender-sensitive disaster management.

Figure 1.1: Bangladesh

While it is proving difficult to implement wide-ranging gender-sensitive disaster management policies, some non-government agencies are leading the way in practice. Gokhale, Dumesic, & Mavrikakis (2008), highlighted the work of an Indian NGO called Swayam Shikshan Prayog (SSP)—which translates as 'learning from one's own and others' experiences'—which has implemented gender-sensitive practices for more than 15 years. Gokhale notes that SSP encouraged women to take a lead in repairing and reconstructing damaged houses in the wake of an earthquake, Parasuraman (1995) and Bosher et al., (2007), noted that SSP focuses on training women to become disaster management leaders. This suggests that social and cultural barriers can be removed but Gokhale (opacity) notes that the success of SSP has rarely been emulated.

The study focuses on the flood vulnerabilities and specific needs of women in economically poor communities in Bangladesh during and after the flood. In-depth understanding of the specific issues would enable policy makers to devise effective flood management policies and implementations. The disaster management vision of the Bangladesh government aims to reduce the risks posed by natural and human-induced disasters for all citizens, especially those living in poor and disadvantaged communities (Government of Bangladesh (GoB), 2010). While it is impossible to avoid disasters completely, the national strategy aims to contain humanitarian impacts to manageable levels and to ensure the nation has the capacity to respond to emergencies and large-scale disasters if or when they occur (ibid). Current disaster

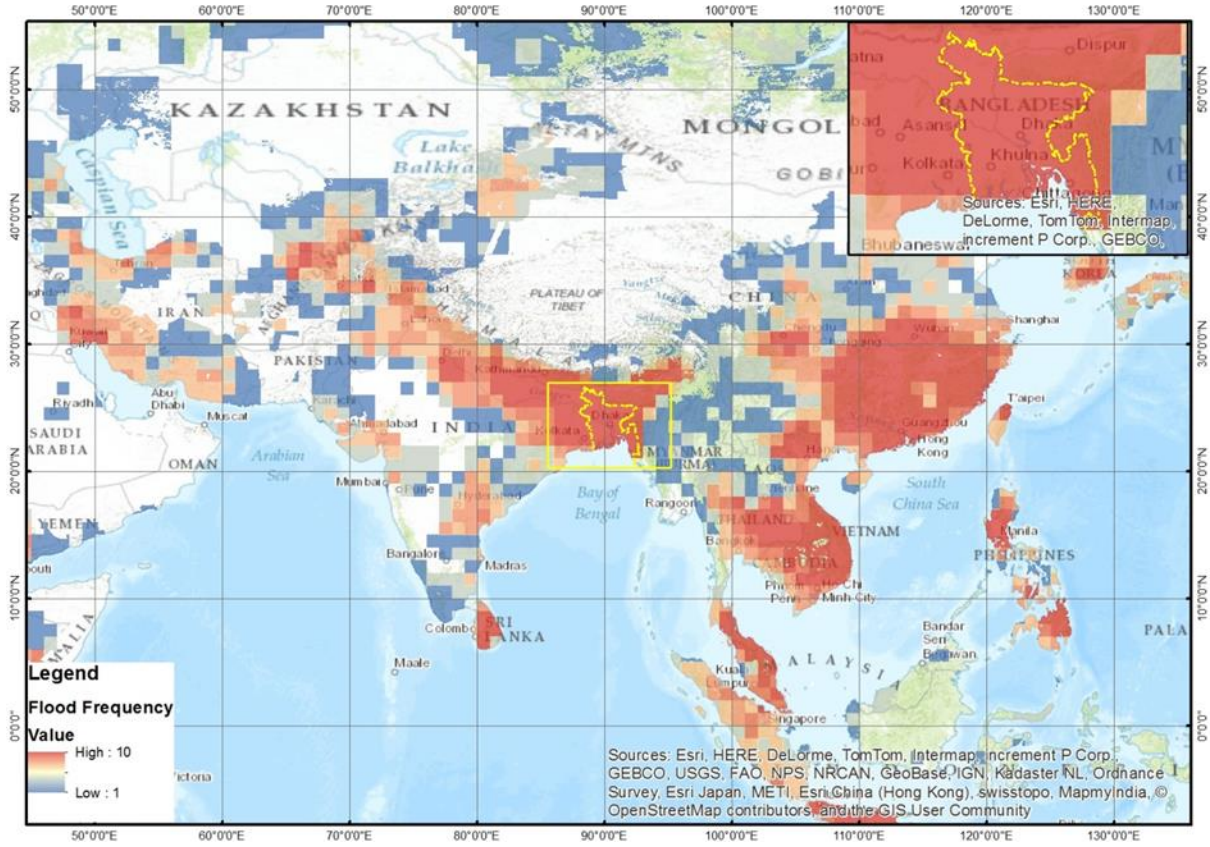
management activities operate on a *pro rata* basis with government and non-government agencies sharing the responsibility to relieve affected communities (Haque and Uddin, 2013). The government has established multipurpose disaster shelters—for both cyclone and flood relief—in various locations across the country but mostly in coastal areas. While they can be used during floods, they have been primarily designed to offer short-term shelter during cyclonic storms.

Because the multipurpose shelters have been designed for short-term emergencies they do not offer enough space for large numbers of people to take shelter for prolonged periods, such as the two or three months commonly associated with major flooding events in Bangladesh. Yet floods are an annual phenomenon in Bangladesh, with the most severe floods occurring during the months of July and August. Regular river floods affect 20 per cent of the country on an annual basis and this can increase to 68 per cent during extreme events (GoB, 2014). The floods of 1988, 1998, and 2004 were particularly catastrophic, resulting in large-scale destruction and loss of life. Rather belatedly, the Bangladesh government developed a Flood Response Preparedness Plan of Bangladesh in June 2014 in order to restrict flood impacts and reduce the damage as much as possible (GoB, 2014). However, the challenge is enormous because Bangladesh is one of the most densely populated countries in the world, with approximately 1100 people per square kilometre (Farid, Ahmed, Sarma, & Begum, 2011).

More than 40 per cent of the population still live below the poverty line. Many economically poor communities in Bangladesh are exposed to natural disasters (Khan and Nahar, 2014). It is estimated that 31 per cent of the population lives below the national poverty line (Shaha and MNB Zaman, 2014), and according to the Hunger Report, the majority of them are women and children. Poor people are particularly vulnerable to natural disasters because their houses are poorly built and because they have few assets or savings to support themselves during the recovery period. Floods are particularly hard for poor people to cope with because the inundation can last for months, leaving the affected people without paid livelihoods and dependent on limited relief aid or on family or friends who may also be struggling to survive. People who depend on fishing, agricultural labour, or subsistence activities for survival in 'normal' times are in dire circumstances in the wake of flood disasters (Islam, 2009).

In Bangladesh, women commonly bear multiple responsibilities at home, including food preparation, acquisition of cooking fuel, health care for family members, general care for children, and the responsibility to look after the education needs of their children. Women in poor rural communities commonly engage in a wide range of activities with only some of them being understood as paid work. These include raising seedlings, gathering seeds, postharvest handling of crops, cow fattening and milking, goat husbandry, 'backyard' poultry farming, apiculture, food processing, making things out of cane and bamboo, silk reeling, handloom weaving, garment making, fishnet making, coir production, and production of handicrafts. A significant number of rural women—particularly those living in households that do not have any land—engage in what has been traditionally seen as men's work; e.g. crop harvesting, building construction, and earthworks (Dankelman, 2008). When natural disasters such as flooding occur, the workload on such women multiplies because they continue to carry responsibilities for their households in very difficult circumstances and assume increased

responsibilities for the health and wellbeing of other women, children, the elderly, and the disabled[1]. While women living in economically poor urban communities tend to have more opportunities for paid work, they face similar pressures during flood disasters[2]. Yet a number of cultural taboos make it hard for such women to seek help or even discuss their difficulties with others. Because of their time-consuming obligations to other family members, they often



lack external social support.

Figure 1.2: Global Flood Frequency[3]

Disaster relief workers report that socially isolated women face an increased risk of sexual abuse or even abduction during flooding disasters[4]. They also report that pregnant women are less able to access medical support and in remote rural areas some of these women will be forced to give birth without any kind of medical help and often in conditions that are far from

[1] Before undertaking this research, the author worked for the Red Cross in Bangladesh and worked with many vulnerable communities recovering from disasters.

[2] As observed by the author.

[3] Global Flood Hazard Frequency and Distribution, v1 (1985 – 2003); Center for Hazards and Risk Research - CHRR - Columbia University, and Center for International Earth Science Information Network - CIESIN - Columbia University. 2005. Global Flood Hazard Frequency and Distribution. Palisades, NY: NASA Socioeconomic Data and Applications Center (SEDAC). http://sedac.ciesin.columbia.edu/data/set/ndh-flood-hazard-frequency-distribution. Accessed 26th February, 2014.

[4] According to a number of Red Cross fieldworkers interviewed by the author.

sterile. In general, women in Bangladesh have very little economic independence from men and they rarely have independent access to, or control over, financial, physical, or natural resources (such as land). Few women have access to training or extension services for working in agriculture, and public administration and governance are dominated by men at all levels of society. While women in remote rural communities are particularly vulnerable to the impacts of flood disasters, studies have also shown that more women and girls are badly affected by coastal cyclones than men and boys in Koira, Dacope and Shyamnagar Upazila (Islam, 2012). However, floods pose particular challenges because their duration can exacerbate the vulnerabilities of women.

The current flood management strategy of the Bangladesh government focuses on improving flood forecasting techniques. However, there is no evidence to suggest that this has reduced flood impacts and research presented in this thesis will suggest that this is because the warnings do not reach vulnerable communities in an accessible or timely manner. Relief distribution to affected communities is carried out mostly at the beginning of flood events and there is little documentation of who gets the relief and what they may have known of flood warnings. This thesis supports that the poorest members of flood-affected communities soon exhaust their savings, and many are forced to sell their valuable possessions and assets, flee, or migrate to other areas. Relief is commonly distributed according to a vulnerable group list prepared by the local chairman—an elected politician. However, this opens the possibility for political considerations influencing the selection of beneficiaries (International Crisis Group (ICG) 2012). Relief workers note that single mothers often struggle to get relief aid because of social isolation resulting from cultural taboos which restricts their movement outside of the home[5]. This thesis will demonstrate that gender-specific needs are rarely taken into account in the distribution of relief aid in Bangladesh. Furthermore, when relief is targeted at the poorest members of flood-affected communities, middleclass women can neither get relief nor engage in paid work and this problem remains largely unnoticed (Uthpal et al., 2010).

The existing flood coping mechanisms practiced among poor flood affected communities are self-invented, small scale, highly disintegrated, and above all place little emphasis on saving credit for bad days (Pulhin, 2001). The most popular current coping mechanisms include constructing a temporary wooden platform called *macha* a few feet above ground, raising the house plinth, elevating a tube well base, selling livestock during the flood, taking out informal loans with high interest rates from local money lenders, and in some severe cases, selling land and property. There is a tendency for affected people to migrate to other areas temporarily or permanently during floods. However, few people in poor communities have enough money to build a *macha,* and Islam (2012), shows that many female-head are forced to seek help from neighbours or to take shelter away from their homes.

Islam (2012), notes that women try to make their houses more resilient to disasters by using locally available resources such as using strong poles and straw, and increasing the height of the foundation of households and the level of cow sheds. Such techniques are also used to protect goats and poultry from flood waters. In flood-prone areas, women often make elevated

[5] As told to the author in interviews with relief workers.

platforms for family members with disabilities, using the *chouki* (traditional bed) made from bamboo and wood (ibid). As mentioned above, there is a widespread fear of sexual abuse of women in flood shelters leasing women to take shelter with unaffected relatives rather than go to an official shelter. The thesis demonstrates that many poor families rely on members leaving the flooded area to find paid work in order to send money home to support the family.

As earlier mentioned, cyclone shelters have been built in many coastal areas and the Bangladesh government has promised to complete 2000 more shelters to cater for the need (GoB, 2010). Each shelter can accommodate anywhere between 500 and 2,500 people (Paul, 2009) but they are not designed for long-term occupation and such shelters do not cater for the needs of women, children, or people with disabilities. Despite the recent construction of more cyclone shelters in coastal Bangladesh, the government is falling behind its target of providing shelter for all people living in cyclone-affected zones (ibid). Furthermore, relief workers report that hasty construction means that many of the shelters have little light, poor sanitation facilities, and often lack adequate water supplies.

The Bangladesh government has a constitutional requirement to protect all citizens including women and children in times of disaster. Frequent cyclones and flooding also mean that many local and international non-government organisations are involved in disaster preparation and recovery and civil society organisations—such as the media and university academics—frequently discuss the challenges International organisations, such as CARE, Islamic Development Bank (IDB), UNICEF World Food Program, World Vision, Catholic Relief Services (CRS), Islamic Relief Worldwide (IRW), Oxfam Australia, Muslim Aid, Association of Social Advancement (ASA), Proshika, and Bangladesh Rural Advancement Committee (BRAC) were especially involved with relief and rehabilitation activities (Sarkar, 2009).

Through increased planning and activity Bangladesh has achieved significant progress in disaster management in the country in recent years. The standing orders on disaster (SOD) of Bangladesh government clearly defines roles and responsibilities in the event of a disaster. However, the legislation is rather vague and clear responsibilities are not codified in law (Bannerman et al., 2011). There are few legal safeguards for disaster-affected people and the delivery of relief aid remains largely uncoordinated (ibid). Disaster management and relief is also rather centralised in Bangladesh and local government authorities lack the capacity to act effectively (ibid). Despite many advancement in disaster management, women sensitive disaster policy is still lacking.

1.1 Disaster vulnerabilities in South Asia

Bangladesh is located in South Asia and is highly susceptible to natural disaster because of its climate and geography. According to the 2011 World Risk Report, countries like Bangladesh, India, Nepal, and Pakistan exhibit a high level of disaster vulnerability because of their hazard exposures and lack of coping capacities. Floods that are triggered by heavy monsoon rainfall commonly cause enormous extensive loss of life and damage to property, crops, and infrastructure (ibid). The 2007 South Asian floods affected a very wide area across India, Nepal, Bhutan, Pakistan, and Bangladesh and resulted in a death toll in excess of 2,000 with a

further 30,000 people seriously affected in some way (South Asian Association for Regional Co-operation (SAARC, 2007). Extensive flooding in the Indus Valley of Pakistan in 2010 resulted in an official death toll of 1,985 and the flood waters lasted for months causing dislocation and loss of livelihoods for millions of people. (Davis, 2014). The frequency of extreme floods is on the rise in Bangladesh, India, and Pakistan (Mirza, 2011).

In Nepal, floods and landslides occur almost every year (Mirza, 2011). Historical data has shown that Nepal witnessed major floods in the Tinao Basin (1978), Koshi River (1980), Tadi River Basin (1985), Sunkoshi Basin (1987), and a devastating cloud burst in the Kulekhani area (1993) which alone claimed the lives of 1,336 people. The 2010 Indus Valley floods in Pakistan were followed by further flooding in 2011. Flooding is the most frequent natural disaster in Sri Lanka with floods commonly associated with two monsoon season per year (Kaklauskas, Amaratunga and Haigh, 2009). Vast expanses of India experience annual flooding with some of the worst examples being the 2005 flooding in Mumbai, the 2008 Kosi flood in Bihar, 2009 floods in South India, and 2010 flash floods in Leh (Ghatak ,Kamal &Mishra, 2012)

The records show that Bangladesh is the most flood prone country in the world. (Dewan, 2015). Furthermore, analysis of historic data shows that the magnitude, intensity, and duration of floods have increased in Bangladesh during the last few decades (Khalequzzaman, 2000). It also appears that most of the flood control embankments experienced breaching since their completion, and are not very effective in reducing the damage to the environment, economy, and property (Khalequzzaman, 2000; Dutta and Herath, 2004; SAARC, 2012). Figure 1.1 shows flood-prone areas of Bangladesh with the location of case study sites for this thesis.

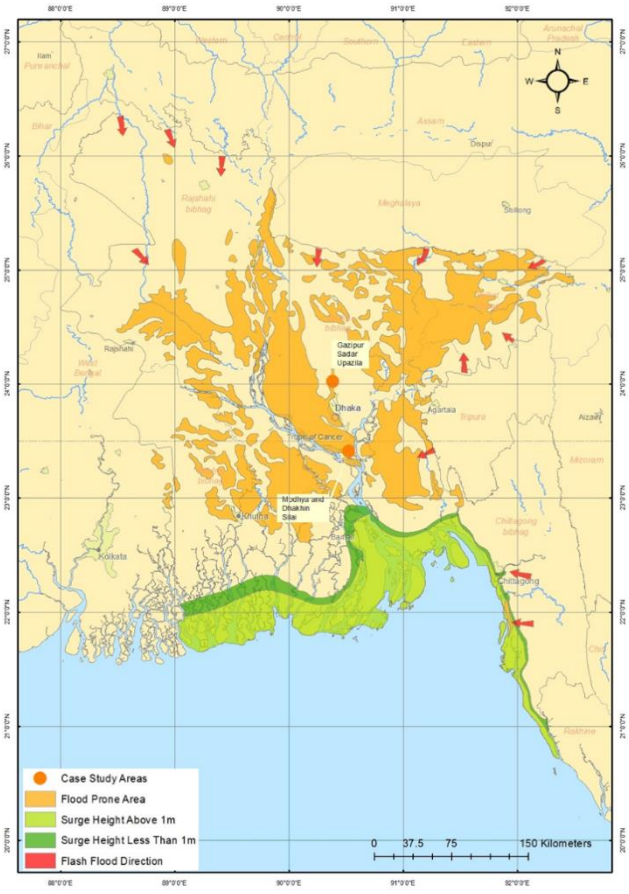


Figure 1.3: Flood-prone areas of Bangladesh with study sites indicated

1.2 Flooding in Bangladesh

Bangladesh accounts for about seven per cent of the catchment area of the three large trans-boundary river systems (the Ganges, Brahmaputra, and Meghna). As all three rivers traverse the country and flow onto very flat land, the annual monsoons in the upper regions result in annual flooding. Given that only 29 per cent of the country's total area is of an acceptably high level, flooding affects most of the country. People have settled in every part of Bangladesh

except in the low marshes and many of these settlements are flood exposed. Tidal flooding occurs annually in heavily populated coastal areas between June and September. Every year, Bangladesh faces a range of flooding events:

- Flash floods that occur during mid-April before the onset of the south-westerly monsoon.

- Rain-fed floods that generally occur in the deltas in the south-western villages in the country and are increasing in low-lying urban areas as well.

- River floods that are the most common with areas along the rivers inundated during monsoon season.

- Storm surge flooding which mostly affects the coastal areas of Bangladesh. Severe cyclones and associated floods can cause great loss of life.

While cyclones are particularly devastating, the major cause of recurrent flooding is rainfall in the river catchments (See Appendix Table 1). Of course, annual flooding helps to enrich cultivable land with alluvial silt, and this explains why people continue to inhabit flood-prone areas. However, the floods take their toll on people, livestock, agricultural activities, and property (Brakenridge, 2012). Silting has also meant that the upper reaches of the rivers can no longer be navigated by boats (Rahaman, 2009). Deforestation in river catchments and frequently unauthorised human modifications of landforms have resulted in more rapid flows of rainfall into the rivers and increased silting (ibid).

The records show that floods have been a persistent danger in Bangladesh. During the 1950s for example, severe flooding occurred successively in 1954, 1955 and 1956, when more than a quarter of the country was inundated (Haque, 1997). The 1988 flood affected about two-thirds of the country while the 1998 flood alone caused 1,100 deaths, rendered 30 million people homeless, damaged 500,000 homes, and caused heavy losses to infrastructure. The 1998 flood lasted for 65 days from July 12 to September 14 and affected about 67 per cent of the country. This devastating flood had an enormous impact on the national economy, in addition to causing hardships for people and disrupting their livelihoods in urban and rural areas. Devastating floods were also frequent through the 1960s and early 1970s, engulfing an area ranging between 35,000 and 52,000 square kilometres as reported by the Department of Disaster Management (http://www.ddm.gov.bd/). Two very exceptional years were 1987 and 1988, when over 40 per cent of the country was devastated by consecutive flooding, causing damage estimated at $US 1.3 billion in a country with an estimated Gross Domestic Product of US$ 21 billion (Haque, 1997; World Bank, 1990). On average, 21 percent of the area of the country (31000 km^2) gets inundated by floods annually (World Bank, 1990). The 1998 flood was the worst on record, engulfing 68 per cent of the country and causing damage estimated at $US 2 billion (Siddique and Chowdhury, 1998). Yet even though flooding is such a regular occurrence in Bangladesh the data on extent and damage is incomplete, inconsistent, and partially misleading (Paul, 1997). Floods are assessed by a number of institutions with different assessment criteria (Chowdhury, 2000).

The particular challenge posed by flooding is that inundation can last for many days or weeks. This means that most modes of transport are paralyzed and communications are often disrupted. The inundation causes serious damage to crops, grain stores, and houses and other buildings, roads, and other infrastructure and it results in significant losses of livestock and domestic animals. It is hard to deliver relief aid to people surrounded by flood water and people often go without enough food or drinking water for days at a time. People often remain marooned in flood waters without enough food and drinking water until relief arrives.

Prolonged flooding disrupts the normal functions of daily life and the lack of clean water and adequate sanitation pose many health risks to affected communities. Water-borne diseases proliferate and flood-affected communities often experience poor nutrition and health (Balgos, Gaillard, & Sanz, 2012).

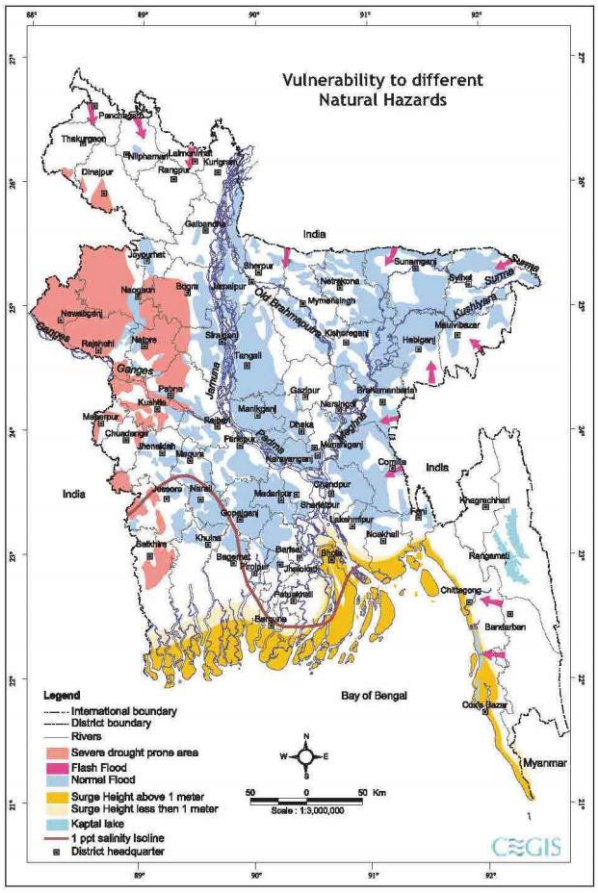


Figure 1.4: Vulnerability to Different Natural Hazards

(Source: Centre for Environment and Geographic Information Services, Bangladesh Climate Change Strategy and Action Plan 2008, page 5.)

1.3 Flood Management strategies

Traditional approaches to flood control have relied on structural works, including beams, flood walls, levees, or modifications to river channels (e.g. widening, lining with concrete, or straightening). These structural approaches have failed to significantly reduce flooding or reduce ever-increasing economic losses from floods (Mileti, 1999). Embankments further complicate the situation by causing siltation of the river channel and the resultant lowering of its carrying capacity, drainage congestion and water-logging, as evidenced in the Brahmaputra River basin (Gupta, 2005). Furthermore, structural approaches often eliminate wetlands and animal habitats and can cause a host of unforeseen ecological impacts (Burby et al., 1988). Moreover, structural approaches that simply divert water flows can lead to water stagnation and pollution of water supplies to human settlements (Gupta, 2005).

After the disastrous floods of 1987 and 1988, the Bangladesh government introduced many changes to flood management strategies. This included the decision to only build flood diversion structures of strategic importance above the 'once in 100 years' flood levels. The government also decided to construct school building in flood-prone areas with the assumption that they could serve as temporary flood shelters and new standards were adopted for building flood-resistant highways. The government also promised to stop further encroachments on the

flood plains and passed legislation controlling new developments in the flood plains and wetlands. However, the legislation did not stop encroachments onto flood plains and a strong citizens' movement is encouraging the government to do more to implement its laws in and around the capital city Dhaka.

Timely flood forecasting and warnings have been a key part of government strategies to reduce flood impacts and human suffering. This is considered to be a very cost-effective way to reduce flood impacts and a Flood Forecasting and Warning Centre (FFWC) was first established in 1972 under the administrative control of the Bangladesh Water Development Board (BWBD). Over the years, the system of flood forecasting and warning has improved substantially. Soon after the catastrophic floods of 1987 and 1988, flood control activities became a central part of government business. This resulted in the adoption of a Flood Action Plan (FAP) with 26 component strategies (Chowdhury, 2000), incorporating both structural and non-structural measures. Flood warning was strategy 10 (FAP 10) and the FFWC was asked to radically improve its forecasting capacity. This involved the use of new technologies to monitor water levels in all major rivers. However, this thesis will demonstrate that the flood information is not reaching the most vulnerable people in time to make a difference. Furthermore, it is not specific enough to know how floods will emerge locally.

The Flood Action Plan has attracted funding from 17 international donor agencies and it started with a budget of $US 10 million for the period from 1990 to 1995 (Beck, 2005). However, despite persistent criticism of past flood mitigation strategies, most of this funding has been spent on engineering works to build embankments and levees and on further investments in the FFWC (ibid).

The government is slowly putting more emphasis on non-structural responses to flooding. It has abandoned plans to make areas flood free and instead it is emphasising a need for engaging with various stakeholders to better manage flooding. This has led to a pilot project called the Compartmental Pilot Project (CPP), Tangail (year?). The project works with detailed land topography and 'micro-hydrological zoning' data in order to fine-tune flood mitigation and adaptation strategies and Water User Groups (WUG) have been established to develop shared responsibilities. In this pilot project, flooding is allowed within each local unit as decided by the stakeholders in the WUG. If the pilot project is successful, the approach will be adopted nationally.

1.4 Women as Victim of Flood vulnerabilities

Researchers have long demonstrated that natural disasters have particularly bad consequences for economically poor communities in general and women & children in particular (e.g. Blaikie, Cannon, Davis, & Wisner, 1994; Anderson, 2009; Vatsa and Krimgold, 2000; Fothergill and Peek, 2004). The consequences are particularly severe when it endures prolonged flooding (ibid). The inequitable effects of flood impacts can, in turn, undermine wider sustainable development aims because the gap between the rich and poor has widened (Bangladesh Water Development Board, 2014). However, although the floods affect poor communities as a whole, the severity of impact varies according to economic status of each

household as well as age of household members, marital status of women, the number of dependent women and children. While it is generally true that people with more economic resources will cope better than those with few such resources, the structure and functioning of each household and its potential support networks can offset simple measures of economic wealth. Furthermore, people with very different economic status can live in the same community.

Rather than treat poor communities as homogeneous entities, it is important to focus on households and particular enterprises in order to have a more nuanced, bottom-up understanding of how a particular community operates. At the same time, it is important to remember that women have particular vulnerabilities and needs which may relate more to social and cultural factors than simply economic status (Dastidar 2007; Garcia 2007).

Women in rural Bangladesh tend to work as subsistence farmers, often operating on less productive land such as steep hills or river banks that are prone to erosion (Chaudhury, 2008). Hence they often live and work in areas that are particular flood prone and Aguilera et al. (2009) note that they often lack resources to move to higher ground after the flood waters rise. Yet, as Gokhale, Dumesic, & Mavrikakis, (2008) argues, their very vulnerability can mean that women can emerge as community leaders in times of crisis. Women may be more aware of the need to secure food, water and fuel in times of flooding and Bosher et al., (2007) has pointed to examples of women participating in informal community disaster preparation work even if they are largely excluded from more formal disaster management forums.

It is important to think of women as potential agents for disaster mitigation and adaptation rather than passive victims of natural disasters. The efforts that women make to pool their resources, support each other, and care collectively for children and the frail are largely unacknowledged (Bosher et al., 2007; Gokhale et al., 2008). Furthermore, in rural areas when men are not able to participate in paid agricultural work because of flooding, women can often continue to look after poultry and goats and sell some accumulated assets to sustain their households. Women often manage household budgets and can make and sell food and handicrafts or obtain low-interest loans. Women often do more to sustain flood-affected households than men. Exploring the women specific issues and needs will certainly improve the effective disaster management policy,

1.5 Multiplication of agencies involved in disaster relief and recovery

Beside the Government of Bangladesh and international agencies such as UNICEF, Red Cross and Red Crescent, a vast array of local NGOs operates all over Bangladesh. Many of these agencies work in disaster relief for both natural and human-induced disasters. However, relief workers report that there is little co-ordination of the efforts of so many agencies[6].

There are four high-profile bodies that have responsibility for emergency work and disaster management: the National Disaster Management Council (NDMC), headed by the Prime

[6] According to interviews conducted by the author.

Minister; the Inter-Ministerial Disaster Management Coordination Committee (IMDMCC), led by the Minister of Food and Disaster Management; the National Disaster Management Advisory Committee (NDMAC), headed by a specialist nominated by the Prime Minister; and a Parliamentary Standing Committee on Disaster Management to supervise national policies and programs. They share the aim of providing coherent policies and the macro-coordination of activities, particularly relief and rehabilitation (Haque & Uddin, 2013). However, the fact that there are four such bodies makes the task more difficult.

In the areas of both cyclone and flood hazards, the Bangladesh Red Crescent Society (BRCS) and various donor agencies also play nationally important roles. The Cyclone Preparedness Program (CPP) was established in 1972 following the devastating cyclone of 1970, under an agreement between the BRCS and the Government of Bangladesh, with an aim to undertake effective cyclone preparedness measures in coastal areas. Under the supervision of BRCS, the CPP has a joint management structure, with two committees, comprising a seven-member Policy Committee headed by the Minister of MoFDM, and a 15-member Implementation Board led by the Secretary of the MoFDM. The CPP has about 33,120 trained volunteers, including 5,520 women (Haque, 2013).

The Disaster Management Bureau (DMB) has been assigned the role of coordinating the activities of NGOs. Some NGOs which began in Bangladesh—including the Grameen Bank and Bangladesh Rural Advancement Committee (BRAC)—have received international acclaim and many of them operate internationally (www.odi.org/resources/). NGOs and community-based organisations (CBOs) are actively involved in disaster mitigation and relief, micro-credit delivery, micro-credits, family planning, and protection of human rights. About a quarter of foreign assistance to Bangladesh is channelled through NGOs. They include CARE-Bangladesh, OXFAM-Bangladesh, Action Aid, Intermediate Technology Development Group-Bangladesh, Bangladesh Disaster Preparedness Centre (BDPC) and Disaster Forum. While many of them are involved in public education and disaster prevention they are all involved in emergency relief and rehabilitation (MoFDM 2005). While the proliferation of agencies has been welcomed, widespread concern has been expressed about the lack of co-ordination (Ahmed et al., 2012).

1.6 Research Gap and Focus of the thesis

Several studies have been conducted on the topic on disaster management and gender. However, none of these researchers have used comprehensive investigation about the appropriateness of the merits of the entitlements-based understanding of vulnerabilities, the sustainable livelihoods approach to disaster management, the importance of supporting existing coping mechanisms, and the need for a nuanced and context-sensitive understanding of the needs of women in relation to flooding disasters. This study will extend the empirical research literature on vulnerabilities and coping mechanisms for women living in poor flood-

prone communities in Bangladesh.

Fothergill and Peek (2004) have noted that the term "coping mechanisms" is used rather loosely and uncritically in disaster management literature. More empirical work is needed, they argued, on the effectiveness of particular survival strategies, especially those practiced by women.

Arguably, the suggestion that poor communities have their own coping mechanisms could encourage complacency on the part of disaster relief agencies. As Fothergill and Peeke (ibid) noted, it is more likely that the coping mechanisms of the poor have limited effectiveness.

The broad rationale for the focus of this study is as follows:

a) A very small number of previous studies have identified the commonalities and difference in the flood vulnerability and coping mechanisms of women in rural and urban settings in Bangladesh.

b) The findings of such a study could help aid agencies to better target their assistance to women in such communities.

c) The findings can be used to test the ability of national disaster management policies and strategies to respond to local contexts and complexities.

The study focuses on the vulnerabilities of women living in poor urban and rural communities in Bangladesh during and after regular flooding events. The term 'disaster resilience' is becoming increasingly popular in disaster management literature (Bach, 2015). However, the meaning of word 'resilience' is being contested (Davoudi, & Porter, 2012). The term 'coping mechanisms' is preferred to the term 'resilience'.

The thesis makes regular use of the term 'poor communities' and it is noted that the words "poor" and "poverty' have many different interpretations. If the World Bank "poverty line" of $US 2/per day in income is used, it is estimated that 26 per cent of people in Bangladesh fall below that line (UN, 2010). However, the World Bank itself notes that this is only one way among many of defining poverty and has offered a much broader "definition" of poverty in the following:

> *Poverty is hunger. Poverty is lack of shelter. Poverty is being sick and not being able to see a doctor. Poverty is not having access to school and not knowing how to read. Poverty is not having a job, is fear for the future, living one day at a time. Poverty has many faces, changing from place to place and across time, and has been described in many ways. Most often, poverty is a situation people want to escape. So poverty is a call to action -- for the poor and the wealthy alike -- a call to change the world so that many more may have enough to eat, adequate shelter, access to education and health, protection from violence, and a voice in what happens in their communities* (The World Bank, 2009).

Following this, the Government of Bangladesh also defines "poverty" in very broad terms:

> *Poverty is a broad front. It is about income levels. It is about food security. It is about quality of life. It is about asset bases. It is about human resource capacities. It is about vulnerabilities and coping. It is about gender inequalities. It is about human security. It is about initiative horizons. It is each of these and all of these together* (GoB 2004, p. 13).

Gender inequality is included in this definition because all surveys show that women have much lower incomes than men. However, they also face greater social isolation and Kabeer (1994) notes that the practice of *purdah* (Islamic female isolation) creates a form of poverty not related to incomes.

There is a large body of literature on the "coping mechanisms" of poor people and poor communities (see, for example, Pelling 1999; Sufiyan 2014). Not all of this is focused on the impacts of natural disasters, however Sufiyan (2014) has noted that the concept of "coping mechanisms" is commonly associated with disaster vulnerabilities and many NGOs try to work with poor communities to enhance coping strategies.

Anderson and Woodrow (1998) explained that many NGOs began working in the late 1980s to identify capacities that already exist within particular communities to cope with natural disasters. Pelling (1999) used the term 'adaptive capacity' for a similar purpose, writing that:

> *Vulnerability has three components: exposure, resilience and resistance. These components are simultaneously the products of political and socio-economic structures and the capacity of individual actors and social institutions to adapt to hazard stress [ibid, p. 250]*.

1.7 Research Aim, Objectives and Research Questions

The overall aim of this research is to contribute to a gender sensitive policy framework that takes into consideration women's specific issues and vulnerability. The central concern that emerges from this is namely, to investigate the challenges that women face during flooding events and the effectiveness of disaster relief and recovery work of government and non-government agencies and reflect on their disaster relief policies and its implications. These concerns can be seen as objectives to guide the thesis as follows:

1. To determine what disaster management policies are in place currently to support the affected and vulnerable communities;
2. To examine how disaster relief is distributed to all affected communities during major flooding and to explore if rural women are more disadvantage than urban women when it comes to distributing disaster management relief;
3. To explore if gender bias is present in current natural disaster management processes;
4. To identify the response, relief, and recovery strategies that could best enhance the coping mechanisms of the affected women.

These objectives drives the following research questions:

1. What preparation and coping mechanisms are currently in place for women to provide immediate relief from the natural disaster?

2. What are the differences of vulnerabilities for women between rural and urban areas during the natural disaster management?

3. To what extent does gender bias exist during natural disaster management in Bangladesh?

4) How is disaster relief provided to affected communities?

1.8 The Research Method

The above-mentioned research questions will be investigated primarily by using qualitative methodology using case studies following the approach of Eisenhardt (1989), Miles and Huberman (1994), Strauss and Corbin (1998), and Yin (1994). Quantitative methodology will be used largely for demographic and economic (agricultural activities) data collection.

The central aim of this research is to contribute to a gender sensitive policy framework that takes women's specific issues and vulnerability into consideration. As such, this study is exploratory in nature where the lived experience of the participants is documented as a case study (Patton, 2002; Yin 1994). Case study enables researchers to deeply explore programs, events, activities, processes, and individuals (Creswell, 2003; Strauss and Corbin (1998). Therefore, the application of multiple case studies as the method is useful when confronted with insufficient theoretical backgrounds which is the case in this study. That is to say that this study is not based on a particular theory rather the previous theories will enable to better understand the field of study and develop more appropriate ways to explore for further development of empirical knowledge in this field and contribute to existing knowledge.

1.9 Contribution of the Study

The overall contribution of this thesis relates to the potential theoretical and practical implications to the study of gender sensitive policies affecting victims of disaster and its management. Several studies have been conducted on the topic on disaster management and gender. However, none of these researchers have used comprehensive investigation about the appropriateness of the merits of the entitlements-based understanding of vulnerabilities, the sustainable livelihoods approach to disaster management, the importance of supporting existing coping mechanisms, and the need for a nuanced and context-sensitive understanding of the needs of women in relation to flooding disasters. More specifically, this thesis makes

three key contributions. The first is the contribution to our understanding of socio-cultural factors related to disaster vulnerability and theory development relating to gender integration in disaster management - an area that has not been extensively investigated before. Second, it aims to contribute to better approaches of managing the nation's floodplains, revisiting national policies, and makes suggestions to the existing programs and policies (for instance, Bangladesh floods and mitigation policies). These contributions in policies may transform or mitigate the occurrences of flood, which causes widespread devastation, economic damages and loss of human lives every year in the vulnerable communities. Third, the findings of the thesis will have implications for other flood-prone countries in the South Asia region where similar social and cultural factors are in play at a time when climate change impacts are increasing the frequency and intensity of flooding events. Specifically, it will contribute towards to global communities and the non-governmental organizations by providing better understanding of women's specific needs during disaster management to elevate women from dire poverty.

Outline of the Thesis

The thesis consists of eight chapters. Chapter 2 reviews the literature that relates to the core of this study. Chapter 3, discuss the methodological issues and justifies the case study approach and explains the research design and data analysis. Chapters 4, 5 and 6 discusses the key findings. Chapter 7 discusses the implications of the findings and relates to the national disaster management policy of Bangladesh. Chapter 8 examines the overall findings and its implications and draws conclusions as well as suggests future research.

CHAPTER TWO: LITERATURE REVIEW

2.0 INTRODUCTION

In pursuing the research questions listed in chapter 1, this chapter reviews the literature on: the impact of disasters on women, especially in South Asia; the vulnerabilities of women in relation to "natural" disasters; the impacts of disasters on poor communities, especially in South Asia; disaster coping mechanisms of the poor, and of women within poor communities; specific challenges posed by flooding; and the potential role for women in disaster management. In order to set the context for the study in Bangladesh the review focuses on literature related to South Asia or underdeveloped nations more broadly.

2.1 The impacts of disasters on women

In recent years, a wide range of studies have focused on how differently men and women are affected by, and respond to, during disasters (e.g. Ikeda, 2009; Gell, 2010; Horton, 2012). For a start it has been observed that disaster fatalities are seldom gender neutral (Neumayer and Plümper, 2007; Enarson and Chakrabarti, 2009), and survival rates of women are much lower than men in the wake of disasters (Guha-Sapir, van Panhuis and Lagoutte, 2007; Basher, 2008; Eiinder and Erixson, 2012). Based on a sample of 141 countries over the period from 1981 to 2002, Neumayer and Plümper (2007) found that natural disasters lower the life expectancy of women more than that of men, which means that, on average, natural disasters and their consequences kill more women than men or kill women at an earlier age than men.

Many of these studies have also suggested that the disaster-related gender gap in life expectancy is negatively connected to the socio-economic status of women (Neumayer, & Plümper, 2007). In other words, the female mortality rate is higher in disasters not because women are physically weaker, but because of male-dominated social structure, underpinned by cultural traditions (Begum, 1993; Lewis, 2006; Norris et al., 2005; Rashid and Michaud, 2000). The expectation that a woman will look after the children and the elderly can make it harder for her to save her own life (Begum, 1993; Kotze, 1996). This suggests that everyday social and cultural practices result in higher disaster-related female mortality (Neumayer and Plümper, 2007).

Women are among the most vulnerable population groups because they are poorer, on average, than men; generally have less access to, or control over, resources; and are restricted in what their independence and agency by a wide range of laws and cultural (Cambron, Acitelli and Pettit, 2009; Cannon, 2002; Covan and Fugate-Whitlock, 2010; Kotze, 1996; Wisner and Luce, 1993). Poverty leaves people more vulnerable to disaster and poverty for women is amplified by ideologies about gender (Seager, 2005, 2006; Jones-Deweever and Hartmann, 2006; Saroor, 2010). Poor women can rarely afford quality housing located in areas with limited hazard exposure, and adequate supplies of food to cope with disaster-related disruptions (Cannon, 2002). A poor woman might die or be injured in a disaster because she lives in a flimsy shack located in a dangerous place but also because she lacks food for family and herself and cannot find paid work (Rigg et al, 2008). Unless poverty traps for women are dismantled the predicted

increase in the intensity and frequency of natural disasters associated with global climate change will have particularly disastrous consequences for women (Cannon, 2002; Reed and Christie, 2009).

Studies have also shown that female-headed households are more likely to have inadequate preparation for a disaster and are likely to need greater assistance after a disaster (e.g. Zottarelli, 2008). In female-headed households, the ability of women to create safe conditions in the face of impending floods or hurricanes is greatly reduced when they lack reliable incomes and other resources (Cannon, 2002; Waite, 2000). It has been argued that female-headed households are vulnerable to disasters not because the disasters discriminate or even because relief aid is inadequate but because of gendered divisions of labour (Takasaki, 2012).

In general women are responsible for a larger share of domestic and child rearing work than men and they are also likely to have a greater emotional attachment to their home than men (Aksaray et al, 2006; Samuels, 2012). Studies have shown that, in the wake of disasters, women tend to take responsibility for the wellbeing of children and other family members before they seek relief aid and they rarely request assistance with their domestic or childcare work even when this work has been made more difficult by disaster impacts (Rao, 2006; Steckley and Doberstein, 2011). The variety of roles that women are expected to play in reproduction, production and community care, combined with cultural perceptions of how they should play such roles, makes it very hard for them to deal with disaster (Cupples, 2007; Kotze, 1996; Stehlik et al., 2000). Preparations for disasters, and activities in the aftermath, are clearly organised along gender lines where males are viewed as the major protectors and providers and are expected to play a bigger role outside the home (Always and Smith, 1998; Peak and Fothergill, 2008; Samuels, 2012). By contrast, women tend to be seen as nurturers and comforters with primary responsibilities within the home where they carry the burden of both physical and emotional work (ibid). One study has suggested that the stress of their post-disaster emotional responsibilities has led to increased use of alcohol, tobacco, and illicit drugs by some women (Cepeda et al, 2010).

Some researchers have linked the post-disaster health and safety issues faced by women and girls to their lack of social power (e.g. Callaghan et al., 2007; Harville, Xu, and Buekens, 2009). It has been noted that their relative lack of social power makes women more sensitive to the dangers posed by natural disasters (Ripley, 2009) and that they are more likely than men to respond to calls for evacuation (Brezina, 2008; Brown et al., 2010; Covan and Fugate-Whitlock, 2010).

2.1.1 Death and injury

It is widely reported that women and children are more likely than men to be killed or suffer injuries in a natural disaster although Mazurana et al (2011) have noted that data which is disaggregated by gender is rarely made available. Global Facility for Disaster Reduction and Recovery (GFDRR) data suggests that women accounted for 61 per cent of fatalities in Burma as a result of Hurricane Nargis in 2008, and 67 per cent of fatalities in the 2004 tsunami Indian Ocean disaster in Banda Aceh in Indonesia. For Bangladesh, it has been estimated that women accounted for a staggering 90 per cent of deaths in the 1991 cyclone disaster which killed

140,000 people (Ikeda, 1995, cited by IUCN, 2004).

A number of factors have been suggested for the higher rates of disaster-related mortality and injury for women, including the fact that they frequently have to look after dependent children; may be expected to wear clothing that hinders mobility; and may be physically weaker than men due to underlying health problems (including malnutrition) (Oxfam, 2012). In some cultures, women are also expected wear long hair and may be expected to be accompanied a male family member when outside the homes. They may be discouraged, or certainly not encouraged, from participating in physical activities that could save their lives in a disaster, such as swimming or climbing (Chowdhury et al., 1993; Oxfam, 2005; Women's Environment and Development Organization (WEDO), 2008). In other words, the key constraints are more likely to be social and cultural rather than biological. This is confirmed by the observation that more men than women died in the Hurricane Mitch disaster in Central America in 1998 because their work practices made them more exposed (Gomáriz, 1999).

Ironically, concerns over safety may also be a contributing factor in Bangladesh because cyclone shelters, where there is little privacy, may be considered unsafe environments for girls, in particular, and they may instead be left in more precarious situations at home (Plan, 2011). While much of the literature on disaster mortality and injury focuses on abrupt disasters, Sen (1990) has noted that women tend to die more frequently in slow-onset disasters such as droughts because they are more likely to go without food.

2.1.2 Post-disaster migration

It has long been noted that after big disasters some members of a poor household have to leave home to seek paid work. Following Hurricane Mitch, large-scale migration of male heads of households was reported (Delaney and Shrader, 2000) with the men hoping to find employment and send remittances back to their families. According to Fordham (2006), there is little information on what this kind of migration means for the women who stay at home. They may be left waiting for money that never arrives, if the men decide to start a new life elsewhere, and this may be compounded by the fact that some households sell their assets to finance the journey of the men. On the other hand, Fordham suggests that the departure of the men may allow the women to seek work outside the home and he suggests that women in Muzzaffarabad, Pakistan, felt they had more freedom when the men left.

It has long been the case that women sometimes migrate after a disaster as Bradshaw (2001) noted that women also left home after the Hurricane Mitch disaster in Nicaragua to seek work in the 'service sector', leaving adolescent girls responsible for the care of younger siblings. It has become much more common in recent decades for women in the Indian sub-continent to leave home seeking work in the Middle East (DFID,2007) and women in Bangladesh leave rural areas to get work in the city-based garment industry (Ali, Begum, Salehin, & Farid, 2008).

2.2 The impacts of disasters on poor communities

A number of studies have demonstrated that floods, earthquakes, volcanoes, hurricanes,

droughts, and similar disasters seriously interrupt economic activity by disrupting transportation, affecting manufacturing, reducing agricultural production, creating shortages in raw materials, deterring external investment, and channelling public and private sector resources into reconstruction (Asef, 2008; Bankoff, 1999; Chee-Kien and Pieris, 2011). Furthermore, post-disaster recovery funding is raised through taxation and private donations and this can also be an economic deterrent (Penning-Rowsell and Wilson, 2006; Pompei, 2008). Many disasters also destroy 'natural' and physical capital on which people rely for their livelihoods (Ibarrarán, Ruth, Ahmad and London, 2009). A major disaster can directly affect the local economy, but the effects can reverberate more widely (Asef, 2008; Bergholt and Lujala, 2012; Parker, 2011). Impacts can be felt at city and national levels (Sanderson, 2000; Syroka and Wilcox, 2006). The destruction of major infrastructure incurs both direct and indirect costs to national economies (Hill, Wiener and Warner, 2012; Inyang, 2009; Sims, 2007); with indirect costs often being the most significant (Tirasirichai and Enke, 2007). Natural disasters can have negative impacts on a national tourism industry (Calgaro and Lloyd, 2008; Robinson and Jarvie, 2008; Trivedi, 2009). Furthermore, a combination of disasters can compound the impacts; for example, Bangladesh experienced two floods and a cyclone in a single year (2007) and it has been estimated that the total economic losses amounted to about US$3 billion (Menon, 2012).

Of course, major disasters result in property loss or damage for many (Delorme, Zinkhan and Hagen, 2004). However, poor people are often most exposed to disaster impacts and they lack economic resources/assets to recover from the impacts (Delorme et al., 2004; Kahn, 2005). They can least afford the costs associated with repair, reconstruction of relocation (Masozera et al., 2007). Furthermore, if recovery is financed through direct taxation, poor people may be effectively paying for the recovery of richer compatriots (Ermolieva and Sergienko, 2008). Following the Hurricane Katrina disaster in the US in 2005, for example, government loans favoured wealthy neighbourhoods over poorer ones (Masozera et al., 2007). A number of scholars have argued that anticipated increases in the frequency and intensity of natural disasters threaten to plunge poor communities into even deeper poverty (Ibarrarán et al., 2009; Naswa and Garg, 2011).

It has been noted that natural disasters can also stimulate economic growth, especially when post-disaster recovery is at least partially funded by external sources. Several researchers have argued that disasters provide opportunities to update capital stock and adopt new technologies (Agrawal, 2011; Cuaresma, Hlouskova, and Obersteiner, 2008; Davies, 2010). This has been seen as a beneficial outcome of 'border crossing' and 'interconnectedness' (Nitagai, 2012; Skidmore and Toya, 2002); however such benefits may flow predominantly to the better resourced and connected people and communities in a disaster-affected area. As Arnold (2006) noted economic gains and losses need to be analysed at a household level while Hallegatte and Dumas (2009) have argued that it is never possible to turn a disaster into a clear economic positive. Even if there are 'macro-economic' gains in effective disaster recovery a wide range of researchers have noted that few of the benefits reach the (Cardona et al., 2010; de Waal, 2004; Ibarrarán et al., 2009; Jacob et al., 2008; Kaur, 2006).

Natural disasters tend to have particularly negative impacts on agriculture and the impacts can

be enduring (Navrud, Aaring, Le, Tran Huu and Bui Duc, 2012). While such impacts are bad for those who own farmland they can be even worse for farm workers (Mainville, 2003; Steege et al., 2009). The negative impacts can be enduring for agricultural regions (Kaur, 2006). Small businesses are also highly vulnerable to disaster impacts especially in socio-economically distressed neighbourhoods (Corey and Deitch, 2011; Krantz, 2010; Yang, Lindell and Prater, 2009). Businesses are more likely to relocate when they have operated from rented (Wasileski et al., 2011).

2.3 Shifting the focus to vulnerabilities

Many researchers have highlighted the need to focus on the disaster vulnerabilities of poor communities (e.g. Sufiyan, 2014) with vulnerability. The term vulnerability is defined as 'the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard' (Wisner, 2004). This is not a new concern because the point was being made in the late 1980s (e.g. Anderson and Woodrow, 1991 and in 1999 Mark Pelling 'Vulnerability has three components: exposure, resilience and resistance. These components are simultaneously the products of political and socio-economic structures and the capacity of individual actors and social institutions to adapt to hazard stress.' (p. 250). The focus on reducing disaster vulnerabilities has flowed into more recent literature on disaster 'resilience' (e.g. Adger, Arnell, and Tompkins, 2005). According to Adger, Arnell and Tompkins (ibid), disaster resilience involves both long-term investments in efforts to raise the general living standards of poor communities and more specific attention to their exposure to potential disasters. Other disaster management scholars have drawn a distinction between 'social resilience' and 'economic resilience' (e.g. Mannke, 2011).

For this study the concept of resilience seems too far-reaching to focus on the disaster vulnerability of poor women in Bangladesh and the pre-existing focus on the 'coping mechanisms' of the poor has been preferred (see below).

While many scholars have stressed the need to focus on the disaster vulnerabilities of poor communities, others have made the point that 'developing nations' often lack the resources to address such vulnerabilities (e.g. Fothergill and Peek, 2004). Such nations commonly have to address a host of other poverty-related challenges which can increase disaster vulnerability, such as high levels of unemployment, population growth, chronic lack of basic services for the poor, and a lack of local and national institutions with a capacity to address such problems (Smith, 1996; UNISDR, 2002; Anderson, 2000; Vatsa and Krimgold, 2000).

2.3.1 Particular forms of hazard and disaster exposure

A huge number of studies have not demonstrated that poor people are particularly exposed to natural disasters and extreme weather events (e.g. Flint and Luloff, 2005; McMahon, 2007; Ali and Talukder, 2010; Doherty and Clayton, 2011; Kim, 2012). This is often because they are forced to live in hazardous locations, such as coastal areas or on steep land, but it is also because they lack the resources to minimise disaster impacts on their dwellings or neighbourhoods or prepare for post-disaster recovery (Shaw and Goda 2004; Metz and Nieves, 2005; Iuchi and

Esnard, 2008; Norris et al., 2008; Smith, 2012; Allison, 2012). They are more likely to experience stress, anxiety, isolation, disruption, displacement, depression, and feelings of powerlessness (Edwards, 1998). While many of these studies have relied on qualitative data and sometimes anecdotal evidence, a number of scholars have noted a correlation between disaster impacts and income levels (Forgette, King and Dettrey, 2008; Zahran et al., 2008) while other studies have noted that disaster-related morbidity and mortality is generally higher for poor communities (Kaur, 2006; Margaret McMahon, 2007; Pradhan et al., 2007; Donner, 2007; Zahran et al., 2008; Rubin and Rossing, 2012). It has been noted that poverty increases disaster vulnerability while natural disasters often increase the number of people in poverty (Norris, Baker, Murphy and Kaniasty, 2005). However, Fothergill (2003) has noted a tendency for non-poor people to blame the poor themselves for having high levels of disaster exposure.

Several studies have demonstrated that pre-existing socio-economic conditions play a huge role in determining the capacity for a particular economic class to respond immediately to a disaster and to move towards long-term recovery (Fradin and Fradin, 2010; Levitt and Whitaker, 2009; Masozera, Bailey and Kerchner, 2007). The poorest of the poor have less insurance coverage, fewer possessions to liquidate, more problems securing loans, and greater dependency on labour migration (Zamani, Gorgievski-Duijvesteijn and Zarafshani, 2006).

2.3.2 Vulnerability of women and children

A range of scholars have noted that the literature on disaster impacts and vulnerabilities has been largely gender blind (e.g Basher, 2008; Cupples, 2007; Enarson & Meyreles, 2004; Seager, 2005). In recent years, the neglect has been addressed (e.g. Cupples, 2007; Ginige, Amaratunga and Haigh, 2009; Ikeda, 2009; Oxfam, 2010; Horton, 2012). Researchers were rather slow to note that disaster fatalities are seldom gender neutral (Neumayer and Plümper, 2007; Enarson and Chakrabarti, 2009) and that post-disaster survival rates are also much lower for women than men (Guha-Sapir, van Panhuis and Lagoutte, 2007; Basher, 2008; Eiinder and Erixson, 2012).

Most of these studies have noted that the particular impact of disasters on women exacerbated by their socio-economic status. It has also been argued that high female mortality rates in disasters are not caused by women being physically weaker, but because of male-dominated social structures and cultural traditions that have limited their ability to protect themselves (Begum, 1993; Edwards, 2009; Lewis, 2006; Norris et al., 2005; Rashid and Michaud, 2000). For example, the expectation that women will care for children and the elderly commonly means that they will put their own lives at risk in order to save others (Begum, 1993; Kotze, 1996).

Recent studies have also begun to focus on the disaster vulnerability of children because of their physiological, psychosocial, and cognitive differences from adults (Belfer, 2006; Guha-Sapir et al., 2007; Javaid, Arshad and Khalid, 2011; Murray and Monteiro, 2012). Young children often lack the ability to understand what is happening when a disaster hits and they can be deeply traumatised by the death or injury to parents, the loss of other loved ones, disruptions to normal routines, frightening images in the media (Balaban, 2006; Belfer, 2006; Steckley and Doverstein, 2011). Children have unique needs (Belfer, 2006) and disasters

disrupt some of their most basic needs, including the need to feel safe (Javaid et al., 2011), and some studies have noted that disaster trigger an increased incidence of certain acute illnesses, such as diarrhoea, fever, and acute respiratory illness in children under the age of five (Demir et al., 2010; McLaughlin et al., 2009; Osofsky, 2008). Datar, Liu, Linnemayr, and Stecher (2013). Disaster vulnerability is compounded by combinations of age, sex and class so young girls in poor communities commonly have high levels of vulnerability (Pradhan et al., 2007; Wisner and Luce, 1993). Children with disabilities and special health care needs are also highly vulnerable and this too is exacerbated by poverty (Baker, Baker and Flagg, 2012; Berry et al., 2011; Peek and Stough, 2010).

Disaster-related anxiety disorders are common amongst young children (Bhushan and Kumar, 2007; Guha-Sapir et al., 2007) but they can are difficult to address when normal life is disrupted. Commonly observed anxiety disorders include separation problems, sleep difficulties, re-enactment of the trauma in play, irritability, survival guilt, deterioration in academic performance, and anxiety of recurrence of the trauma (Barrett, Ausbrooks, & Martinez-Cosio, 2012; Kronenberg et al., 2010; Soeteman et al., 2008; Jones et al., 2009; Şahin, Batıgün and Yılmaz, 2007; Zubenko and Capozzoli, 2002). All of this puts extra pressure on the women who have primary responsibility for their care and wellbeing. Parents have extra responsibility in looking after traumatised children (Peek and Fothergill, 2008) yet they need to remain calm because children acquire a sense of safety from the cues perceived from the adults of their family (Madrid and Grant, 2008).

In disaster situations, children can easily become separated from their families and if they are alone in disaster shelters there can be risks of physical and sexual abuse or even abduction (Javaid et al., 2011; Ritchie, Watson and Friedman, 2006). Some poor households send traumatised children out to work (Vásquez and Bohara, 2010). Of course, children react to trauma in different ways (Aptekar and Boore, 1990; Brown, Mistry and Bigler, 2007). However, the impacts of disasters on children increase the disaster burden of poor women.

2.3.3 Triggering hazards and multiple vulnerabilities

As demonstrated above, many studies have linked disaster vulnerabilities to categories of age, class, ethnicity, gender and physical or mental disability. Yet these categories can interact with each other in complex ways and responses can also vary enormously.

Norris et al. (2008) have noted that local communities exist in an interaction of built, natural, social, and economic environments which can all be disrupted in the event of a disaster. Literature on disaster resilience (e.g. Clements, 2009) emphasises the possibility of ‘bouncing back’ after such disruptions but the capacity to bounce back is related to access to recovery resources (Paton et al., 2001). Resilience is not a very useful concept for communities which lack the capacity to address pre-existing vulnerabilities (Jha et al., 2011).

Within vulnerable communities there will be groups or individuals who have capacity to cope (Gingie et al., 2010). Bull-Kamanga (2003) has pointed to a combination of poverty and lack of political influence for understanding differential disaster impacts. However, vulnerabilities at a local level are influenced by forms of vulnerability at regional or national levels so the

causal factors are complex and multi-faceted.

Extreme weather events become social disasters when there is a combination of triggering hazards and vulnerabilities in place. An increase in disasters is either dependent on an increase of hazards or on the vulnerabilities of communities or individuals (Jha et al., 2011). By reducing vulnerabilities, communities can become more resilient (Vlahov et al., 2010). However, in many societies women have little or no say in policies or practices that may reduce vulnerabilities and the emphasis on disaster preparation can favour men over women (Enarson et al., 1998).

In rapid onset disasters - such as cyclones, flash flooding, tsunamis—women are burdened by the need to care for children and other family members. However, slow onset disasters—such as droughts, desertification and deforestation—put even more pressure on women to find ways to sustain family incomes (Gingie et al, 2010). Yet the need to generate household income can reduce the capacity of women to reduce the vulnerabilities of their children and other family members (Ibarrarán et al., 2009). While women are likely to be bound to the home (Aguilar, 2009), men are also more likely to migrate to other areas in search of work (Abramovitz, 2001), leaving the women with extra responsibilities as household heads (Gingie et al., 2010).

2.4 Specific vulnerabilities of women

Gender-based disaster vulnerability is linked to existing social, economic, and political imbalances in society.

2.4.1 Women in rural and urban settings

As noted earlier, rural women can find it harder to rebuild livelihoods and household incomes in the wake of a disaster compared to those who live in urban environments with more diverse forms of employment available to them. Aguilar et al (2009) have noted that rural women in Bangladesh do not even have the resources to move to higher ground when a flood arrives, let alone focus on alternative sources of employment.

Yet the remarkable work of an Indian NGO called Swayam Shikshan Prayog (translated as ‘learning from one’s own and others’ experiences’) shows that rural women can sometimes play a leading role in leading disaster response and recovery work (Gokhale, 2008). In the 1993 Latur Maharashtra earthquake, for example, women supported by SSP played a leading role in repairing damaged houses while the played an even bigger role in the aftermath of the 2001 Bhuj earthquake (ibid). The women received technical training to take on such roles, but it has been noted that it was their role within the local communities that enabled them to motivate other people to participate in recovery work (Bosher, 2007).

Gokhale (2008) noted that even when they may have little role in public affairs, women are often at the centre of local community life, especially in rural areas. While SSP helped to give women a transparent role in disaster recovery work, there are other examples of them playing

less formal leadership roles (Bosher, 2007). It is important, therefore, to avoid equating vulnerability with lack of agency and the community-building work is often not acknowledged.

2.4.2 Control of economic resources

While women may often be the most important informal community leaders, they are commonly excluded from having any meaningful control over economic resources, such as ownership of land and assets, and access to credit (Oxfam 2010). Furthermore, in many societies, they have limited opportunities for education, training and career advancement and this, in turn, restricts their control over economic resources (Cheema and Rajivan, 2011; FAO, 2011; Oxfam, 2010; World Bank, 2011).

2.4.3 Cultural norms and status

It has been widely noted that prevailing cultural norms and practices can increase the disaster vulnerabilities of women by restricting their mobility or preventing them from learning survival skills such as swimming or tree-climbing (Röhr, 2006; World Bank, 2010b). As mentioned earlier such cultural norms can restrict the participation of women in public affairs and in Bangladesh it has been noted that women have sometimes drowned in flooded houses because they were reluctant to appear in public without being accompanied by male family members (USAID, 2000). It has also been noted that women sometimes do not receive disaster warnings communicated to men in public spaces (Dankelman, 2010; World Bank, 2010).

An increase in the number of young women being married in the wake of major disasters in Haiti, Pakistan and some countries affected by the 2004 tsunami suggests that cultural norms restrict their opportunities (Oxfam, 2014). While this phenomenon has not been properly researched it has been suggested that early marriage is associated with the food insecurity that accompanies slow onset disasters (Deen, 2010). Cupples (2007) and Fordham et al. (2007) demonstrate that in very different parts of the world (Nicaragua and Pakistan respectively) disasters mean that most women find their prospects have changed radically, at least for a time.

2.4.4 Violence against women and girls

Violence against women and girls (VAWG) has been the focus of a number of post-disaster studies (e.g. Brown, 2012; Fothergill, 1999; Houghton, 2009; Jenkins and Phillips, 2008). In many cases, it has been noted that the violence against women and adolescent in the wake of a disaster is largely an extension of what had happened beforehand in patriarchal societies. However, it is also noted that disruptions to normal life can increase the exposure of women to forms of abuse which are likely to be ignored by authorities (Enarson, 2000. Enarson argues that many disaster-displaced populations have more female-headed households and fewer adult men than the general population. Consequently, those women have an extra burden of

responsibility to look after their families and ensure household livelihoods (Byrne and Baden, 1995).

According to Fisher (2005), alcohol abuse was one the factors that contributed to an increase in 'Gender-based Violence' (GBV) in the wake of the 2004 tsunami disaster in Sri Lanka. 'The frustration and stress associated with communal living, feelings of loss and trauma and men's increased alcohol consumption were responsible for increased likelihood of GBV', Fisher wrote (p. 26).

The 2012 World Disasters Report noted that while violence in a disaster context might be complex, it is not inevitable because it is largely predictable and preventable (IFRC, 2012). Data on the prevalence and incidence of post-disaster violence is rather patchy and often unreliable. One study which sought to quantify changes in levels of violence was the Nicaraguan Social Audit (CIET/CCER, 1999) which surveyed people in the wake of the Hurricane Mitch disaster of 1998 Asked if violence against women had increased in the wake of the disaster only 21 per cent of respondents said it had while 34 per cent said it had declined. However, this 'finding' may largely reflect the attitude and prejudices of the survey respondents because it contradicts so much anecdotal evidence. When violence against women and girls is already prevalent in a society before a disaster strikes an increase cannot be blamed on the disaster itself. Yet, as Bradshaw (2013 P.p,5 notes: '.if the violence and exploitation suffered by women and girls is due to the event then this is the "disaster" for them [and] if the violence and exploitation suffered by girls is exacerbated post-disaster then this is a disaster risk for them'.

The evidence is mounting that women and girls living in 'displaced people's camps' have higher levels of exposure to sexual abuse. For example, Duramy (2011) detected elevated levels of sexual abuse in the wake of the Haiti earthquake of 2010 while a survey in Lugufu refugee camp and surrounding host villages near Tanzania's western border with Democratic Republic of Congo, found refugees were twice as likely to have sex with 'high-risk' partners, two-and-a-half times more likely to have experienced forced sex and three times more likely to have engaged in transactional sex (IFRC, 2012). There are reports that the fear of sexual violence against their daughters is so pervasive that families would rather send their girls elsewhere than have them live in disaster shelters, limiting their access to services that might be beneficial to them such as psycho-social support (Plan, 2011). Le Pape and Salignon (2003) have argued that sexual abuse has largely been ignored by humanitarian aid agencies.

2.4.5 Access to Education

While women living in poor communities face limited access to education in 'normal' times, their opportunities, and those of their children, can be further restricted during a natural disaster. Many schools and other education facilities are either destroyed or damaged in rapid onset disasters. For example, a study of the impacts of Cyclone Sidr in Bangladesh in 2007 found that 5,927 education institutions were either destroyed or significantly damaged (Khan and Nahar, 2014).

Some displaced residents and send their children to schools in other areas, however, it is hard

for them to feel settled if they are apart from their families and worried about what s happening at home (Barrett et al., 2012; Fields, 2005; Johnson, 2008). It has also been noted that such students can feel profoundly disoriented when they return to their disaster-affected homes (Henry, Cho and Dupuis, 2008). Watson, Melancon and Kinchen (2008) have argued that disasters can reduce school attendance and retention rates whilst imposing extra financial burden on parents and Barrett et al. (2012) have noted that academic performance declines for disaster-affected students.

2.4.6 Health needs

The risk of outbreaks of contagious diseases is often presumed to be very high in the chaotic situation that follows natural disasters (O'Dempsey, 2009; Watson, Gayer, & Connolly, 2007; Wisitwong and McMillan, 2010); with contributing factors being lack of access to clean water and sanitation facilities, overcrowding in temporary shelters and lack of access to healthcare facilities. The poor are more likely to have restricted access to clean water, sanitation and healthcare facilities while they also face more difficulties in securing adequate shelter and forms of employment (Lu, 2011).

Poverty is one of the primary predictors of social health disadvantage as measured by higher rates of infant mortality, low infant birth weight and premature mortality (Sherrieb, Norris and Galea, 2010) and numerous studies have demonstrated that post-disaster evacuation and relocation worsen the health outcomes for poor people (Lu, 2011; Wisitwong and McMillan, 2010). Increased health problems for children obviously place extra burden on women as primary carers.

The development of post-traumatic stress disorder (PTSD) after a disaster is generally the most prevalent psychiatric disorder among people with low socio-economic status (Diene et al., 2012; Galea, Grattan et al., 2011; Wisitwong and McMillan, 2010). Some scholars have criticised the 'medicalisation of distress' (Summerfield, 1999) and others note that different cultures may experience and display symptoms of trauma differently (Norris et al., 2001). The IFRC suggests addressing psychosocial needs should be based on the principle that most acute stress problems during emergencies are best managed without medication, following the principles of 'psychological first aid' (IFRC, 2009).

At a global scale it has been noted that in 'normal' times there are greater numbers of women than men in therapy, on psychiatric medication, or in mental hospitals (Ussher, 1992; Chesler, 1972). While there is little evidence to support the assumption, it is likely that disasters will make this gender gap even worse. However, caution needs to be exercised when evaluating mental health data because Showalter (1985) has noted that historically women have been diagnosed as being 'mentally ill' for displaying attitudes considered radical at the time or actions that are outside the gender norm (Showalter, 1985). Yet a study from Tamil Nadu in India (Kumar et al., 2007) showed that PTSD was higher among women with no household incomes and those who were illiterate.

Specific kinds of disasters increase the prevalence of particular kinds of diseases. For example, flooding increases the risk of water-borne or mosquito-borne diseases. This has particularly

serious implications for Bangladesh where it has been the incidence of malaria has increased dramatically during last 30 years with an estimated 14.7 million Bangladeshis now vulnerable to malaria along with dengue fever, dysentery, asthma, hypertension and various skin diseases (Atiq, 2008; Huq and Ayers, 2008).

Post-disaster studies have noted that pregnant and breast-feeding women face a lot of challenges in the wake of natural disasters (UNFPA 2010). It has been noted, for example that the 2010 earthquake in Haiti worsened already high levels of maternal mortality while women who found themselves sharing shelters with strangers after the 2005 earthquake in Kashmir, Pakistan, stopped breast-feeding their infants due to a lack of privacy (ibid).

Lack of access to contraception can also raise issues with unplanned births, especially in the context of increased sexual assaults (discussed above). Sexual assaults not only have psychosocial implications for the victims but also physical health effects with increases in the prevalence of sexually transmitted diseases. A recent report by the Women's Refugee Commission and Save the Children noted that while relief agencies focus on providing food, water and shelter for refugees in emergencies, the sexual and reproductive health needs of young people, particularly vulnerable girls, too often sit at the bottom of their checklists (as cited in UNFPA, 2013).

2.4.7 Power imbalances

Women are often poorly represented at all levels of formal decision-making in almost all nations on Earth. This applies in economic life as well as in politics and in some cases the power imbalance is sanctioned by law. A recent World Bank study, for example, reported that 103 out of 141 economies studied imposed legal barriers on women's participation in economic life (World Bank 2011).

Natural disasters can undermine the confidence that citizens have in political leaders in both developed and 'developing' nations alike (Achen and Bartels, 2004; Healy and Malhotra, 2010; Cole, Healy and Werker, 2011). This can create new forms of political instability and a study by Berrebi and Ostwald (2011) has suggested that natural disasters can increase support for 'terrorist' organisations because they provided more disaster relief than government agencies.

2.4.8 Fragile support network

It is self-evident that natural disasters can destroy or weaken friendship and kinship networks for adults, adolescents and young girls and boys. However, the ability to restore networks may be more difficult for girls as parents may be more protective of them in periods of great instability (IFRC, 2012). Boys are more likely to have opportunities to participate in physical activities and games which can improve their physical wellbeing as well as their social networks, as seen in studies of the impacts of disastrous 2010 floods in Pakistan (IDMC, 2011).

For adult women, the loss of networks may have implications for childcare and this, in turn can reduce their opportunities to participate in income generating activities. While women may normally have stronger and wider social networks than men, their ability to effectively

transform good networks into tangible support may be less. For example, a woman's ability to help others may be tempered by her more limited access to relevant resources (Bradshaw, 2013). Duramy (2011) noted that the 2010 earthquake in Haiti destroyed many women's social support networks, thus increasing their vulnerability to violence. Earlier Hoffman (1998) suggested that post-disaster reliance on family and kinship networks can reinforce the traditional dominance of men. On the other hand, the intervention of external aid agencies and NGOs can draw into question unequal power differentials and it has been noted that an influx of NGOs following the 2005 earthquake in gave some adolescent girls and boys the chances to leave the confines of the village in order to attain education or other forms of support (Ahmed and Fordham, 2012).

2.5 The challenges posed by flooding in South Asia

Around the world, acceleration in population growth and changes in land-use patterns have increased human vulnerability to floods (Ferreira, 2011). Harmful impacts of floods include direct mortality and morbidity and indirect displacement and widespread damage of crops, infrastructure and property (Doocy et al., 2013; IPCC, 2007). Every year floods take thousands of lives, leave millions homeless and cause significant loss to properties and infrastructures all over the world. While floods are categorised as rapid-onset disasters, repetitive and/or prolonged floods can resemble slow-onset disasters regarding their duration and extensive impacts.

The rivers which originate in the Himalayan range cross Nepal, Bhutan, Bangladesh, India and Pakistan and all of these South Asia nations are prone to regular flooding. Major flooding can affect numerous regions at the same time and the 2007 South Asia floods resulted in around 2000 deaths and the displacement of around 30 million people (Menon, 22012). In 2007, 200 people died in flash flooding in Karachi while around 730 died and some 350,000 were displaced in flash flooding that accompanied Cyclone Yemyin in the same year (Menon, 2012). In September 2008, flooding from the Kosi River in the northern state of Bihar caused the deaths of at least 75 people and the displacement of over 2 million more (SAARC, 2012). Monsoon rains caused the death of around 40 people in Pakistan's Khyber Pakhtunkhwa Province in 2009 with around 175,000 displaced (USAAID, 2009). Also, in 2009, flash flooding occurred mid-March following heavy rains and increased snow melt; resulting in 80 deaths and displacement of nearly 58,000 people across northern India (Menon, 2012). From Mid-July till Mid-August 2010, all four provinces of Pakistan were badly affected during the monsoon rains when dams, rivers and lakes overflowed, killing at least 1,750 people, injuring 2,500 and affecting 23 million people; the worst flooding in the nation's history. In the last nine years, 69 floods have been recorded in South Asia (Menon, 2012) and aid workers estimate that 5.2 million people were affected by tail-end monsoon flooding in northern India in 2011(Menon,2012). In 2009, the World Food Program estimated that around 83 million people suffered food shortages because of flooding in South Asia.

The records show that Bangladesh and Nepal are the two densely populated nations in the region which experience significant flooding on a regular basis (Dewan & Ninno 2015). The plains of the foothills of Nepal and the entire floodplains of Bangladesh are traversed by rivers

which originate in the mountain range. Both countries fall within the "Indian Monsoon" zone which means that they experience heavy precipitation during the wet monsoon, and this regularly results in flooding which destroys infrastructure, crops, vegetation while displacing millions of people (Mirza, 2010).

While the arrival of floodwaters can cause death and injury to humans and livestock the lingering impacts of water pollution and increases in water-related diseases continues to cause death and illness. Regular flooding also causes losses and damage to infrastructure, disruptions to the normal lives and livelihoods of the people affected, food and water shortages and increased prices, and general social insecurity (Ghatak et al., 2012). Deforestation and other land use changes in the river basins are already increasing the severity of annual floods in Nepal, Bangladesh and India (Sivakumar, & Stefanski, 2010). and climate change predictions suggest that the flooding will get even worse (Isaacs et al., 1998; Regmi et al., 2008). Bangladesh and Nepal have many rivers in common and they also have similar agriculture-based economies and social structures. Bangladesh has become a focus for many studies on flood impacts and work on flood mitigation and management in Bangladesh has important implications for Nepal as well (Dewan & Ninno 2015).

A low-lying country with more than 230 waterways, Bangladesh is one of the most disaster-prone nations in the world. Fifteen per cent of its land floods annually on average and it is estimated that 60 per cent of the country is flood-prone (Menon, 2012). In 2004, the figure reached 34 per cent and in 2007 two floods and a cyclone together killed 4,000 people and caused economic losses of about US$3 billion (Menon, 2012. Coastal cyclones result in flash flooding and in mid-November 2007, Cyclone Sidr hit southern Bangladesh killing nearly 3,500 people and leaving millions homeless (Sundram, 2008). Around 400,000 people were left homeless in Bangladesh when Cyclone Aila hit in 2009 and many villages were either completely submerged in floodwaters or destroyed (Akter, 2009). In June 2010, powerful landslides triggered by heavy rains killed at least 47 people in south-eastern Bangladesh, striking a coastal area as people slept and burying many alive inside their homes (Yamane et al., 2013). Farmers in northern Bangladesh have observed that flash flooding is occurring earlier in the year than in the past (Memon, 2012).

Although flooding is a natural phenomenon, it is exacerbated by human activities such as unplanned or poorly conceived urban development with poor drainage maintenance, the emergence of informal settlements in the flood-disaster-prone areas, overcrowded houses constructed on flood-prone areas, and encroachment upon waterways, which may cause changes in the hydrological balance of waterways (Nolan and Maron, 1995). Other human activities that exacerbate flooding include land reclamation, which is achieved through filling in swamps and flood plains, and destruction of mangroves and wetlands which have generally reduced the flood storage capacity of urban areas (Adelekan, 2009).

In Nepal, children have had the highest flood-related crude mortality rates of all age groups and were nearly twice as likely to die in the flood as their same-sex parent (Pradhan et al., 2007). However, recent reviews of age-specific risks for flood mortality have been inconclusive because attempts to aggregate data were hampered by high proportions of deaths where the age is unreported (Jonkman and Kelman, 2005).

Floods in developing countries pose a greater threat to human life, health and well-being than in developed countries. In general, two-thirds of deaths directly related to flood events are caused by drowning and one-third by physical trauma, heart attack and electrocution (Fitzgerald et al., 2010). The most vulnerable members of the community are the elderly and the youngest requiring special assistance (Dewan et al., 2015). While economic losses are rising, direct deaths from flooding may be declining over time as measures to prevent flooding are increasingly being deployed (Dewan & Ninno 2015). The impacts of flooding in Bangladesh and Nepal are severe in both rural and urban areas.

Bangladesh and Nepal have large agrarian economies. In Nepal, the agriculture sector provides over 30 per cent of country's GDP and supports more than 86 per cent of the population, whereas in Bangladesh agriculture comprises about 18.6 per cent of the country's GDP and employs around 45 per cent of the total labour forces (Weisman et al., 2011). In Nepal, monsoon floods result in inundation and sand deposition over large areas and this can result in long-term food insecurity for a large proportion of the population.

In Bangladesh, the major causes of flood-related deaths are drowning, water-borne diseases, diarrhoea, and snake bites while in Nepal landslides are a major risk factor (Few et al., 2004). During the 2007 monsoon floods in Bangladesh, snake bites were estimated to be the second most significant cause of death after drowning and contributed to more deaths than even diarrheal and respiratory diseases (ICHARM, 2008). Other major health impacts result from being traumatised by witnessing death as well as difficulties in getting access to food and clean drinking water. Fuel such as cow dung, jute stick which are used in rural areas are usually washed away or become wet, making them unusable, while in urban areas the water damages the gas pipes leading to non-availability of gas for cooking (Dewan & Ninno 2001).

Moreover, prolonged flooding makes it difficult or impossible for day labourers to find employment and this leads to severe food shortages and death from hunger (Dewan & Ninno 2015). During the 1988, 1998, and 1999 floods in Bangladesh, hundreds of industries, especially garments factories went under water and some of them never recovered from the damage, resulting in a worsening of employment prospects for many (NAPA, 2005; Ahmed, 2012; Nishat et al., 2000). Flooding in urban areas can cause severe damage to employment-generating infrastructure and create long-term problems for the urban poor (Denissen, 2012).

Research shows that the impact of flooding on housing and households can be extensive. Fast flowing flood waters are capable of washing away entire slums while the slow rising water damages buildings. In rural areas of Bangladesh houses with mud walls, coconut leaf walls and tin walls collapse leaving people and assets exposed and vulnerable. About 32 per cent of total population in Bangladesh lives in slums (Miyan, 2012; Rahman, 2011) and many of these people can be made homeless or left stranded for days due to flooding.

According to Jha et al. (2012), floods cause significant damage to public buildings such as hospitals, clinics, educational buildings, and significant cultural sites such as mosques and temples. In both Bangladesh and Nepal roads are frequently closed due to flooding and in urban areas the flood waters often scatter garbage and this, in turn, can clog the drains (Jha et al., 2012; NAPA, 2005; Dasgupta et al., 2010). In Nepal, 1993 flooding in the Gandaki river system

damaged the Kulekhani Hydroelectric power station (Dixit et al., 2007; MoWR, 1993).

Aman, a special type of rain-fed rice grown in Bangladesh is highly susceptible to river floods (Baky et al., 2012). During the 1998 flood, for example, it is estimated that 82 per cent of deep-water Aman and 91 per cent of transplanted Aman were lost, leaving the whole country food insecure (Ninno et al., 2001). Most of the annual flooding occurs during the wet monsoon (July–August) and this affects the summer vegetable crops. The whole mushroom industry was seriously affected by the floods of 1998 and 2007 causing huge loss of foreign currency (IPCC, 2007). Within rural and semi-urban areas, the impacts of flood are severe on domestic livestock, such as poultry and dairy cows, which are a major source of income for the poor in both Bangladesh and Nepal (Dewan & Ninno 2015). Cultivated fish drift away due to erosion of embankments and boundaries of the lakes or ponds and this results in economic losses to the export industry of Bangladesh. In both Bangladesh and Nepal, flood-related agricultural losses are making these countries more dependent on foreign aid (Weir, 2009).

2.6 The role of women in disaster management

The prevalence of natural disasters in South Asia means that there has been significant attention paid to disaster risk reduction (DRR) (Gaiha, Hill, & Thapa, 2010). However, there is little in this literature about the role of women in DRR or even their role in building 'resilient' communities. While numerous scholars (e.g. Rahman, 2013) have written about the disaster vulnerability of women, few have discussed their potential role in reducing flood impacts or helping to lead recovery work. In Bangladesh, women who have experienced flooding on a regular basis have developed practices for storing appropriate food (Pinkowski, 2008; Ariyabandu, 2003). Nasreen (2000) has explained, for example, that women in Faridpur prepare a mixture of puffed rice, and dried coconuts, secured in appropriate packaging safe from flood waters. Women in this area also ensure that their meagre belongings such as clothing and bedding are stored in such a way that they can be easily removed when flood waters rise. A study of flood experiences in Joipur, Bangladesh, noted that women take considerable risks to procure drinking water from great distances, walking through chest-high water or swimming to collect fresh and clean water (Ariyabandu, 2003). Another study noted that women use various techniques to take water out of the tube wells so as not to mix it with flood water, and to purify the water, in the absence of wood fuel (Nasreen, 2000). Similarly, women in the Jhang area in Punjab, Pakistan, have mastered the skills to survive floods across generations. While male members of their families take the livestock to protective embankments or distant places, the women make preparations to care for the children, the valuables, and the cooking utensils (Enarson, 2004). As Ariyabandu (2003) has noted, it is the women who make provision for food to support the family during floods and yet they have little say in DRR.

2.7 Coping mechanism of poor women

People obviously do what they can to help their neighbours when flood waters arrive and clearly it is not only the women who provide such mutual assistance. Men, as well as women,

take children, the sick and elderly to safe places and they help each other to protect property and livestock (Yodmani, 2001). However, women provide most of the care for children and other vulnerable people and they find ways to secure and prepare food (Cannon, 2002). Women frequently take a leading role in looking after livestock and in rebuilding damaged houses (Ariyabandu and Wickramasinghe, 2005; Pinkowski, 2008). In the wake of the 2001 earthquake in the Indian state of Gujarat, women were found to be engaged in rubble clearing, masonry for reconstruction, and community meetings (Enarson, 2001).

The literature on 'coping mechanisms' suggests that 'coping' means finding ways to solve problems, to handle stress, or to develop defence mechanisms (Brahmi and Poumphone, 2002). Blaikie et al. (1994) suggest that 'hazard coping strategies may comprise preventive, impact-minimising or post-event coping actions. Clarke Guarnizo (1992) developed a framework for mapping out 'adjustment mechanisms' based on categories of mechanisms--social organisation, economic relationships, technology use and cultural arrangements—in relation to different phases in the disaster lifecycle--before, during and after. Social coping mechanisms include assistance from kinship networks and self-help groups. Economic adjustment includes livelihood diversification and community credit groups. Technological adaptations against flood damage include portable housing materials and schemes for food storage. Cultural arrangements include crisis perceptions and the passing on of knowledge between generations.

In a study covering selected Asian countries, Francisco et al. (2011) presented a disaster adaptation framework which classified adaptation strategies under four headings: behavioural, structural, technological, and financial. These authors also noted that adaptation strategies can be either reactive or proactive, reactive strategies referring to actions that are performed at the very last minute or when the event is already happening while proactive strategies come from anticipating the event in advance. However, Danilo and Roehlano (2014) have suggested that household rarely use adaptation strategies unless they perceive that 'utility', or net benefit, outweighs the option of not adapting.

Many studies discussed earlier show that poor communities which experience flooding on a regular basis have many entrenched coping mechanisms. They know, for example, how to use plastic water basins as buoys, also using wide planks of wood to make rafts in order to transport themselves and their few possessions to safe ground or evacuation centres (Zoleta-Nantes, 2007). They know how to avoid electrocution from live wires and how to cut down food consumption and expenses on clothing, shelter and recreation (ibid). They can self-medicate and diversify household incomes (ibid).

Women and girls play neglected roles in coping with floods before, during and after the flood waters are present. They normally play the central role in keeping families together and in delivering food (Dasgupta et al., 2010). They store food and cooking fuel in safe places, and they story fodder for their livestock (Rahman, 2013). They care for sick family members and for their neighbours. They play a neglected role in maintaining household incomes (ibid). While attention focuses on the work required to rebuild damaged infrastructure, women are the pre-eminent community builders.

CHAPTER THREE: RESEARCH METHODOLOGY

3.0 INTRODUCTION

In order to understand the real issues and challenges that pertain to natural phenomena, researchers have developed several methods and techniques to improve the accuracy and depth of the information gathered. This chapter will detail the research methodology utilised in this research. Primarily, the research methods used in this study are based on qualitative research techniques and consists of two modes of data collection. The first was a questionnaire through which primary data was collected from the two selected districts (Tongi Upazila and Shilai Union) with the objective to better understand the demographics of each district as well as ascertain their economic environment (agricultural activities) both before and after floods. The second method was ethnographic study and semi-structured face-to-face interviews and focus groups with the flood affected women from the two districts. Interviews were also held with the agencies that provides relief during disaster as well as government officials and community leaders.

Thus, it should be noted that the research method used in this study were a combination of both qualitative and quantitative in order to address the research aims and the research questions.

In his article, Sieber (1973) provided a compelling reason to combine quantitative and qualitative research which resonates with this study. He argues that "a combination can be effective at the research design, data collection, and data analysis stages of the research process. For example, at the research design stage, quantitative data can assist the qualitative component by identifying representative sample members, as well as outlying (i.e., deviant) cases. Conversely, at the design stage, qualitative data can assist the quantitative component of a study by helping with conceptual and instrument development. At the data collection stage, quantitative data can play a role in providing baseline information and helping to avoid "elite bias" (talking only to high-status individuals). On the other hand, at the data collection stage, qualitative data can help in facilitating the data collection process. During the data analysis stage, quantitative data can facilitate the assessment of generalizability of the qualitative data and shed new light on qualitative findings.4 Alternatively, during the data analysis stage, qualitative data can play an important role by interpreting, clarifying, describing, and validating quantitative results, as well as through grounding and modifying" (R. Burke Johnson et.al 2007).

In order to address the research questions several sources of data collection was required to achieve triangulation and complementarity (Rocco, Bliss, Gallagher and Perez-Prado, 2003; Hesse-Biber, 2010). Impact of flood on local community including women and children depends largely on the local context. Consequently, the experience and mitigation approaches of both rural and urban settings is important for comparison.

By comparing the experiences of women living in different geographic, social and economic contexts, it was possible to explore the similarities and dissimilarities on how they experience flooding events. The use of an inductive logic helped to develop an in-depth understanding of

the research topics. The use of such research methods using two case studies enables the researcher to develop a rich picture of the case study experiences. The use of complementary research methods (Hesse-Biber, 2010) strengthens the comparability of the case studies and lends weight to the wider implications. The research is interested in shared experiences of women as well as the influence of different social, cultural and economic factors.

3.1 Philosophical considerations in mixed methods research

According to Creswell, Klassen, Plano Clark and Smith (2011), researchers who use mixed methods research are commonly interested in philosophical pluralism. They see benefit in acknowledging that different ontological assumptions can lead to very different interpretations of the same lived experiences but rather than insisting on a single research philosophy they see benefit in bringing different research methodologies into dialogue with each other. This has been described as a dialectical approach in which post-positivist, social constructivist, pragmatic, and 'transformative' approaches are brought into open dialogue with each other because each method used has particular philosophical underpinnings (Greene, 2007). Philosophical pluralism is important for this research because assumptions underpinning much of the international literature on disaster management may differ widely from the assumptions and worldviews of women living in poor communities in Bangladesh.

Mixed methods research encourages a researcher to think more critically about their own ontological assumptions in relation to those of the research subjects. However, it also suggests that conscious reflection on the dialectical interplay of such philosophical differences can result in the emergence of new, 'transformed' beliefs (ibid. Furthermore, a pragmatic emphasis on "what works" can ensure that philosophical and cultural differences can be overcome in the search for transformative outcomes which value both 'objective' and 'subjective' forms of knowledge (Morgan, 2007) According to Mertens (2009), 'transformative' research is commonly interested in creating more just and democratic societies and this overriding goal permeates the whole research process, from selecting problems to drawing conclusions. The pragmatic emphasis of mixed methods research serves this goal well.

3.2 Overall Research Design

The transformative goal of this research endeavor is to better understand the flood vulnerabilities of women in Bangladesh in order to ensure that disaster management policies and practices meet their needs far better in the future than they have in the past. The failings of past approaches have been highlighted in the literature discussed in chapter 2 and a range of scholars have called on disaster management agencies to understand and enhance the 'coping mechanisms' of the poor and affected victims. . However, little research has been done on the long-term efficacy of such 'coping mechanisms' and it is entirely possible that they worsen disaster vulnerabilities in the long term. Given the rather instrumentalist assumptions of many

people working in disaster management, this research included use of a research survey, which also enabled a 'sampling' of experiences that is hard to achieve by using more targeted qualitative research methods. However, for the reasons discussed above, I knew that a survey would barely scratch the surface of the experiences of the women. For entirely pragmatic reasons, debates about the relative merits of post-positivist or social constructivist research were largely resolved in favour of qualitative research methods that have emerged from the social constructivist approach.

In a nutshell, the mixed methods methodology adopted for the research included a mix of both qualitative and quantitative research methods. A quantitative questionnaire was designed and pre-tested in a pilot research exercise. This pre-testing enabled the researcher to understand which questions were clearly understood by the women concerned and this led to amendments to the survey discussed below. The collection and statistical analysis of survey data in the two case study areas provided a good foundation for selecting questions to be pursued through qualitative research techniques. For reasons discussed above, the selected qualitative research methods were focus group discussions (FDG) and semi-structured interviews.

The qualitative research method is applied to complement the quantitative research method. A mixed method was used in a convergence way to support our quantitative findings. After commencement of data collection and analysis, qualitative research method using focus group discussion (FGD) and semi structure interview was conducted to achieve the specific objectives for the study. The entire research process is depicted in Figure 3.1.

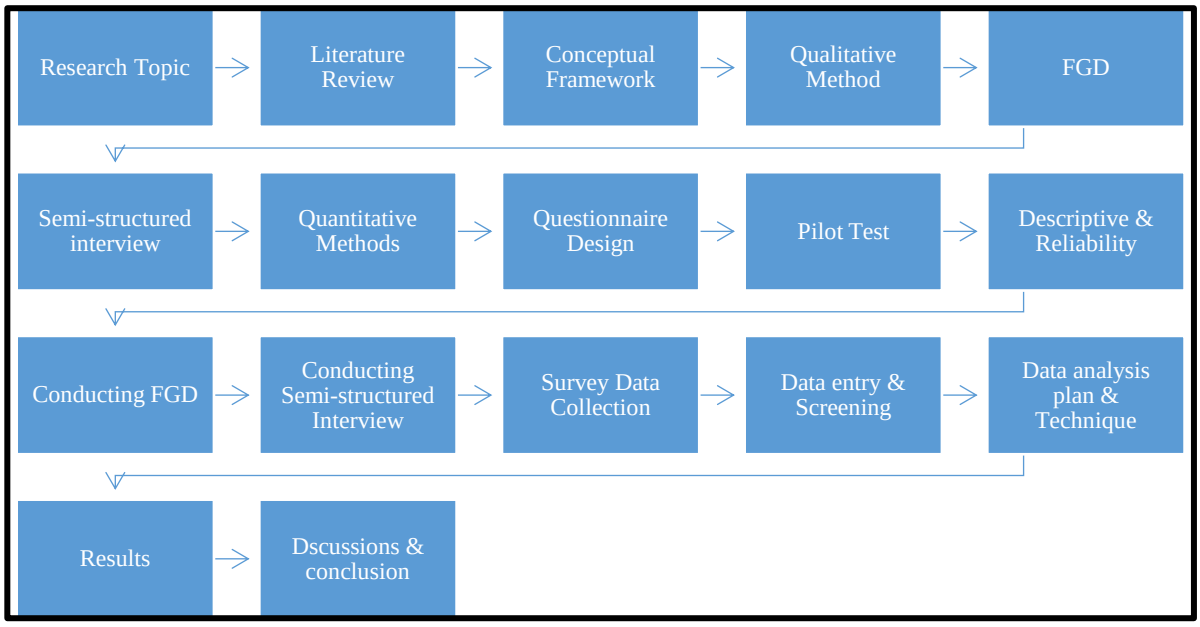


Figure 3.1: Research process

The overall research design and explanation of all methods used was approved by the Victoria University Human Research Ethics Committee and approved consent forms were used in recruiting participants for the focus group discussions and semi-structured interviews.

3.3 Selection of case study sites

3.3.1 Tongi Upazila

The Tongi Upazila district was selected as this area is a flood prone where many villages reside. The lowland of Tongi Upazila is flooded every year during the rainy season. The flood waters start coming to the area at the end of June and generally stay until the end of September. In the years 1998, 2004 and 2008 the city experienced major flooding which submerged two-third of the city. According to the research questionnaire, poor people living in this area say they have no alternatives other than to remain in waterlogged conditions for two to three months during major flooding events.

Tongi Upazila is located 25 kilometres to the north of Dhaka city centre. The major rivers in this area are the Turag, Balu, Labandaha and Salda. Tongi Upazila has a number of medium to large industries and the district is also known for cottage industries (Bangladesh Bureau of Statistics, 2012). With an area of 446.38 square kilometres, Tongi Upazila is bounded by Sreepur Upazila to its north, Saver Upazila and Uttara Thana and Rupganj Upazila to the south, Kaliganj (Tongi) and Rupganj Upazila on the east, and Kaliakair and Savar Upazila on the west. Tongi (Town) consists of nine wards and 31 *Mahallas* (administrative districts). This town is home to many of Bangladesh's important establishments such as the Bangladesh Rice Research Institute (BRRI), Bangladesh Agricultural Research Institute (BARI), Central Extension Resources Development Institute (CERDI), Seed Certifying Agency, Security Printing, Machine Tools Factory, Bangladesh Ordnance Factory, a diesel plant, Bangladesh Institute of Technology (BIT), BRAC Dairy Farm, and Nova Poultry Limited (BBS, 2012).

Figure 3.2: Map of study area (Tongi)

3.3.2 Shilai Union

The Shilai Union district was selected as the villages of the district faced major flooding in 1998, 2004 and 2008. All caused severe damage to the agricultural economy, particularly because they affected crops in the fields. The flooding had a prolonged impact on village economies and the everyday life of the villagers. The severity of damage to houses and disruption to daily activities was much more intense than in previous floods. The impacts of regular flooding in the district are cumulative, especially for those with few economic resources. Residents of the area were engaged in a constant struggle with recurrent floods and land erosion.

Shilai Union villages are located in the Munshiganj District of metropolitan Dhaka, even though they are around 22 kilometres south-west of the Dhaka city centre. This district has a total land area of 954 square kilometres, of which 560 km² are cultivable and 23 km² are fallow land. The district has no forest area. Around 163 km² are irrigated, while 106 km² sits below the river water level. There are 14 rivers of around 150 km in length passing through the district.. The district is bordered by the mighty Padma River to the east and south. It is bounded by Dhaka and Naraynganj districts to the north, Madaripur and Shariatpur districts to the south, Comilla and Chandpur districts to the east, and Dhaka and Faridpur districts to the west. The villages under study are located on an island (*char*) of the Padma River.

Munshiganj District has a mild and humid climate and the annual temperature variation is not significant. A hot and showery monsoon begins in March to May after the cool and dry winter of December-February. The March-May monsoon is followed by the comparatively calmer but very wet monsoon season from June to September. The area receives substantial rainfall during July and August.

Figure 3.3: Map of Study Area (Shilai Village)

3.4 Survey design and development

The selection of the case study sites enabled to plan a pilot test and work out how to collect an adequate sample of survey responses. The process used here was taken from Malhotra (2008) and it is represented in Figure 3.4.

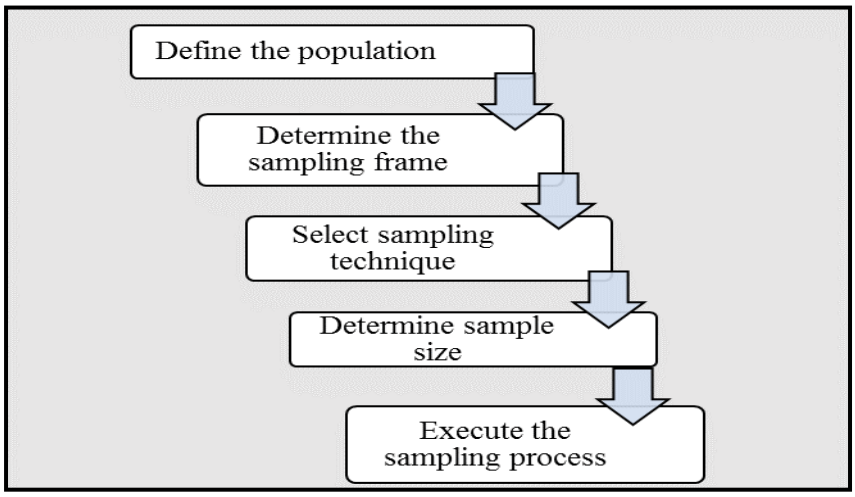


Figure 3.4: Sampling design process (Malhotra, 2008)

According to Cavana *et al.* (2001) good survey design requires attention to three main considerations: a) the wording of the questions; b) the planning how variables will be classified on a scale and coded after receiving a response; and c) the overall appearance of the questionnaire. The process used to design and test the survey instrument is represented in

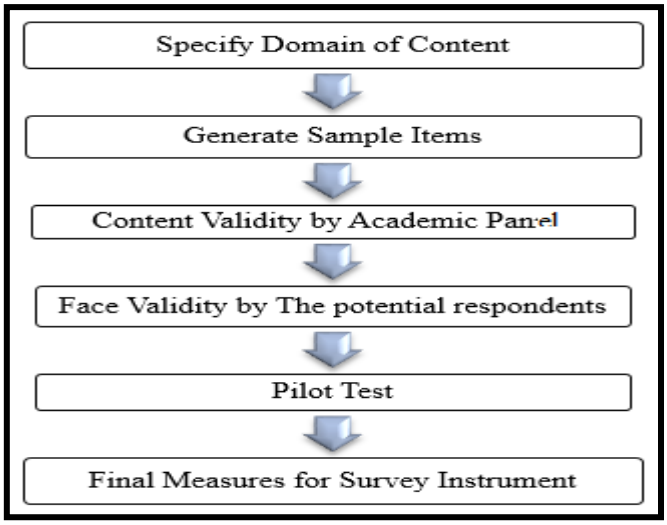


Figure 3.5: Process for development of the survey instrument [Adapted from Malhotra and Grover, 1998]

The draft questionnaire contained key topics and was divided into three sections (See Apppendix C). Section A contained several questions about forms of support received by the respondents during floods and questions designed to collate demographic information about the respondents. Section B contained several questions regarding relocation following flooding and Section C covered the 'coping' strategies used by the respondents before, during and after

flooding.

The variables were obtained by using a 5-point Likert scale with anchorage from "strongly disagree" to "strongly agree". As Cavana *et al.* (2001) stress it is important to subject draft surveys to 'content validity' tests and this draft survey was subjected to two validity tests: a) analysis by a panel of relevant experts; and b) testing with some potential respondents.

Five senior Bangladesh academics, with research expertise related to the focus of this research focus and questionnaire design agreed to participate in a group analysis of the draft survey. The expert panel members were asked to comment on: construct names, construct definitions and the extent to which the available options wold enable respondents to exercise a judgement related to the concepts presented. Each academic was asked to rate the survey questions on a scale ranging from 'very weak estimate' to 'very strong estimate' and they were invited to offer additional comments if they wished. Based on this feedback some questions were dropped and others were reworded

Following the evaluation by the expert panel, the revised questionnaire was then pre-tested with 10 residents from Shilai Union. Discussion with the respondents aimed to determine if any of the questions seemed ambiguous or biased to them. They were asked to rate the questions on a scale ranging from 'very difficult' to 'very easy' and they were invited to comment on the survey as a whole. This pre-testing of the survey instrument led to further amendments to the wording of the questions. The pre-testing of the survey was followed by a pilot of the amended questionnaire with 30 respondents and the completed pilot surveys were subject to Cronbach's 'alpha test' (Hair, 2010) for internal consistency. This resulted in further amendments to the wording of particular questions. Table 3.1 presents the demographic breakdown of the 30 respondents who participated in the pilot survey.

Table 3.1: Demographic information for the pilot survey

Variables	Frequency	Percentage (%)
Gender		
Female	30	100
Age		
16-19 years	5	17
20-29 years	6	20
30-39 years	7	23
40-49 years	2	7
50-59 years	5	17
60 and above years	5	17
Education		
No school	5	17
Primary school	9	30
Some secondary school	7	23
Finished secondary school	8	27
Trade training	1	3
University (undergraduate)	0	0

Variables	Frequency	Percentage (%)
University (postgraduate)	0	0
Income (Monthly average income)		
***BDT 1000 and less**	7	24
BDT 1001-BDT 2000	10	33
BDT 2001- BDT3000	4	13
BDT 3001-BDT 4000	6	20
BDT 4001- BDT 5000	2	7
BDT 5000 and above	1	3

***BDT=Bangladeshi Taka (Currency)*

Following the advice of the expert panel, "purposive sampling" was used to recruit respondents. Purposive sampling, also known as judgmental, selective, or subjective sampling, is a form of non-probability sampling in which researchers rely on their own judgment when choosing members of the population to participate in their study. This type of sampling enabledthis study to seek survey respondents who could extend the sampling in regard to criteria such as specialist knowledge, experience of flooding and interest in the topic of the research. Researchers conducting surveys may find people willing to complete a survey without relevant knowledge or experience and purposive sampling aims to reduce this problem.

In relation to sample size, Hoe (2008) has said that a sample of 200 offers enough statistical strength for data analysis. According to Hair *et al.* (2010), sample size plays a significant role in obtaining stable approximations and explanations of significant results. With these considerations in mind, 250 questionnaires were distributed in each case study site and with response rates around 88 per cent this meant that around 200 completed surveys were obtained for each site.

3.5 Focus Group Discussion (FGD)

The term Focus Group Discussion is used to refer to group interviews with more than two people being interviewed at the same time (Myer and Newman, 2007). The method enables interviews to be conducted with people who might be reluctant to be interviewed alone but, more importantly, it generates an interactive discussion on the topics covered (Huston and Hobson, 2008). According to Wall (2001), focus groups originated in psychology in the 1920s but they have become common practice in the fields of education, management and public health.

According to Massey (2011) group discourses can generate more shared learning than individual interviews and discussions often turn to questions of what could be done to address shared concerns. In this sense, the method not only benefits the researcher but often many of the participants as well (Rose-Anderssen, Baldwin and Ridgway, 2010). In addition, this exploratory study allows quick capture of information in an inexpensive manner.

In total twenty-three focus groups were held. All FDG participants were asked to sign a consent form before the discussion could begin. The FDG format and recommendations of Kadir and

Nadarajah (2012) that divides the focus group sessions into three phases were used as follows: 1) Introduction, in which all participants introduce themselves and the aims of the discussion are introduced and discussed; 2) Main discussion, in which participants are invited to share their thoughts on open-ended starting questions and on what others in the group are saying; 3) Concluding discussion, in which all participants are invited to offer their final reflections on what has been said or seek clarification about points made by others. The sessions ended with the researcher summing up the key points made by the participants. Following principles articulated by Myer and Newman (2007) which stipulate that a FDG needs to have more than three participants, each FDG group conducted had more than three participants and approximately 50 people participated in FDGs in the two case study areas with the sessions conducted in Shilai Union and in Tongi Upazila. Each session was recorded once consent had been obtained from all participants.

Before the FGD formally took place, in both districts, every effort was made to intermingle and engage in casual conversations with women to become familiar with their environment and to get understanding of their local social and cultural practices. This not only provided an insight but also helped to make adjustment to the open-ended questions.

In the Shilai Union case study area, six FDGs were held with flood-affected women; three in Modhya Shilai village and three in Dhakhin Shilai village as these areas are affected by the floods. Each FDG had six to eight participants. The local Red Crescent Office in the Shilai Union area helped to identify potential participants and participants agreed that the Red Crescent offices were the most appropriate venue for the meetings. Although the Red Crescent workers introduced the potential FDG participants, they were not present at the meetings and I took full responsibility for convincing the women to participate.

The discussion in these FDG sessions focused on the impact of floods on the daily lives of the women and how they survived or coped with additional responsibilities. I noticed that early reticence soon gave way to enthusiasm for the discussion and while the women freely disagreed on some matters, they showed great respect and care towards each other. Those who had either missed out or failed to get a reasonable share of relief aid showed anger about this, but the anger was never directed towards other women in the group. While the women were understandably reluctant to discuss some problems—such as domestic violence—in front of each other, they were remarkably frank about many of the issues discussed.

In Tongi district area, a total of five FDG sessions were also held with four to six participants in each discussion group. The FDG were also held, with consent, in the local Red Crescent offices. In this case study area, the focus was on recruiting FDG participants who worked in different forms of employment affected by the major floods and the camaraderie was not as strong as in Shilai Union. The participants were reluctant to disclose personal information, but initial reticence again gave way to enthusiasm for the discussion and the women gradually felt more comfortable about sharing personal stories.

In Tongi district, twelve Focus Group Discussions were also conducted with people working in disaster relief agencies such as Red Crescent. There are many more disaster relief people working in this area than in Moldhya and Dhakhin and I used the group discussions to hear

about their personal experiences in trying to support flood-affected women and this led to interactive discussion about why the needs of women are often neglected.

Figure 3.6: Focus group discussion in Shilai Union villages

3.6 Semi-structured interviews with flood-affected women

By conducting the survey and through recruiting participants for FDG sessions, the researcher got to know a wide range of women in each of the case study districts. Using a purposive sampling approach, interviews were conducted with individual woman with the age ranging from 18-80 years old. In each interview the researcher introduced herself to the participants and briefly explained the research, the research questions as well as different aspects of the interview and assured them that they could discuss their issues and challenges at their own pace, making sure they were comfortable. In addition, the researcher's knowledge of the local dialect helped to win the trust of interviewees as the researcher addressed them in kinship terms according to their age, to gain their respect as it is a social and cultural norm not to address people with their names as follows women were married and young as'*Bhabi*', elderly women as, *'Khala'/'Chachi'*, and older women as, *'Dadi'*. Interviews were conducted at the Red Crescent offices. While some women had no reservations about this, others said they would prefer to meet at a more neutral location such as their community centres or their homes. At some locations the women were frequently interrupted, which meant that the interviews took longer to complete.

The majority of the women interviewed were living with their husbands or partners at the time of the flood while some of them were widowed and living on their own. Three women interviewed were separated or divorced during the flood. Half of the sample included women with children aged from new-born to adolescents.

The interviews, which on average lasted approximately two hours, were conducted as 'guided

conversations' in which the women themselves determined the telling of their stories.

The interviews gathered information on the transitions and adaptations that the women and their families experienced during and after a flood. The participants were also asked to talk about flood impacts on their health and well-being, as well as that of their family members.

3.7 Semi-structured interviews with aid workers and government agents

A total of eighteen semi-structured interviews were conducted with the aid workers and government agents actively involved in disaster relief work. Interviewees were selected from the leading relief/aid agencies operating in Bangladesh, including Bangladesh Red Crescent Society, International Federation of Red Cross and Red Crescent Societies, Action Aid, and the government's Disaster Management Bureau.

In these interviews I encouraged the relief workers to talk of their personal experiences rather than seek to represent the views of their organization or employer. Again, I used open-ended questions to prompt the discussion of experiences and lessons learnt. In all cases, the relief workers said that the specific needs of women are rarely met and that success tends to be measured in terms of simple volumes of relief material distributed rather than the extent to which the relief aid is targeted to the most vulnerable people and groups in the disaster-affected communities. In general, the relief workers welcomed the opportunity to discuss their personal experiences and share some of their frustrations about poor targeting of relief aid.

3.8 Data Analysis

The sections below describe the processes by which data were organized and analysed. As mentioned earlier, the study was conducted using qualitative approach with two modes of data collection. The first being the survey questionnaire and second, the interviews and focus groups. My aim in analyzing the data was to look at *How the disaster response, relief, and recovery are provided to affected communities? What preparation and coping mechanisms are currently in place for women to provide immediate relief and recovery services? To what extent does gender bias exist in natural disaster management (DM) in Bangladesh?* The following sections will explicitly explain how the techniques were used in analyzing the data.

Survey questionnaire

A number of steps were taken once the once the questionnaire was returned to the researcher. Initial advice was taken from an expert in relation to the use of Social Package for Social Science (SPSS) to find out the best way for codifying and analyzing the data. Once this information was gathered, the next step involved entering the variables from the questionnaire followed by descriptive statistics which uses the data to provide descriptions of the population, either through numerical calculations or graphs or tables and inferential statistical analysis which makes inferences and predictions about a population based on a sample of data taken

from the population in question. These techniques were used to analyze the data and interpret the findings.

Interviews and Focus Groups

The qualitative and interpretive data collected from face-to-face interviews and focus groups were analysed using four analytical techniques: within-case display, content analysis, pattern search and explanation building. All these analyses were carried out using, NVivo. NVivo is a qualitative data analysis (QDA) software program used the analysis of unstructured text, interviews, focus groups, surveys (mixed methods) and social media. It has been designed for qualitative researchers working with very rich text-based and/or multimedia information, where deep levels of analysis on small or large volumes of data are required. This software allowed for efficient storage, coding, indexing and retrieval of data so that patterns in the data could be discovered. The software is based on a code-and-retrieve technique for within a "project" created by the researcher. It keeps "on-line" and "off-line" text organized and portable. On-line documents are the transcribed text while off-line documents are secondary data such as archival reports, tables and graphs from other sources.

3.9 Limitation of the study

While the researcher had the advantage of the language, the knowledge of local cultural practices remained limited and it was obvious that there were aspects of local life at the village that remain hidden as. I could never fully step into their shoes.

It was hard to work between the worlds of professional disaster relief and localized village life. Despite every effort it was very hard to translate some of the terms and assumptions that underpin disaster management work into language that the women could readily understand. It was equally difficult to translate the experiences of the women into a pragmatic, instrumental, language used by disaster management agencies. It was also difficult to gather accurate demographic data, not only because many of the women were reluctant to divulge personal information but also because concepts such as monthly income are rather obscure to them. Most of them live in a world in which income is erratic and takes many forms; 'averages' make little sense to them. In addition, several practical difficulties were faced many practical difficulties in getting women to attend interviews at particular times and many of them felt highly constrained by their domestic duties. Some felt the need to hurry home to cook for their husbands and/or children and some of my interviews were interrupted a number of times. It was difficult to find an appropriate venue for interviews and difficult to take notes, while also trying the best to make the interviewees feel relaxed. I did not transcribe the interview and group discussion recordings in full but used my notes to listen back to critical parts of the interviews and group discussions. The recordings were valuable to check the accuracy of my notes and memory. Mixed methods research is very time consuming. Conducting a survey with around 200 respondents in each case study community was the most time-consuming process of all yet it yielded fewer insights than the focus groups and interviews.

Red Crescent officers accompanied me when I met some of the women and this may have influenced what they told me, at least initially. Not surprisingly, the Red Crescent officers put me in touch with women who had received relief aid from them, and I had to consciously correct this bias by seeking out women who had received relief from other agencies or not at all.

CHAPTER FOUR

CASE STUDY: SILAI UNION

4.0 INTRODUCTION

Shilai Union villages are located in Munshiganj District, which is within the Dhaka Division of Bangladesh. As mentioned in chapter 3, the district has 14 rivers with a combined length of 150 kilometers flowing through it. The district is about 22 kilometers south-east from Dhaka city but the case study villages are located on an island (*char*) in the Padma River in the southern part of the district. They are in a rural zone and are relatively remote from the capital city.

The villages of the district faced major flooding in 1998, 2004 and 2008. All caused severe damage to the agricultural economy, particularly because they affected crops in the fields. The flooding had a prolonged impact on village economies and the everyday life of the villagers. The most recent major flood was in 2008. Most of the respondents to the research survey recounted their experiences based on their memory of the 2008 flood. The women reported that this flood was lower in magnitude than the 1998 and 2004 floods, but the flood occurred earlier than anticipated and many farmers suddenly found that they could not harvest their crops. The severity of damage to houses and disruption to daily activities was much more intense than in previous floods. The impacts of regular flooding in the district are cumulative, especially for those with few economic resources. Residents of the area are engaged in a constant struggle with recurrent floods and land erosion.

4.1 Location and flood vulnerability

As mentioned in chapter 3, the case study area experiences two monsoon seasons per year with heavy rainfall in July and August causing recurrent flooding. The villages experienced major flooding in 1998, 2004 and 2008. While women in the villages recalled that the 2008 flood was lower in magnitude compared to 1998 and 2004 it caused even more damage because it came earlier than anticipated and little had been done to mitigate its impacts. Most of the discussion in the case study research focused on the experiences of the major flooding of 2008 as the villages are still piecing together from the disaster. . As well as inundation of houses, roads and crops major floods like this cause problems related to soil erosion.

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Figure 4.1: Map of Munshiganj District

(Source: https://www.google.com/maps/)

Figure 4.2: Map of Munshiganj District, the location of the case study Shilai Union

(Source: https://www.google.com/maps/)

4.2 Demographic information about research participants

More than 90 per cent of people living in Munshiganj District are Muslims. Agriculture is the main occupation in the area where more than 38 per cent of people are involved primarily in agricultural activities and another 22 per cent of people work as agricultural laborers. Other major occupations include commerce, approximately 23 per cent, service economy, about 11 per cent, and foreign remittance, approximately six per cent (www.munshiganj.gov.bd/).

There were no primary education facilities in the villages until the government built a new primary school in 2009. In 2012 there were 365 students attending the school. The area has one high school supported by five teaching staff, comprising three female and two male teachers. There are 50 female-headed households in the two villages. There are no tertiary colleges or higher education institutes. There are seven mosques in Shilai Union villages. Each village has one bazaar (village market). The Modhya Shilai village has a health complex and a Land Settlement Office which provides services to both villages.

Figure 4.3: Map of Shilai Union Village

Source: Google maps

4.3 Production and livelihoods

To cope with losses caused by regular flooding, women in Shilai Union have adopted the habit of working in multiple seasonal occupations, such as stitching on a hand-loom during the rainy season to complement income they can earn by sowing crops at the appropriate time. Once the seeds are sown there is very little work for women in the fields, so they generally turn their attentions to daily wage labour (when called) or work as *buas* (house maids). In the harvest season they return to working as crop harvesters in the fields. Most poor women in this area depend on work as hired agricultural laborer's and their labour is in high demand in the harvest season. However, it is very hard for them to create work opportunities across the whole year.

During the first week of the fieldwork research in these villages, I carried out a survey to get basic information about the villages, the residents and the impacts of flood disasters. The survey results showed major sources of income at the household level were agricultural and non-agricultural labour as well as foreign remittances from relatives living and working abroad. The sources of livelihood of the villagers are presented in Table 4.1.

Table 4.1: Research participants' occupations

Occupation Sources of livelihood	Percentage
Agriculture (Land owner)	18.05%
Agricultural Labor (Seasonal)/ Other Daily Wage Earner	41.66%
Transport worker/Porter (Rickshaw/cart puller)	25.69%
Foreign Remittance	6.94%
Fisheries	5.55%
Small Business Owner	2.08%

Source: Field Survey 2011

Agriculture (Land Owner)

As agriculture is the main occupation in this area, those who own land are generally better off than those who have no land. However, the size of land holdings varies considerably and only those with larger holdings can consider themselves to be relatively comfortable.

Agricultural Labor (Seasonal)/Other Daily Wage Earner

People in this category are mainly those who have no land of their own and hence serve as daily wage laborer's in the field of those who have cultivable land. These people commonly also sell their labour to other non-agricultural based activities when agriculture-based work is not available. People in this group can be divided into two categories: a) those who do not have agricultural land but do have access to a homestead; and b) those who have access to neither. Eleven of the people surveyed in Shilai Union villages had a homestead, but no agricultural land, while three others had sold their homesteads after the 2004 flood to cover flood-related debts. Those with homesteads were mainly living in huts erected on government-owned *khaas* land (i.e. land that is owned by the government but not being used for any apparent purpose). These people were completely dependent on daily wage labour as a primary source of income. They often faced unemployment or under-employment. Women in this category were generally paid less than the men and they had very low social status in the village. Some of them said that the lack of reliable income made it hard for them to provide reliable food for their children.

Transport Worker/Porter

Most of the people in this category worked as porters in the local market. Some of the women in this category also worked in the government's Food for Work Program, mostly working on

road construction projects. Some of them told me that during floods they are not able to find paid work, and some are forced to migrate out of the district in search of other work. Five survey respondents in this category also sold milk, poultry, eggs, vegetables, fruit, oil and handicrafts in order to survive, often taking their goods to Munshiganj town to sell but this is impossible when roads are cut off by flood waters.

Foreign Remittances

About seven per cent of survey respondents were working in foreign countries as labourers to increase their economic opportunities. Some sold their land in order to pay the costs of travelling abroad and some were cheated by migration agents and lost all their assets.

Fisheries

Some of the respondents working in fisheries lived in their own homesteads and some lived in rented or shared houses or squatted on government land. However, only those who owned fishing boats considered themselves to be economically well off. Others struggled to make a living. During floods these people have difficulty finding work.

Small Business Owners

Only two per cent of respondents owned small grocery stores in the village or had stalls at the local market.

4.4 Cycles of agricultural production

In Shilai Union villages, the dominant products for sale are potatoes, jute, chilli, mustard, rice and sesame, sugarcane and bananas. The planting and harvesting times are shown in Tables 4.2 and 4.3.

Table 4.2: Harvests in Bengali and Georgian calendars

Month in Bengali Calendar	Month in Georgian Calendar
Boishakh	14 April to 14 May
Joishtho	15 May to 15 June
Asharh	15 June to 15 July
Srabon	15 July to 15 August
Bhadro	15 August to 15 September
Ashshin	15 September to 15 October
Krtric	15 October to 15 November
Aghrahayon	15 November to 15 December
Poush	15 December to 15 January
Magh	15 January to 15 February
Falgoon	15 February to 15 March

Month in Bengali Calendar	Month in Georgian Calendar
Chaitro	15 March to 15 April

Source: Banglapedia

Table 4.3: Cropping calendar in Madohya and Dhakhin Shilai

Agricultural product	Crop planted according to Bengali calendar/ Gregorian Calendar	Crop Harvested according to Bengali calendar/ Gregorian Calendar
Jute	Choitro/ 14 March to 13 April	Srabon and Bhaadro/ 14 July to 14 August and 15 August to 15 September
Potato	Aghrahayon/ 14 November to 14 December	Choitro/ 14 March to 13 April
Chili	Kartic/ 15 Octber to 15 November	Boishakh/ 14 April to 14 May
Mustard	Kartic/ 15 October to 15 November	Falgon/ 15 February to 15 March
Rice (aoush and Boro)	Kartic/15 October to 15 November	Boishakh/ 14 April to 14 May
Sesame	Choitra/ 15 March to 13 April	Joishtho/15 May to 15 June

Source: Field survey, 2011

The soil of Shilai Union villages is highly suitable for jute cultivation so it widely cultivated. Jute is planted during March and April and picked during July and August. The plants are gathered into bundles and soaked in the nearest canal under a layer of grass and brushwood until sufficient fermentation had occurred, allowing the fiber to be easily separated from the plant. This process takes 10 to 15 days. After fermentation, it is the women's responsibility to strip or separate the fibers. This activity takes about three months.

Other agricultural products that are grown in the study area villages include rice, sesame, chili, mustard and potatoes. *Aush* and *Boro* rice are planted during October to November and harvested in April and May. Sesame is planted during March to April and harvested during May to June. Mustard is planted during October to November and harvested during February to March. Chilli is planted between October and November and harvested during April to May. Potatoes are planted during November and December and picked during March to April. This shows that in the absence of flooding, agricultural work is available for most of the year. However, the cycles are radically disturbed by significant flooding.

4.5 Cultural restrictions for women in work

The occupations of rural women and their participation in the labour market in rural Bangladesh are constrained by the prevailing patriarchal culture. Cultural factors which restrict women's participation in work include practices such as wearing the *parda* (veil) and the widely held view that women should remain in their homes. Such restrictions and cultural biases have led to comparatively low earning capacities for the women. In the study area, women had to overcome cultural restrictions to play a key role in agricultural activities while

they also earnt money for their families by making craft products for sale and by taking care of livestock. However, while men can usually relax when they return home from work, the women have to cook meals and take care of all their domestic duties. This means they have little or no time to relax. During my time in the rural villages, I found that extreme poverty takes the women outside their homes to pursue income generating activities and yet social and cultural norms mean they are forced to take jobs that offer very little pay.

4.6 Key Findings

Starting with the research questions presented in chapter 1, a thematic analysis of the research data was undertaken and the key findings are presented under the themes that emerged from this analysis.

4.6.1 Flood Warning and Short-Term Impacts

In the focus group discussions, women described their experiences during floods including support they received from the government, NGOs and from the local community. All women in the study had a shared opinion that floods have not been properly handled or managed at any level. The general conclusion was that the information they received was conflicting and inconsistent. Furthermore, the women said that the poor levels of preparedness on the part of the local government to handle flood emergencies of the magnitude experienced during the major floods in 1998, 2004 and 2008 added to their difficulties. Insufficient information and resources or poor coordination of resources were common complaints among the women interviewed.

In focus groups and interviews women noted that flooding occurs every year in the rainy season (between July and September) and that when villagers know a flood is coming, they prepare their houses and build floating platforms (*macha*). Mostly they hear about impending flooding through radio announcements or verbal communication from other villagers. However, out of 30 survey respondents, only two people said that they heard about the forthcoming inundation over the radio during the 2004 floods. In 2008, the floods came suddenly--the floodwaters arrived at night--and the villagers had not time to prepare at all. There were few television sets in the village at this this, and most of the people I spoke to said that the only warning they got was from other villagers. In focus group discussions women said they are too busy with their domestic duties to pay attention to the radio or television broadcasts.

More than 83 percent of survey respondents said that they did not receive official flood warnings (see Figure 4.4). In monitoring news media discussions about natural disasters, I have noticed that they tend to focus overwhelmingly on cyclones rather than floods and they rarely convey specific or targeted information about anticipated local impacts.

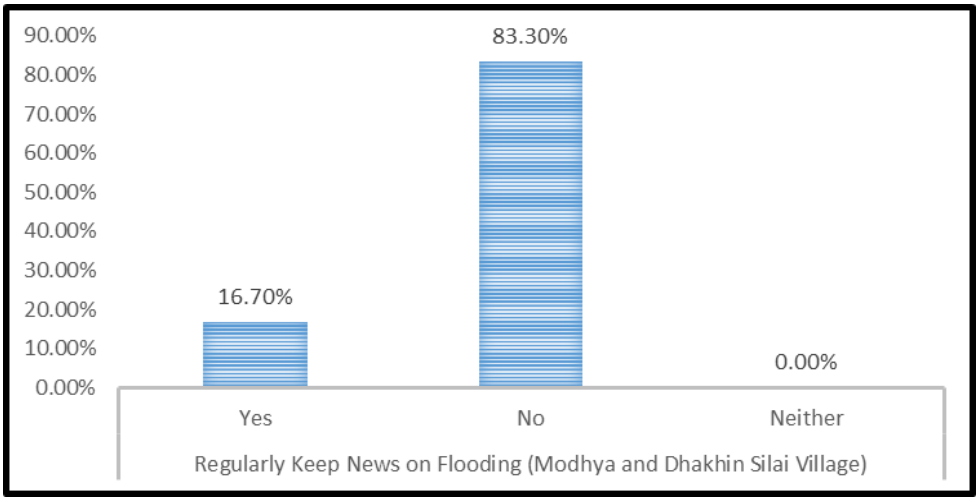


Figure 4.4: Survey results on flood warnings

The villagers reported that the notorious 2008 floods came around midnight without any notice and caused widespread panic. People I spoke to said that they spent the night on the *choki* (bed) along with their children, their valuables and their poultry and goats; were praying to Allah (God) that He might let them make it through the night. A sentiment expressed by several women in focus group discussions was:

> *We didn't have any information that a flood is coming and we were not prepared for it. It came all of a sudden during midnight. We didn't receive any relief during 1998 and 2004 flood. So, we were tried to save ourselves with the support of our neighbours in 2008.* [Focus Group, Silai Union, 2011]

About 75 per cent of respondents believed that communication technologies were not important for receiving disaster forecasts because broadcasts have failed to provide flood victims with enough information. However, the victims believe that the communication technologies can play an important role in informing them of flood forecasts. The problem could be the lack of access to modern technology; for example, how to access the internet.

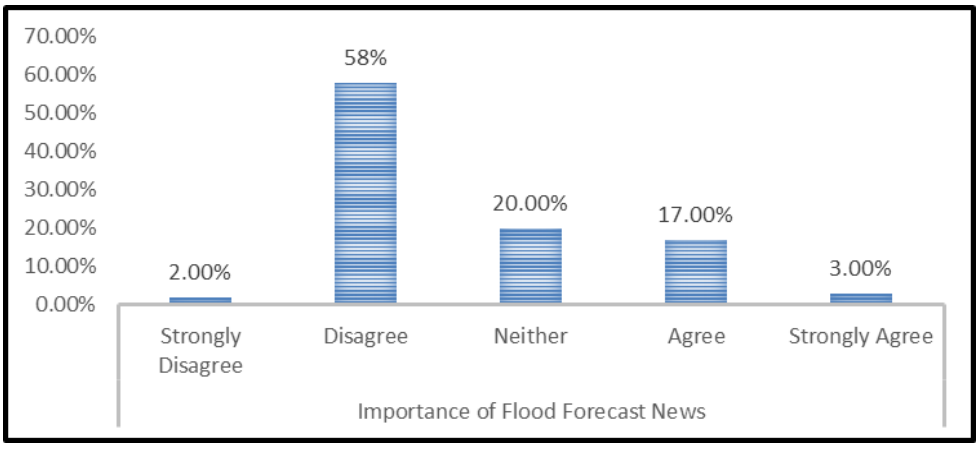


Figure 4.5: Survey Result: Importance of Flood Forecast News

In commenting on the sudden and unexpected arrival of the 2008 flood waters, Jamina Khartoum from Dhakhin Shilai, said:

> *When a disaster comes, the house and crops go under the water. Sometimes we lose our nearest ones. Waterborne diseases spread like an epidemic.*

Another interviewee, Sahara Begum, said:

> *My daughter fell into the water and we had to take her to the community doctor. We are lucky that she survived as I was careful and immediately found her in the water. We took her to the doctor without any delay.*

The following is my own synopsis of what a wide range of the women reported during my discussions with them in 2011:

> *We know what to do during a flood; we raised our houses during the rainy season, as we know that this is the time every year when flood occurs. We made a platform to save and keep our cattle; we also take shelter on the platform along with livestock. The male members of the family, with the help of the other male neighbours in the village, make the platform. It is very hard work but you can't always have neighbours help you out when everybody is trying to save their own home. Women are mostly involved with domestic activities. We knew this particular flood* [in 2008] *would stay for three to four months and we have to live in this water-logged condition. It was an enormous logistical effort to take necessary things to safe places; we have carried everything by boat. Those who did not have a home or a place to live had to live on a boat. Sometimes we have to transfer our valuable belongings to a safe place. Sometimes the flood comes without notice so we could not do anything or could not take any precautionary measures. We tried to save important documents, money, ornaments, clothes and dry foodstuff. In the years 1998 and 2008, floodwaters arrived and started rising all of a sudden in the night while we were asleep. We spent a sleepless night with a terrible fear.*

Interviewee Mumtaj Begum said:

> *My uncle died during the 2004 flood and we couldn't bury him here because the whole village was under water; we took him to another place by boat and buried him.*

There was no evacuation plan. The villagers mentioned that there was no place where they could go to take shelter. Traditionally they have lived with flooding and they take the suffering as granted. One focus group participant said:

> *We didn't receive any information on flood from any sources. If we knew about it earlier we could have prepared ourselves for it. In our village there is no place where we can take shelter. Making a macha* [platform] *is the only shelter for us, and if it rains, our lives become miserable.*

Many of the women mentioned that in the future they would definitely like to have flood forecasts from the government or any other source, so they can prepare themselves better.

Many research participants said that the government should build an embankment and/or a bridge that can protect them from floods so that they can travel to other areas during flooding. Women expressed concerns about future flooding, the costs and adequacy of flood proofing measures, and their financial security in the light of expenses that individuals had incurred as a result of the flood.

Morjina Begum from Dhakhin Shilai said:

> *We try to save some money for future floods or any other natural disaster, but there is little that we can save. When we realize the flood is coming, we try to collect dry food, arrange a boat, etc., but it is difficult because you need money to buy a boat. Sometimes the men try to make a boat for transportation during flood.*

4.6.2 Cooking, Food Preparation and Rationing

In Shilai Union villages the sources of food for most people are from their own homestead gardens, the local market and stores, or food received as wages. Villagers traditionally take three meals a day, but it is often difficult for poor people to manage three meals a day. During floods there was a great difference in the kinds of food available, the amount taken, and the regularity of food preparation. Poor people who already struggled to have three meals a day struggle to have one meal a day after floods and some were left starving. In Bangladeshi society, it is women who are primarily responsible for the preparation and serving of food for family members. Nevertheless, during my interviews all interviewees mentioned that their food intake and preparation is different during flood periods.

Single mothers and female-headed households had a much harder time during floods as they were not only responsible for earning wages, but also for the preparation and storing of food. These women often had to seek help from economically well-off families in the village to survive during floods, and if that was not enough, they commonly had to take loans from local money lenders. I asked some single mothers about their food and nutrition; whether they were able to manage adequate food and nutrition during and after a flood. Some said that they did not even manage nutritious food during normal times, let alone during floods. More than 53 per cent of the survey respondents said they did not receive adequate food and nutrition during floods; about 27 per cent of the victims reported being starving at some point.

Table 4.4: Survey result: Receive adequate food and nutrition during flood

	Received Adequate Food and Nutrition During Flood				No opinion	Total
	Had Very Little Food/Had to Starve at some point	Did not Receive Adequate Food	Received Adequate Food	Had No Trouble with Food		
Count	33	64	10	1	12	120
% within Location	27.5%	53.3%	8.3%	.8%	10.0%	100.0%

The research shows that preparation and consumption of food during floods is very different from normal times. During floods, survivors normally shelter on a *macha* and use portable mud ovens which use biomass or firewood for fuel (*chula*) for cooking. This presents another problem of collecting firewood, cow dung cakes or dry leaves for cooking, because they are very scarce during floods. This reduces the frequency of cooking as many women told me that they only cooked once every two or three days during floods.

There was also variation in the amount of rice or other food cooked and served to the family during floods because the women have no choice but to start rationing food. The women commonly reported that most of their meals would be *khichuri* (hotchpotch of rice and lentils cooked together). Those who could not afford even *khichuri* would either starve or look for herbs or leafy plants that grew naturally in water. The women told me that during floods their families sometimes eat fish if they can catch them, but meat would be the rarest meal unless their poultry or livestock became very sick and they had no other way of saving them. One woman from Modhya Shilai area told me:

> *Apa* [sister], *we cannot afford fish and meat, even in normal times. Sometimes we catch a fish from the canal or pond and eat that but during the flood it is difficult to catch fish.*

Most of the women mentioned that they tried to provide food for their family members first and only ate leftovers themselves. They prioritized saved other family members from illness or physical weakness. Women also mentioned that they eat *fen* (rice gruel) during flood times which they would usually throw away. Some poor women reported that they often had to survive on rice gruel in the normal, flood-free times as well, but they do this reluctantly because they do not want to waste anything. They said they would not give *fen* to their husbands or children. About 50 per cent of the women interviewed reported preparing their meals by only boiling vegetable roots, herbs and animal fodder without any spices during flooding. Normally people in Bangladesh would not eat anything if spices are not included in the cooking, but during the flood everything becomes useful. Many flood victims mentioned that even if they managed to cook rice, they would pour water on the leftovers and eat it the next day and add chilli. They called it *panta bhat*.

The women said that during floods they prepare food that needs less fuel, such as a different kind of *bharta* (mashed vegetables/potato). Sometimes they cooked *shapla* (water lily), Different type of herbs or vegetables such as *kolmi shak* and *kochu shak* (arum leaves) were a common source of food for them during floods.

4.6.3 Community Health Concerns

The impact of a disaster on the physical, mental and social wellbeing of individuals and communities will vary depending on how well they can cope with any sudden changes. During floods, most of the research participants in this case study area did not have enough sleep. Most of them mentioned that they had hardly slept during flood periods. Some said they spent the

whole period of the flood on a *macha* or on top of their tin roof. There was no temporary refuge where they could go and take shelter. There was a school that could be used but access to the school was not provided by the local authority. Worries and disturbances kept most of the women awake through the nights. The *macha*s were commonly built in a hurry and rarely had enough space to accommodate the whole family comfortably. Often, they did not have a roof, yet sometimes people had to share their space with neighbours. Those who have young children had to stay awake at night to guard their children from falling off the *macha* into the warer. As Ruma Begum from Dhakhin Shilai village put it:

> *I couldn't sleep the whole night. We were staying on macha with my parents and my young boy. He was only two years old that time. I was afraid he might fall off from macha and drown.*

When I asked why she was so worried about this, she mentioned that in their neighbourhood, one young boy fell off from *macha* and drowned in flood water. The mother was sleeping at the time and could not save her son.

A number of the women were particularly worried about the safety of their young daughters. As Jamila Khatun from Modhaya Silai village put it:

> *We stayed on the macha during the whole flood period. We cooked there, slept there. I could not sleep at night. I was worried about my two young daughters. It was dark all around, and I couldn't arrange kerosene for lamps, so we had to stay in the dark at night. I lay awake in the darkness thinking about the danger that might occur to my daughters. Finally, we sent them to my father's house, which was out of the flood-affected area.*

Sleepless nights, therefore, were a common experience of most of the flood victims, which undoubtedly caused deterioration in their general wellbeing. However, this particular impact of the flood is probably not noticed by many outsiders because the women are reluctant to talk about it.

According to the survey respondents, around 90 per cent of the tube-wells in Shilai Union area were inundated with flood water and the ponds were filled up with salt water so they had to go far to collect drinking water. Women went to other villages on boats to collect drinking water and often the boats would capsize in the flood waters with the heavy load. They used alum to purify the floodwater for drinking or boiled it if they could not get the alum. Sixty per cent of the survey respondents and most of the interviewees said that they felt insecure moving around in floodwaters due to the possibility of snakebite as well as possible physical abuse from others also trying to get drinking water.

One woman said:

> *Every day I had to swim to the tube-well with a dekchi (cooking pot) and waited in the chest-deep water for a long time to collect water from a tube-well which was under water. After a great struggle, I managed to collect one dekchi of water which I used for the whole day…. This one pot of water was a precious asset for us, and we had to use it very carefully. We used it for cooking and drinking. But that small amount was never adequate for the*

needs of the whole family, and we could not always drink when we were thirsty.

Many diseases are also associated with contaminated water and water shortages. Without adequate water people cannot wash themselves or their clothes properly. Cooking utensils cannot be cleaned and food cannot be prepared hygienically. The restrictions on cleanliness result in various parasitic, fungal and skin diseases and eye infections.

4.6.4 Personal Hygiene for Women

During interviews and focus group discussions, the women often mentioned that the most uncomfortable and awkward problem for them was the lack of latrines. Most of the houses in that area had pit latrines and most of those are flooded or washed away. They said that they had to look for substitutes. One woman said:

> *In our area, we, along with another four families built a temporary toilet. The male members of the family made a small square platform with bamboo as a temporary toilet, and then tied pieces of jute around that. We would sit on the platform and defecate. It was quite difficult to keep balance. Five families used that toilet during the flood.*

I was told that older people often cannot make such temporary toilets, so they have to defecate on a piece of paper and throw it away in the floodwaters. This reveals how floodwaters become contaminated and dangerous to the hygiene and wellbeing of the flood-affected people. Living in such conditions for any length of time causes psychological stress. I was told that many young children suffered from diarrhea. The main reason for this is probably the flooding of the tube-wells. Respondents mentioned that they tried to boil their drinking water but boiling alone was not enough.

The research participants noted that there are other common diseases associated with flooding, such as fevers and the common cold. People suffer a lot during floods, even after the floodwater subsides. In some cases, women reported that their children suffered from pneumonia as well. Meanwhile, the women often had to stay in wet clothes for a long time as they had to move about in the water for various reasons. The nature of their clothing--*shari*--makes it difficult to dry and they commonly stay in in wet clothes for days on end.

Ill health forced many of the women to seek medical treatment for their children or themselves but they could not go to a proper medical clinic so they commonly sought treatment from what people in Bangladesh call *kabiraj* or “quack doctors”. The survey showed that over 80 per cent of the respondents sought the help of a quack doctor.

Most of the women in interviewed and in focus group discussions complained about developing sores on their feet as well as other skin diseases from walking in contaminated water. One man I interviewed mentioned that a peptic ulcer he had been suffering was aggravated during the flood, perhaps due to increased anxiety. However, whatever the health problems were, the biggest problem was that they had no access to a hospital, pharmacies or general practitioners because of the distances and major transport problems caused by flooding so they relied on unqualified “quack doctors”. For many the biggest problem was transport

while some said that they would not be able to pay for a visit to a doctor even if one was in reach.

4.6.5 Other Specific Challenges for Women

The women in this case study face a wide range of challenges during floods and some of these have already been discussed. Of course, men also suffer in the same conditions and they find it very hard to get paid employment. However, many of the women said that the unemployed men tend to sit around while the women have to get on with their responsibilities to look after children and older family members as well as poultry and livestock. They carry the responsibility to protect the family assets.

In addition to those already discussed, specific challenges facing the women were:

Fuel/firewood collection

Because women are mainly responsible for preparing food for their families, they have to find cooking fuel. Dry wood is almost impossible to find and the women have no space to dry it out on their crowded *machas*. Many of the women told me that they have to travel long distances by boat to collect dry wood. Some women said that they reduced their cooking to make the wood go further. Others said that they resort to alternative fuels, such as cow dung, coconut husks and rice hulls. Even when they could get fuel cooking on crowded *machas* was always a major problem.

Insecurity

Most of the women told me that they always feel insecure at night during floods. Some said that they are left along with their children when their husbands go in search of work and they worry about thieves or strangers. Women with daughters appear to worry the most and one interviewee, Halima Begum, said:

> *My daughter is 19 years old. My husband was not here during flood periods. He is working as a day labourer in agriculture fields. During flood periods there was no work for him, so he went to Dhaka city for jobs. I stayed home with my three children. I can't sleep a single night because I was worried about my daughter. I don't feel safe when there are no male family members at my house.*

Lack of *machas*

Some of the women said that they could not build a *macha* platform because of the shortage of materials needed. They had to ask help from neighbours or relatives. Some poor women lived in boats tied to big trees during the flood. I was told that many poor women are forced to sleep without cover.

Toilet issues

When I discussed the issue of toilets with the women most of them said feel ashamed to go to

the toilet in front of others. Many of them said that they go into to the bushes or a jute field rather than use temporary toilets. A number of women told me that they try to put off going to the toilet for as long as they possibly can, but they said that this leaves them with abdominal pain or discomfort. The easiest option is for them to urinate and defecate over the edge of their *macha* in front of their children, but this causes them great embarrassment. The women were very reluctant to talk to me about these issues but were able to do so in focus group discussions.

Menstruation

Many of the women said that menstruation is the most difficult time for them during floods and even more so for adolescent girls. According to Mumtaj Begum:

> *Normally in regular time we try to hide our menstruation things from the male members of the family. We use cloth and wash it and use that again. But during flood time when I went through an awful time as I had to keep the same cloth on all day, even if it was completely wet. As men of the family stayed at home during a flood, I would feel shy to change and wash it. I couldn't wash until late at night. I washed the cloth at midnight with flood waters. I felt scared as there were so many snakes in the floodwaters and at night I couldn't see anything.*

A young woman, Shiouli Begum, said:

> *I collect pieces of clothes from a tailor shop. I used that during my menstruation period. After using, I threw them into the floodwater. I had to be very careful about men while doing this. It would be very shameful if men found me doing this.*

Looking after livestock

As mentioned earlier, women are primarily responsible for the care of the family's livestock. During floods, they commonly keep the poultry and goats with them on the *macha* platforms. However, this ensures that the *machas* are crowded and uncomfortable. Finding food for the livestock is another problem during floods. Those who have cows try to find high ground for them and this is normally along road embankments. However, a number of the women told me that theft of livestock is always a problem when they are not within sight.

Mobility

Women research participants told me that they find it very difficult to move from one place to another during floods. Connecting roads are often cut and the women said that it is harder for them than men to get access to boats.

Seeking refuge

In Shilai Union villages there were no allocated flood shelters. As mentioned already, most people in flood times live on *macha* platform or on the roof of their house. Those who are not able to construct their own *macha* have to rely on neighboukrs or others villagers to provide

shelter. A few of the women said they have gone to their parents' house but this can mean that they lose contact with their husbands. For example, Majeda Begum, said:

> *During the 2008 flood, my house was inundated with floodwater. The water was up to my waist. I didn't feel comfortable to live on the macha because my daughter was only two-and-a-half months old. So, I went to my parents' house. I was there for three months. I was worried about my husband. I didn't get any news from him. It was not possible for him to visit me because he had to guard our house. I was mentally depressed.*

4.6.6 Relief Aid

In Shilai Union villages, the local *Union Parishad* (local government authority) served as the relief distribution agency for all government relief. The Chairman of the *Union Parishad* has the responsibility to distribute relief among villagers. The Chairman and the members of the *Union Parishad* draw up the list of beneficiaries. This was the case for the big 2008 flood and, according to one interviewee, government relief included two kilograms *chira/muri* (parched rice) and half a kilogram of *gur* (molasses) per adult with half of this amount being allocated to each child. However, a number of women said that most of the relief aid went to relatives of *Union Parishad* members while most of the women I spoke to said that they got nothing. A relative of a *Union Parishad* member was present in an early focus group discussion and this made the women reluctant to talk about the issue. However, when I reconvened the group without the UP relative present one woman said:

> *I could not provide any food for my children; they were crying for food. I went to the local UP member for relief, but he refused to support me and said my name was not on his list. But in my area, relatives of the UP member received chira, muri and gur and sold it to the local market. They also have the Vulnerable Group Feeding (VGF) card system; with this card they received monthly support [rice] from the government. They are not poor like me, but they are the relatives of members. The government never looks at this type of corruption.*

The Bangladesh Red Crescent Society (BDRCS) provided 'family kits' to flood-affected people in the district during past floods. However, the research participants said that the relief was not adequate to provide for the large number of flood victims. The women said that one or two organizations may not have enough resources to look after everyone and one woman said:

> *They make a beneficiary list, and they provide relief, according to that. Red Crescent mentioned that they were providing support to the most vulnerable people, but during the flood everyone is vulnerable.*

Some of the women said that the relief they received was helpful but only for a short period. Major floods disrupt normal life for up to three months and relief aid has never been enough for such disasters in this area. Approximately 50 per cent of the survey respondents said that they did not receive relief aid during major floods and around 20 per cent said they were forced

to turn to better-off neighbours to survive the crisis

Most women interviewed praised Red Crescent for providing some relief aid, but they also complained that the local secretary of the Red Crescent Executive Committee was not fair in allocating it. A number of women said that most of the relief aid went to relatives of the committee secretary or to those who support the same political party that the secretary supports. When I pressed this matter in discussion, most of the women agreed that relief aid only goes to people who support the political party in government. Furthermore, some women who received relief during a flood period said that it did not make a big difference. As one woman put it:

> *Relief doesn't matter too much to us. How many days can we survive with one kilo of chira or muri? We need jobs that can support us throughout the flood period.*

Another woman said:

> *I received one kilogram of chira, as relief and that was finished in two days and after that I used to eat shapla [water lily], herbs, fen (rice gruel) throughout the rest of the flood. Sometimes one rich neighbour gave me some rice; I fed my children with it, and that was all that I received as a relief.*

While relief aid was welcomed it was generally considered to be inadequate with the survey showing that only 56 per cent of respondents were satisfied with the relief they received (see Table 4.5). A majority of the survey respondents did not feel that the relief aid met gender-specific needs (see Figure 4.6)

Table 4.5: Survey result: Service satisfaction of relief organizations

Satisfied level with the service of the relief providing organization						
	Very dissatisfied	Dissatisfied	Neither	Satisfied	Very satisfied	Total
Count	2	45	4	68	1	120
% within Location	1.7%	37.5%	3.3%	56.7%	8%	100%

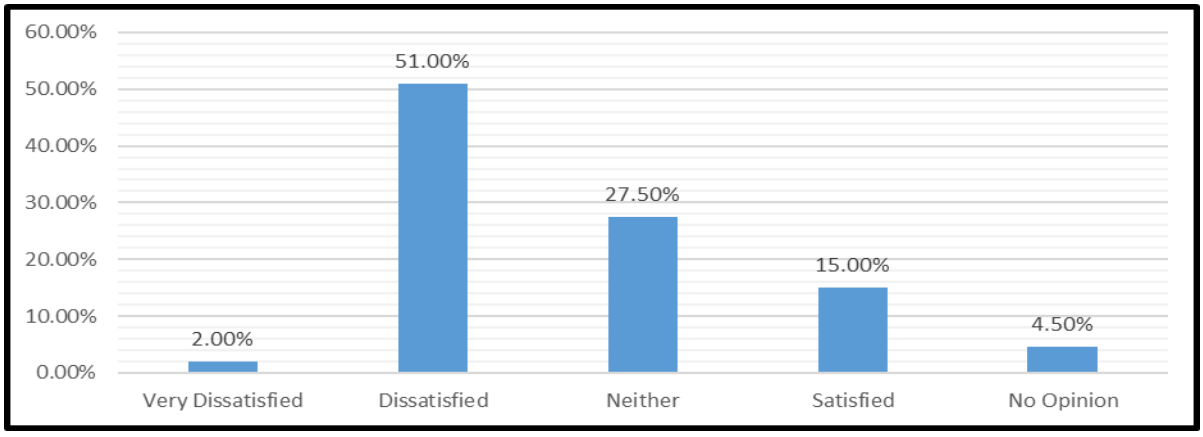


Figure 4.6: Survey result: Relief Material Addresses Gender Specific Needs

This study found that most of the aid for flood victims in this research area came from within the community itself. Those who were economically better-off generally helped their poorer neighbours, and while the support they provided was not adequate to ensure their wellbeing, it was enough to keep them alive. I was told that men often helped other families that were headed by females and some wealthier families provided work for some of the poor families. Those who had one or more family members working overseas were able to get regular financial support from their remittances.

In summary, relief aid does little to end the misery of flood victims. It can, however, ease their suffering if it is provided in adequate amounts and at the right time, and if it reaches the people who need it most. In this research area, however, the research revealed that the amount of relief aid has been inadequate; it has not been distributed according to need; and it has not catered for gender-specific needs. It has failed to reach the most vulnerable flood victims.

4.6.7 Coping Mechanisms

One of the objectives of this research was to explore different coping strategies of the two village communities by studying their livelihood and survival strategies during floods. With floods affecting people regularly, those living in flood-prone areas have invented some coping mechanisms. These mechanisms, or practices, cannot save them completely from all the negative impacts of flooding, but they help them reduce the amount of loss and can help them on the road to recovery.

Household coping strategies of the villages are wide ranging and vary according to skills and resources, as well as extent of past experience. Food conservation and preparation are obviously key considerations for any survival strategy but coping mechanisms also focus on the protection of houses and other physical structures, livestock and crops and the management of drinking water and sanitation. With limited resources it is hard to sustain such coping mechanisms for the duration of major floods but they can be the foundation for more effective disaster aid.

This research uncovered the following key coping mechanisms on this case study area:

Storing paddy/rice

The survey showed that over 80 per cent of the respondents stored some paddy/rice during floods in order to avoid running out of food completely.

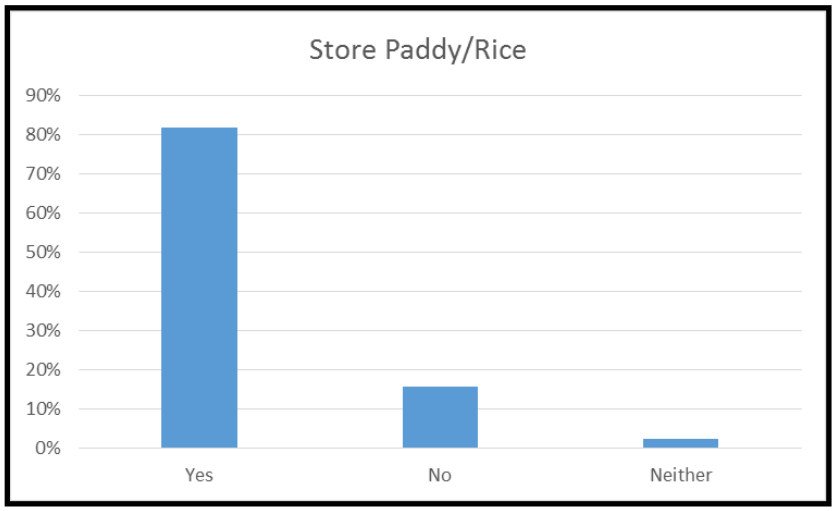


Figure 4.7: Survey result: Storing paddy/rice

Storing dry food

Most of the women I spoke to said that they make a big effort to store dry food such as *chira*, *muri*, *gur* before floods come and the survey found that over 88 per cent of respondents try to store dry foods and rice during floods, including *chira*, *muri*, *gur*, pulses, salt and cooking oil.

Figure 4.8: Survey result: Store dry food/rice

Elevating house plinth and strengthening the house

In the villages, most of the poor people made their houses with mud and this form of housing is badly affected by flooding. Some well-off families have bamboo houses that are a little less vulnerable to flooding. Participants in the study, confirmed that brick and wooden platform houses cope best with flooding, but few people could afford to have such houses. For mud houses, the most common flood mitigation measure taken was raising the height of house plinth. Usually, villagers dig up a ditch or pond near their house and use the soil to raise the house plinth. To reduce flood water impacts and the effects of waves and erosion they often plant trees and catkin-grass around homesteads to protect the soil. Some people who can afford to make a temporary fence do so with bamboo, jute-stick, and water hyacinth.

Another popular measure for protecting the houses is to tie ropes around the outside and linking the main joints with bamboo poles. This research confirmed that the brick and wooden platform houses were more flood-proof than earthen plinth houses.

Figure 4.9: Elevated House Plinth (author's photo)

Rising above the water

The plinth of all dwellings in Silai Union villages were submerged during the catastrophic floods in 1988, 1998, 2004 and 2008. For such big floods the villagers rely on using a platform, *macha*, inside their houses. A simple version of this is to place two *choukis* (cots) on top of each other in order to keep bedding and other belongings above water level. However, purpose-built *machas* can be made from bamboo and these can float on the rising water. If the water level rises to the ceiling of the house the floating *machas* can be taken outside and used as temporary shelter, sometimes with a roof attached. When flood waters are very high people often get onto the roof tops to make temporary shelters. This study also revealed that most of the houses in Silai Union villages had false ceilings in order to make space to store important belongings. Of course, there comes a point when going higher does not work and in big floods people may have no choice but to leave their houses and move to higher ground. However,

they try to stay in their homes as long as they possibly can.

Health care

Given that there was no hospital in the study area, flood victims told me that they are more likely to use local remedies—involving locally available herbs—and if these do not work they tend to rely on the local "quack doctors". During floods the incidence of snakebites increases because snakes often take refuge from the floodwaters in structures such as houses. A number of women told me that people with snakebites are often taken to the local snake charmer of "quack doctor" but if they have been bitten by highly venomous they are not likely to live.

Elevating tube well platforms

The research found that more than 84 per cent of the local tube wells in Silai Union villages were set on higher ground. The platforms of some tube wells were constructed so that they could be elevated even higher during floods, although they struggle to keep the platforms above the level of major floods.

Figure 4.10: Elevated tube well (author's photo)

Elevating toilet platforms

Most of the toilets in the study area villages were pit toilets. Interviewees said that during floods they try to elevate the toilets by using ring slabs, but this rarely works in big floods and the toilets are frequently washed away. When the pit toilets cannot be used, the villagers often construct hanging toilets that open directly to the floodwaters. These are clearly not hygienic, and they require users to have good physical balance, making them difficult to use for young children and older people.

Looking after poultry and livestock

Poultry and livestock are part and parcel of the villages for they provide a source of income as such, looking after them is as critical as the people itself. Keeping poultry and livestock during flood was another challenge for the villagers and especially for the women. People traditionally keep their poultry and goats with them on their *machas*. However, if flood waters rise above the level of fixed *machas* and if they stay for a long period of time, this particular coping mechanism is hard to sustain. Women told me that they sometimes make floating cages for poultry by using a few layers of straw and water hyacinth which are then placed over a flat platform made of banana trunk as a base. However, this uses up material that can also be used as fodder for poultry and livestock so that counts as a loss. Many women said that in big floods they often have to sell their poultry or livestock, especially if they run out of money or credit and borrow money at high interest rates from local moneylenders. It was also noted that poultry and livestock get sick by drinking contaminated flood water and have to be sold at a low price.

As mentioned earlier cattle are commonly taken to high ground during flooding but the women said that the difficulty of doing this forces some women to have their animals slaughtered so they can sell the meat. Furthermore, if the animals grow weak because of malnutrition the owners may be forced to sell them for slaughter. The survey showed that around 95 per cent of the respondents sold their poultry and livestock during major floods.

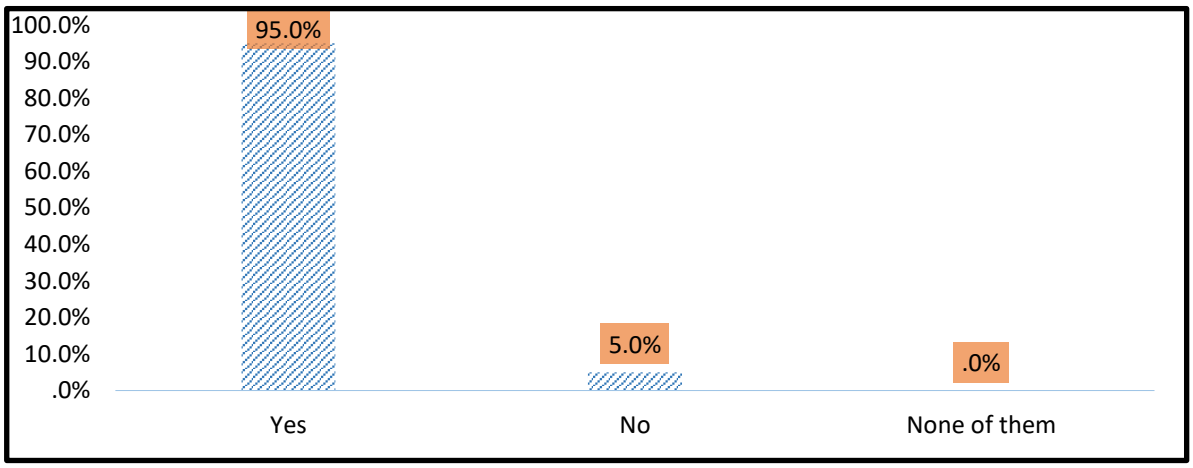


Figure 4.11: Survey result: Sale poultry during and before flooding

Transport

Boats are often the only means of transportation in flood-affected areas. Many households in Shilai Union villages had their own small boats. However, many poor families cannot afford their own boats, so they often build rafts by tying together trunks of banana trees or by lashing together a great many water hyacinths. Such rafts are not a fast means of transport, but they may be the only option. Some women said that if they need to travel relatively short distances they mostly swim or wade through the floodwater.

Drinking water and sanitation

The survey indicated that more than 84 per cent of people elevate their tube wells to avoid flood water contamination and some use pipes to elevate them further when flood waters arrive. Some of the women reported that they had received aid from non-government organisations to elevate their tube wells. However, a significant proportion of houses have no tube wells at all.

Loans and financial aid

Around 90 per cent of the survey respondents said that they borrowed money at some point during the flood or soon afterwards. Poor households rarely have savings when a flood occurs and they often have little choice other than to borrow money. The women told me that they borrow from relatives or neighbours when they can and in small amounts that they can repay. However, the duration of big floods means that they often have to turn to local moneylenders (*mahajans*) who charge up to 40 per cent in interest.

Rationing of food and other necessities

Although most people I talked to, had some emergency food supplies in case of flooding. They said that they had to impose severe limits on their daily food intake in order to make the rations last as long as possible. Past experience means that people know they have to make rations last longer, but this becomes a rather desperate survival strategy which can only loosely be called a coping mechanism.

Seeking alternative sources of food

As discussed earlier, women in the focus group discussions talked about alternative sources of food, noting that fish can sometimes be caught in the flood waters. They also talked about eating waterfowl and other birds that they would not normally think of as a food source. They collect natural herbs and edible plants. A number of women said that they mainly rely on eating boiled water lilies.

4.7 Livelihood Considerations

Discussions with the women about how they can sustain livelihoods when agricultural production is stopped by flood waters revealed that women as well as men often go outside the district, even as far as Dhaka, seeking work; some of them never return. However, paid work is only one consideration in thinking about how the women support their households during and after prolonged flooding. About 44 per cent of the survey respondents said that some members of their family had left the district in search of paid work and all said they know of people who had done so. There are both pull and push factors at work here. Push factors include the fact that people who rely on subsistence farming cannot survive long floods or they end up owing too much to local moneylenders and have to sell all their assets to escape the debt. The biggest pull factor has been the growing garment industry in and around Dhaka, which can provide employment for many and women in particular. Although the garment industry offers paid employment for a large number of poor women, the rates of pay are low and the conditions

are frequently difficult and dangerous so this “escape” from poverty can be an illusion.

There are, of course, some villagers, mainly men, with enough education secure better paid jobs in Dhaka, but interviews suggested that they mostly end up in low-paid jobs. Work in the Middle East is another pull factor and villagers hear of high rates of pay in Middle Eastern, in particular in the construction industry. During my fieldwork in the villages, I encountered around 50 people who had been to the Middle East to find work. Some of them were able to send money back home while they worked in various Middle Eastern countries. However, many of them told me that they were cheated by fake migration agents after they sold assets to travel abroad. They said they were left in an even worse situation because of this.

As discussed already, women undertake many forms of work in and around their homes; including livestock rearing, vegetable growing, paddy husking, making handicrafts and running very small businesses. The expansion of microfinance lending targeted to women in recent years has increased their involvement in running small enterprises, whether that be within enterprises run by their husbands or by themselves. In addition, many of the women in the study area villages also worked alongside their husbands in cultivating their own fields. Working on farms of other people, however, is still the main source of paid labour but there is less need for manual labour with the increasing use of farm machinery. Women told me that they more often work on larger farms with large fields and they work in bigger groups and are often paid in kind (i.e. vegetables) as much as cash.

Table 4.6: Survey result: Daily wages earned by male and female agricultural labourers

Daily Wage Earned by Male and Female Agricultural Labours		
Sex	Daily Wage without Meal	Daily Wage with 2 Meals
Male	80	50
Female	50	20

The bigger farms produce a greater rotation of crop types and the fields are rarely left fallow. This means that the work is spread more evenly across the year, but the total wages are less. In some cases, poor families have tried to make up for lost wages by increasing the number and size of the livestock they maintain and some also supplement the household income by driving rented rickshaws or by buying a rickshaw and hiring it out to other drivers. The rather complicated story of what people do to maintain family incomes and how these are disrupted by big floods was captured well in the account given by Nazma Begum from Dhakhin Shilai who said:

> *I was destitute, and my family had no land. Along with my family I came here in this char to live. My husband was a day labourer. My husband started out driving a rented rickshaw, and I became a seasonal agricultural labourer. I used to pick potatoes and get some money from that. I saved some money and bought a goat. The goat gave birth to two calves. After some time, I sold one for 1000 taka. With the money, I bought another goat which I reared. Once it began to have calves of its own, we were able to*

start selling milk to our neighbours. Later on my husband sold the milk at the local market. This gave us the funds to buy a rickshaw for my husband. With the money, I earn from selling milk and my husband from pulling the rickshaw we became able to feed our family three times a day. We don't have to buy food for cows as the grass is free. But during the last flood when the entire village was under water, and my husband couldn't pull the rickshaw, we had no food for the cow. We had to sell the cow to provide food for the family

Another woman, Shamsunnesa, said:

I grow vegetables in my homestead such as begun, lau (gourd), *cucumbers and seasonal vegetables. My family doesn't need to buy vegetables, and I sell the extra in the local market. I work in the vegetable field, weeding and tying up the vegetables. Now vegetables have become so profitable, all family members, my husband as well as our children, work in the field. I work only on our own field, but there are many women in the area who work for wages in other people's fields. But life was not the same during the last flood as my vegetable garden was destroyed by flood water. I had to sell chickens and vegetables at low prices, and we were struggling to provide food for the family members.*

Because flooding is almost an annual event in this area people have learnt how to survive minor floods, but major and prolonged flooding is another story altogether.

4.8 Lessons for the Future

The residents of each flood-prone area in Bangladesh try to cope with flooding events according to their traditions, culture and resources. The research suggested that people living in the study area villages make good use of the resources they have, but these resources are not enough for them to survive significant floods with any degree of comfort. The research confirmed that mud plinths are easily washed away and that flood mitigation would involve the provision of better building materials, many of which can be sourced locally. The research showed that established coping mechanisms would be more effective if the villagers received better warnings with some details about expected water levels, wind directions and speeds and anticipated duration of the flooding event. As highlighted, the traditional coping mechanisms cannot cope with prolonged flooding. This suggests that short-term flood relief could aim to enhance the local coping mechanisms but more long-term assistance is needed when the coping mechanisms become ineffective. Some families may survive the flooding event but with depleted resources and debts making it impossible for them to escape the consequences. Short-term flood relief is not enough when longer-term survival is not considered.

This study suggests that debts owed to local moneylenders (*mohajons*) are a major impediment to post-flood recovery. This, in turn, suggests that more attention should be given to ways of providing flood victims with low interest loans and long repayment schedules.

This study has also shown that women in the case study villages suffer a much wide range of health and wellbeing challenges than people working in disaster relief and recovery have

imagined. Women caring for children and elderly members of their family are under enormous mental and emotional stress with very little support.

During the research in Silai Union villages, I asked many people for their suggestions on what could be done to make it easier to survive flooding in the future. Most said they needed assistance to better flood-proof their houses and home compounds so that they did not have to leave them. However, many acknowledged that, it is not always possible to stay in their homes during big floods and they suggested that there is a need for an adequate flood shelter where people can take safe refuge. The key recommendations that I gathered are as follows:

- The local government should build a flood shelter or multipurpose building so that people can take shelter during floods;
- The local government should ensure good communal facilities when people cannot stay in their own homes;
- Culverts need to be made to ensure that excess water drains away more quickly;
- An adequate embankment is needed along the bank of the Padma River to protect the village from minor flooding;
- Public latrines need to be built on relatively high ground or on a raised location so that people can use them during floods and this will help reduce the spread of contagious diseases;
- Public tube wells should be built on a raised platform to reduce contamination of drinking water;
- Traditional homestead compounds can be raised to reduce flood impacts, often by using traditional flood-proofing techniques
- A flood shelter should have separate rooms and toilets for women;
- A flood shelter should have enough light to provide safety for women;
- Flood warning systems need to be improved;
- Needs-based distribution of relief needs to be ensured;
- Women need training to get involved in more income-generating activities;
- Homesteads need to be constructed with plinths that are nearly two metres higher than the surrounding land;
- Employment should be created for men and women in the post-disaster period;
- A hospital which can be reached during floods needs to be constructed in the area;
- Awareness campaign are needed for multi-hazard mitigation and preparedness;
- The school curriculum and schedule should include lessons on disaster management and drills in disaster prevention and response.
- There need to be much better databases on disaster vulnerabilities, risk management and disaster recovery to better educate disaster management workers and the wider public.

The proposed prevention and recovery measures need always to be fitted with the specific need of women due to their socio-cultural distinctiveness in Bangladesh. It should be built in a way that women can have access to these services adequately without any constraints.

CHAPTER FIVE: CASE study: TONGI UPAZILA

5.0 INTRODUCTION

Tongi Upazila is located about 25 kilometres to the north of Dhaka city centre. Tongi Upazila contains numerous medium to large industries and is particularly known for its cottage industries (Bangladesh Bureau of Statistics, 2012). With an area of 446.38 square kilometres, Tongi Upazila is bordered by Sreepur Upazila to its north, Saver Upazila, Uttara Thana, and Rupganj Upazila to the south, Kaliganj, Rupganj Upazila on the east and Kaliakair and Savar Upazila on the west. The main rivers are Turag, Balu, Labandaha, and Salda. Tongi (town) comprises nine wards and 31 *Mahallas* (administrative districts). The district covers approximately 49.32 km sq. and is home to many of Bangladesh's important establishments such as the Bangladesh Rice Research Institute (BRRI), Bangladesh Agricultural Research Institute (BARI), Central Extension Resources Development Institute (CERDI), Seed Certifying Agency, Security Printing, Machine Tools Factory, Bangladesh Ordnance Factory, Diesel Plant, Bangladesh Institute of Technology (BIT), BRAC Dairy Farm (Bangladesh Rural Advancement Committee), Nova Poultry Limited, and Cremation Ghat (BBS, 2012).

5.1 Location and Flood Vulnerability

The lowland of Tongi Upazila floods almost every year during the rainy season. The flooding commonly begins at the end of June and goes through to the end of September. During 1998, 2004, and 2008, the city experienced huge flooding that submerged two-thirds of the city leaving people with no other alternatives but to live in waterlogged conditions for two to three months during major flood periods (fieldwork interviews). Figure 5.1 and 5.2 shows the map.

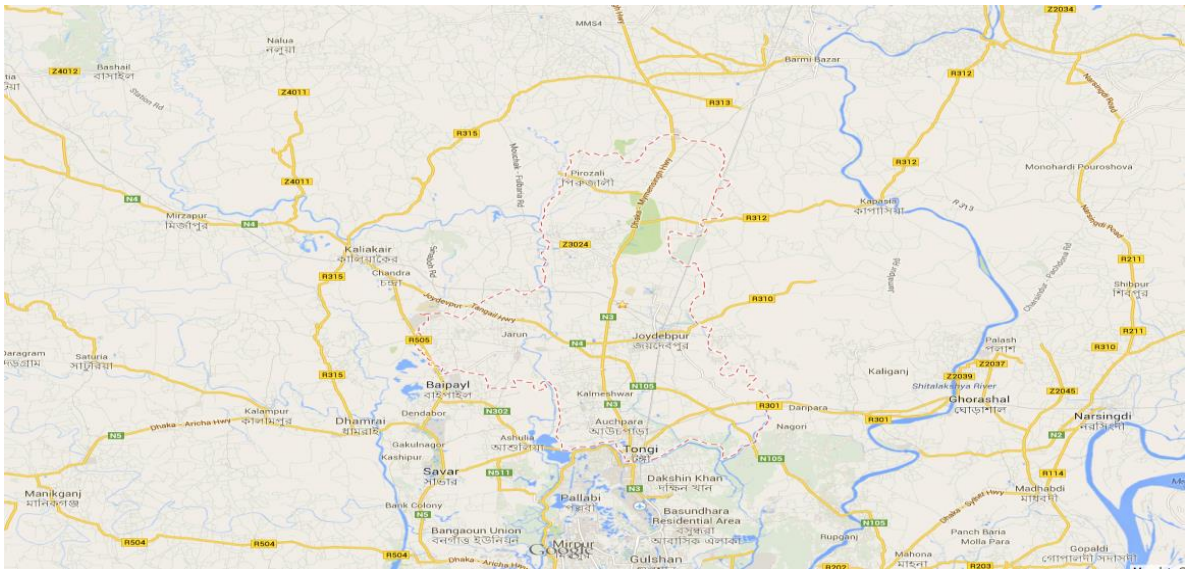


Figure 5.1: ***Google Map of the study area***

(Source: https://www.google.com/maps/))

Figure 5.2: ***Map of Tongi***

Impervious surface areas in the watersheds of the rivers have increased over the last few decades. The Turag River valley is undergoing significant real estate and small industries development. The increased run-off is one of the major causes of flooding in this area. However, the river has not been dredged to save the city from such floods. The illegal infringements onto river banks is contributing to reductions in water-carrying capacity during floods. The lack of an efficient rain water culvert system in Tongi also causes waterlogging throughout flood periods.

During the fieldwork interviews, I was told repeatedly that the flooding has particularly bad effects on the health of poor women in these communities and that pregnant women are severely inconvenient by having to move around in waterlogged and slippery conditions. Many of the women are forced to remain inside the houses where they endure unhygienic conditions. Another major concern that was highlighted was that the schools remain closed for long periods during major floods and this disadvantages the children and makes life hard for the mothers or carers.

5.2 Demographic Information of the Participants

Agricultural Labour

Among the participants, 15 women were working in the agricultural sector, three of whom had no land of their own and two had a small allotment. The latter two women were working with their husbands on their land. The women engaged in all parts of the agricultural labour from planting to harvesting.

Day Labour

This category included eight participants, including women who were selling vegetables, sewing, working part-time in people's houses, and engaged in other *ad hoc* employment. Some of their husbands were pulling rickshaws, carts, or contributing daily labour on construction sites.

Salaried Work

Five of the women were engaged in salaried work either in garment factories, wealthy houses, or with government services. Some of their husbands were working as truck drivers, in the garment industry and some were working in Dhaka City. The women whose husbands were away in Dhaka had to make major household decisions and assume extra responsibilities in the absence of their husbands.

Business

All seven participants in this category were engaged in small business. These women sold rice, pulses, potatoes, vegetables, handicrafts, and clothes. Some also sold milk, poultry, and eggs for additional income. They sold their products in a local *haat* or bazaar directly to the retailer. The occupational breakdown of the surveyed respondents is as follows:

Table 5.1: Occupational categories of research participants

Occupation	Percentage
Agricultural Labour	50%
Day Labour	16.66%
Salaried worker	16.66%
Business	16.66%

5.3 Production and Livelihoods

The people of Tongi City have a range of occupations. Some work in Dhaka and commute by bus or train. During major floods, however, commuting to work becomes difficult and sometimes impossible as roads and railway lines become obstructed by floodwaters. Such conditions prevent daily wage earners from earning incomes and this reduces the monthly salaries of those who depend on their labour. The women interviewed in this study were mostly from destitute or lower working-class sections of the community as the floods impact them greatly.

Tongi City has seen a tremendous increase in the value of its land as developers and businesses are purchasing land to establish industries and family farmhouses. This has resulted in severe deforestation contributing to the severity of floods during monsoon season. When Tongi City experienced major flooding in 1988, 1998, 2004, and 2008, the water became polluted as sewerage overflowed, posing significant health threats. I was told that people camping in the flood shelters (mainly in local schools) faced horrific sanitary conditions. I was also told that almost everyone in the town was affected in some way, and half of the population needed assistance. The landless labourers and day labourers were the worst affected since they were without work for a long time. Their families were stranded on embankments and in government buildings, forced to live in temporary and unhygienic conditions.

A landless agricultural labourer would normally earn about 60-70 taka[7] per day transplanting paddy (rice) seedlings. But during flood periods, they find it hard to secure employment. The paddy fields are flooded by up to three metres of water. People struggle to manage a meal for their families and their animals because food prices rocket upwards due to disruption of the normal transportation systems. At the same time, the price of cattle fodder doubles making it hard for those who keep some cattle. Floods destroy crops, fruit and other trees around people's homesteads. Some cannot feed their livestock and helplessly watch them die of starvation. Stacks of rice straw (normally used as animal fodder) stand in the water. While the people of Tongi City are used to regular flooding, major floods create major problems for them.

The main crops are rice, jute, mustard, and turmeric. The most common fruits are jackfruit,

[7] 84 Bangladeshi *Taka*s = 1USD

pineapple, lychee, mango, blackberry, guava, papaya, palm, boroi, jambura, wood apple, and tamarind. There are seven fisheries, an estimated 3,815 head of poultry, and 80 dairies. Tongi Upazila has a large number of industries including an aluminium factory, textile factory, pharmaceutical and cosmetics industries, a machine tools factory, a diesel plant, security printing press[8], ordinance factory, ceramics factory, packaging industry, brick field, and other garment-related industries. There are cottage industires in two industrial areas in Tongi and Konabari. The cottage industries include weaving, goldsmiths, blacksmiths, potteries, bamboo and cane work, tailoring, bidi-rolling, and woodwork.

There are 36 *haats* (or local weekly open shopping facilities), bazaars, and fairs; the most noted of which are Tongi, Pubail, Mirzapur, Kasimpur, Joydebpur; Baruni Mela (Kaddar), and Rath Mela (Joydebpur). The town also exports jackfruit, pineapple, vegetables, cosmetics, footwear, electrical and electronic goods, medicine, ready-made garments, bidis, cigarettes, and mosquito coils. Many NGOs are active in this area. Prominent organisations include the BRAC, The Association for Social Advancement (ASA), Cooperative for Assistance and Relief Everywhere (CARE), Hunger, PROSHIKA, World Vision, ABC, Dialogue, Swanirvar Bangladesh (Self-reliant Bangladesh), and the PIDIM Foundation.

5.4 Key Findings

As far as possible, the same themes were used to analyse the research data collected in this case study area. Many of the experiences of women in this case study area were remarkably similar to those of women living in the rural villages of the first case study area (see chapter 4), However, where appropriate, the different experiences have been noted; for example in Tongi Upazila many of the women used a disaster shelter.

5.4.1 Flood Warning and Short-Term Impacts

Most of the women, I spoke to in this case study area said that they were not prepared for the major flood in 2008 because it arrived suddenly during the night. No one expected the flood and the inundation seemed unstoppable. Interviewees reported being woken to the sound of suging water or by the sound of neighbours knocking on their door. Many thought the next day would be pleasant and dry and the floodwater would subside. However, the water continued to rise and it became clear that the flooding would last for weeks. Many people evacuated their homes, leaving behind valued possessions and family heirlooms. Those who could afford to, moved into the homes of relatives, while others were forced to go to community shelters. One interviewee, Mina Rani, said:

Water was coming so quickly I could see we were in trouble. I moved to my parent's house

[8] The Security Printing Corporation (Bangladesh) Ltd. (SPCBL) is the only printing press in Bangladesh which prints various security items with a major proportion of banknote production and government postal stamps.

with my children.

Unprecedented levels of flooding left many of the people I interviewed with the feeling that there could be no way to prepare for such an event yet most of the survey respondents were unhappy with available flood information. Bithhi Rani De and Amina Akther, two interviewees, said they did not receive any warning, while interviewee, Amina Akther, added that the information her family received was wrong. They were never informed that the water logging would continue for months.

Almost all the women interviewed suggested that local authorities and media outlets could have done a better job informing residents of scale and effect of the severe flooding. When I asked them how they got to know that a flood was approaching, almost all the women said that they knew flooding would occur at this time as soon as the rain began but they did not know that a very big flood was coming. They said they were prepared for a normal flood but not for a major one.

More than half (52.5 per cent) of survey respondents said that they did not receive news of impending flooding (see Figure 5.3). Some reported that there was no flood forecast in the news and others questioned the reliability of such reports. According to some interviewees, they had heard of flood forecasts for other parts of the country but not for Tongi City. Elderly people in the community told me they rely on word-of-mouth communication of an impending flood while younger people who could afford mobile phones or televisions said that they would prefer to hear foreasts through news broadcasts.

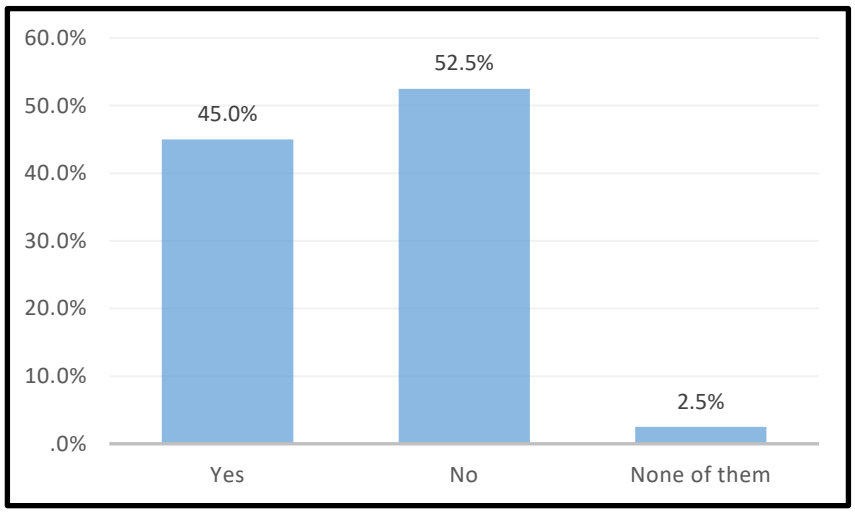


Figure 5.3: Survey result: Regularly get news on flooding

Interviewee Moyna Begum said she was caught by surprise:

At midnight water was rising. Me and my husband spent a sleepless night on the choki [bed] with my children and next morning we moved to a local school. We

took a few clothes with us.

While less than half the survey respondents had received warning of the last big flood, 85 per cent said that such warnings are important to them (see Figure 5.4).

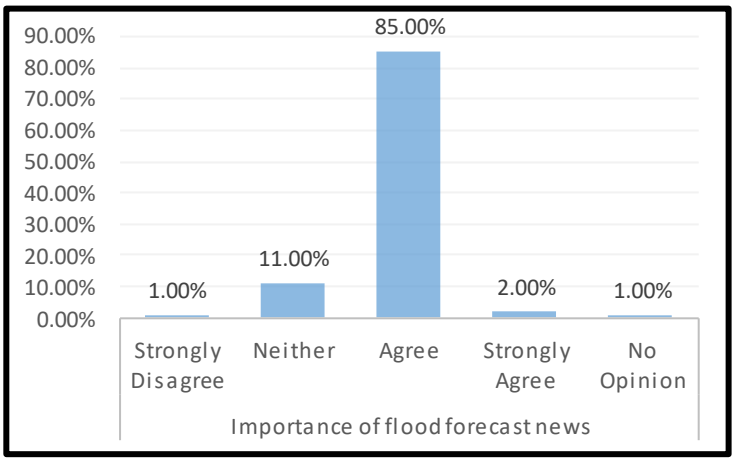


Figure 5.4: Survey result: Importance of flood forecast/news

In discussing the importance of flood warnings, focus group members said that they are particularly important for poor people who live near to the ground because they have bigger challenge to save their valuable items (such as ornaments), land ownership papers (*dalil*), other important documents, and hard-to-replace household items. A warning at least gave them time to put their valuables into plastic covers and keep them. Some focus group members mentioned that during floods men had to take time off work to help look after children and this left them without money. I was told that people do everything they can to stay in their homes; however, in the 2008 flood many were obliged to take refuge in a school, without permission of school authorities, after two or three days of living in the flood water.

5.4.2 Cooking, Food Preparation, and Rationing

In Tongi Upazila, women did not experience flooding as regularly as their counterparts in Silai Union villages. As a result, they were even less prepared for major flooding and few had stores of dry food. Normally, women in Tongi Upazila use gas stoves to cook food, however prolonged flooding send up the price of cooking gas and this meant that only the better-off women were able to continue cooking in their normal way. Portable gas stoves are easy to move when a kitchen area is flooded while those who could no longer afford the gas made or bought a portable mud stove (*chula*) or had one stored in their false celing.

The women who took shelter in a local school used kerosene stoves to cook. Those who took shelter in a railway station or in half-constructed buildings collected bricks and made temporary ovens for cooking. I was told that most women collected fuel such as dry wood, jute sticks, husk, dry leaves, and branches of trees, crop by-products, and agricultural waste to burn.

When households have to go without incomes, it becomes critically important to minimise expenses for maintaining the household so the women resort to food rationing. Those who received food relief aid-- including *chira*, *muri*, *gur*, rice, pulses, oil, and salt—said they had to make it go as far as possible and a number of interviewees told me that they were forced to sell their poultry in order to afford more food. Meat, milk, eggs, and fruits were consumed very rarely while the amount of fish and vegetables consumed decreased. Purchasing food on credit, I was told, is a common practice during significant floods.

As in Silai Union villages, women in Tongi City told me they reduced their own food consumption more than that of their children or other family members. Some of the women said they resorted to eating *fen* as a food supplement, but a number of interviewees said they felt constantly hungry.

5.4.3 Health Challenges for Women

As noted in chapter 4, flooding can cause a wide range of direct and indirect health problems for women. Problems such as the spread of infectious diseases and the effects of malnutrition are aggravated by poverty. For example, a woman who worked in a wealthy houseuld as a housemaid, Rahima, said:

> *I suffered skin infection during flood time. It was painful, and itching, and I had a hard time to deal with that. I went to a local hospital, and they gave me some ointment.*

Many complained about the standard of help they received at the overcrowded hospital with several women suggesting that the same medicine was given to treat different conditions. In focus group discussions, there was consensus that the treatment of pregnant women and children was very poor and a number of women complained that no other organisations helped to fill the gaps left by the hospital care. Interviewee Bithi Rani said:

> *My daughter got malaria. I went to the local government hospital but the doctors couldn't provide any medicine because he told us that all the stock had finished. We borrowed money from our neighbour and visited a private doctor and bought medicine from the local pharmacy. Sometimes hospital people gave tablet for young children. But under-aged children could not take tablets. They needed syrup.*

As noted in chapter 4, floods can cause a great deal of mental anguish to women who have to care for children or elderly family members. One participant in a focus group discussions in Tongi Upazila said:

> *The flood came at night; my family did not get time to move and at night where can we go? We spent a sleepless night. I had to stay awake the whole night with my disabled grandson on my lap.*

Women who have to spend considerable time wading or bathing in polluted floodwater commonly contract skin diseases. The major floods of 1988, 1998, 2004, and 2008 all lasted for over two months and survey respoondents reported that the diseases that they or their family members experienced included diarrhoea and chronic chest infections. While the women of

Tongi City had the better access to health care as there was a hospital in the area, more than a quarter of the survey respondents said that they still used "quack doctors" or relied on traditional herbal medicines when they were available.

While discussing the issue of personal hygiene and toilet facilities, most of the women mentioned that they made a platform behind their house and used it as a toilet during floods. Some mentioned using their neighbour's toilet (if not submerged). During menstruation, they used pieces of old cloth or rags. Government and other relief organisations provided clean water, and water-purifying tablet, but supplies were intermittent.

According interviewees, the most common illnesses apart from diarrhoea were the common cold and skin diseases. The survey indicated that both children and adults suffered from fever, cough, and the common cold. As one interviewee told me, there were no other places for children to play so they played in polluted water and as a result developed fever and coughs.

During focus group discussions, women said that they had to walk through chest-deep water and remained in a wet *shari* for a long time, sometimes resulting in fever. Additionally, most respondents complained about developing sores on their feet and various skin diseases from walking in the polluted water. Some women said that their illnesses were aggravated by anxiety and a lack of food. However, many of the women told me that they tried to avoid disclosing that they felt sick as they thought it would create pressure on their family. Even when unwell, they would take care of others.

5.4.4 Other Specific Challenges for Women

As for the women of Shilai Union villages, the women of Tongi City faced a wide range of specific challenges during prolonged flooding. Focus group discussions made it clear that the women coped with some of these challenges by helping each other. However, it also became clear that prevailing attitudes made them feel that they should defer to men in making significant decisions and many had felt that men would be both physically and mentally better equipped to deal with a crisis. Some of the particular challenges that emerged for flood-affected women of Tongi City were:

Fuel/firewood collection

During the major 2008 flood, poor women often collected food from their neighbours to feed family members. However, when forced to cook they had to find some kind of cooking fuel. Mostly they collected branches and leaves from different trees, but they were often wet and difficult to light. Some were able to use kerosene, however the longer the flood went on, the higher the price went so this also became a difficult option. In disaster shelters they were encouraged to use kerosene stoves but some told me that they found it cheaper to build stoves out of bricks and burn whatever they could. However, they added that they often had to queue up at the only available oven in the shelter. One woman named Sajeda said:

> *During the last flood, we went to local high school and stayed there for one month. The school had only one gas chula [oven], and we were many to cook. I had to wait more*

than two to three hours for my turn. It was not possible to cook for every family over there. We could only cook once a day. Some families bought kerosene stove, but we could not afford that.

Insecurity

Those who had young daughters felt highly insecure about going to the local disaster shelter and would spend countless sleepless nights guarding them. One woman from a focus group discussion said:

I have two young daughters. I was so worried about their safety that couldn't sleep much during the night. There was no electricity. It was dark all around during the night. I tried to stay awake in the darkness thinking about the danger that might happen to my daughters.

Another woman from a focus group discussion said:

I remained awake almost every night. There was no electricity, and I heard about people being robbed in another part of the town. Me and my husband, therefore, kept watch in turns and stayed awake throughout the night.

The findings highlight that sleepless nights were a common experience of many flood victims and yet some interviewees told me service providers did not view this up as a cause of anxiety and stress.

A number of women I spoke to talked about the deterioration of law and order during floods. They felt their houses became insecure and suggested that theft and robbery increased; further convincing people to leave their homes and take shelter in safer places. However, many were reluctant to leave their homes. Nazma Begum, a worker in a local garment factory said:

When the flood came, we stayed two days at home. But when water continued to rise, and we had two local schools for shelter, we moved. We returned later only to find that every belonging that we left back were stolen. Now every day I am working overtime to buy back all the necessary things.

Wet clothes

Women traditionally perform housework wearing the traditional *shari* and the long garments become difficult to manage when they are wet. While there may be water in and around the home the women also have to wade through water or travel by boat to gather food, cooking fuel or medicines and they spend much of their days in wet *sharis* which cling to their bodies. Indeed, they may spend days in a wet *shari* before they have a chance to dry them. As interviewee Ambia Banu told me:

Most of the time I had to walk in knee-deep water for daily household works. I am working in a rich person's house, and if I don't work, I can't provide food for my children. So, my shari stayed wet for a long time. Every time I can't change my shari

as I have only two sharis, and we stayed months after months surrounded by water. That is why I got kala-jor (typhoid) and I could not work for a long time.

Sanitation problems

In the flood shelters men and women essentially share the same space. Several women complained that there was no separate toilet for women. Some of them told me that they felt ashamed when forced to defecate inside the home or forced to bathe in front of male strangers. One woman told me:

Apa [sister], what can we do? We had to do it in front of others. Sometimes we put our stool in newspapers and throw it into the floodwater. I did the same thing with my grandchildren.

Women who did not want to bathe in front of strangers went without washing for days on end. Things were not much better for the women who stayed in their homes because most of the toilets were flooded or washed away. Some women were able to use the toilet of neighbours but this usually meant wading through polluted flood water to reach it. They might also be embarrassed to find a man from another family using the toilet once they reached it. Many of the women told me that they tried to control themselves until late at night so that they could use the toilet in relative privacy. Interviewee Mahima said:

I would try to control myself for as long as I can. I asked my daughter to do so. When we could not hold off anymore we urinated in the flood water that was deep enough. I was very ashamed but helpless.

Menstruation

Many of the women experienced menstruation while staying in a disaster shelter. It was difficult for them to manage as they had few clothes with them. Some women told me that they had to borrow pieces of cloth from others. Changing these cloths was another challenge because menstruation is associated with social taboo, and they had to maintain maximum extreme secrecy with little or no privacy. Several of the women reported that they waited until late at night to change and wash their menstruation cloths, or they helped each other by holding up makeshift screens. During big floods the men are home for much of the time and this exacerbated the problem of maintaining secrecy with menstruation. One interviewee said:

When I had menstruation during flood, it was the worst time I had to face. I had to keep the same cloth on all day as I could not change it even though I was wet with blood. There was no separate place where I could do it. I had to wait till night-time when everyone was asleep. There was also a problem washing the used cloths. I washed it with dirty floodwater which was so unhygienic.

The women were generally ashamed to discuss the challenges of menstruation with me. However, it was clearly a difficult experience that they overcome such embarrassment to speak up. One young women named Amena said:

We were staying in a shelter during flood. I got my menses [menstruation] during the time we were staying at the shelter. This is a huge problem for me to change the cloth and clean it. There were many people around us. I feel so ashamed to tell my mother about it. I had to wait till midnight to change the clothes. My mother and sister covered me when I changed and washed it.

Things were also bad for pregnant women in the flood shelters because they also lacked privacy at a time when they are supposed to display modesty.

Workload increases

As discussed in chapter 4, women in poor communities have the double burden of carrying responsibility for most of the housework whilst also having to pick up paid work to maximise household incomes. My personal observations suggest that in urban communities' men are even less likely to contribute to household work than in rural villages. Indeed, the women told me that some of the tasks normally performed by men—such as the collection of firewood or food shopping—are left to women and girls during major floods. The collection of safe drinking water is a big and onerous responsibility for women during flooding. It takes a long time when the women have to travel far to access clean water sources.

Unemployment/loss of occupation

The increase in household responsibilities makes it very hard for women to find paid employment during prolonged flooding. The problems mount up for women who have no husbands or other male breadwinners in the household, as illustrated in the story told to me by

Rashida Begum's story

Rashida was married to a truck driver and she field that she had a happy family life until her husband divorced her about 10 years earlier and married again after the divorce, she could not afford to live anywhere but in a local slum with her three children. She worked in a rich person's house and was paid 3,000 taka (US$35) per month. The last big flood (2008) submerged their slum and she had to move to a local railway station with her children, where she stayed for two months. She had to go to travel to work by crossing the floodwaters and for a long time wore a wet shari causing her dysentery, malnutrition, and fever. She became fragile without food or treatment. As the complications deepened, she fell sick and was unable to go to work for a month forcing her to send her eleven-year-old daughter to work as her replacement (as they needed money to survive). Her daughter also fell sick after a while. She had no other option but to return to work while ill.

Rashida Begum, a 40-year-old divorcee.

According to the survey, about 78 per cent of working women lost their primary occupations during the flood, mainly because of the closure of the garments and related industries and the

breakdown of transportation systems (see Figure 5.5)

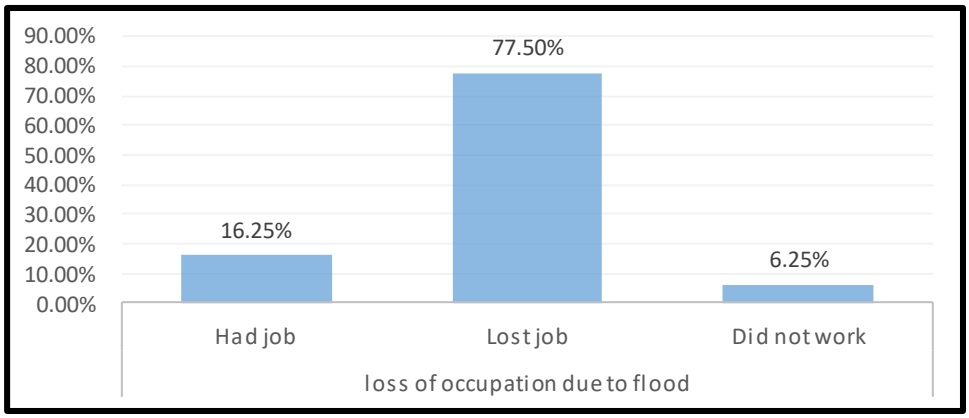


Figure 5.5: Survey result: Loss of occupation during floods

5.4.5 Relief Aid Issues

The field research involved asking as many women as possible about the relief aid, they received during the last major floods. Almost all the women said that they received support from the local Union Parishad chairman and Red Crescent Society. Many of the worst hit people received food and medical assistance from local government, the Bangladesh Red Crescent Societies (BDRCS), and other NGOs. The food supplies included flattened rice (that is ready to eat), with some molasses, *dal* (lentils), and high-energy biscuits. These food items were distributed through the Red Crescent District Units who were supported by members of Red Crescent Youth and other local volunteers. The BDRCS also organised and deployed medical teams, each consisting of a doctor, a paramedic, and at least one male and one female volunteer. People participating in such relief efforts told me that they encountered diarrhoea, hepatitis, typhoid, skin diseases, and, in some cases, measles. Other than the BDRCS, Association of Social Advancement (ASA), and Bangladesh Rural Advancement Committee (BRAC), World Vision, Samajic Union Sagostha, and other NGOs also provided support to the flood victims. All the NGOs provided cash and food to the flood victims.

During the flood periods, the BDRCS and other NGOs ran a kitchen where simple food such as *kichuri* was made available to flood-affected people who were unlikely to get any work for some time to come. Only a few lucky people received a ration card from the BDRCS. Interviewee, Monowara Begum, said:

> *We received 10 kilograms of rice from the local government and 20 kg of rice, 5 kg of dal, 5 litres of oil and a few household items from Bangladesh Red Crescent Society.*

However, another woman said that she and her family received five kilograms of rice, three kilograms of flour, cash of 500Tk, one *shari*, and one *lungi* (sarong). Long after the disaster, they also received relief goods such as a 'family kit' from the BDRCS. Interviewees said that the BDRCS made a list for allocating the ration cards and the relief they gave reflected the

status of the card.

While interviewees told me that they felt that service providers treated them with respect, however, the survey found that only about 54 per cent of respondents were satisfied with the relief aid (see Tables 5.2 and 5.3). A number of interviewees said they got no relief aid at all and others said that what they received was not adequate. In discussions about this it became clear that the women were happy with the way they were treated by relief workers but not happy with the amount of relief aid available to them. Many complained that the relief food had been kept under the sun for several hours and that the relief providers did not consider individual family needs. There was not enough special food for infants.

Table 5.2: Survey result: Satisfied with the relief provided by the service providing organisation

	Are you satisfied with the relief provided by the service providing organisation						Total
	Very Dissatisfied	Dissatisfied	Neither Satisfied/ Dissatisfied	Satisfied	Very Satisfied	No Opinion	
Count	0	28	1	43	0	8	80
% within location	.0%	35.0%	1.3%	53.8%	.0%	10.0%	100.0%

Table 5.3: Survey result: Satisfied with the behaviour and attitude of a service provider during and after a flood

	How satisfied are you with their behaviour and attitude during and after a flood?							Total
	Very Dissatisfied	Dissatisfied	Neither Satisfied/ Dissatisfied	Satisfied	Very Satisfied	No Opinion	No Response	
Count	4	22	6	41	2	2	3	80
% within location	5.0%	27.5%	7.5%	51.3%	2.5%	2.5%	3.8%	100.0%

Commenting on the distribution of ration cards interviewee Amena Begum said:

They issued a ration card and selected people for relief that they mentioned most vulnerable; so many victims were left out from support. How they will survive and what they will do?

Some of the women mentioned that the chairman of the Union Parishad provided boats to move people to school shelters. Some said that he also gave money to buy food for particular families. However, it was never clear how he selected the families to receive particular assistance. It certainly seems that some people who needed help received little or nothing and interviewee Fatima explained her ongoing situation with a rhetorical question:

> *You tell me what will I save and how? I don't have any job; I begged for alms from people for a living. I don't have anything which I can save for the future; I don't even know what I will eat tomorrow.*

5.4.6 Coping Mechanisms

The following are some coping mechanisms that people in Tongi City adopted during the major 2008 flood.

Storing paddy/rice

Many women reported that they preserved rice/paddy by doing extra work during normal times to prepare for the hard times like floods or other economic crises. The survey showed that more than 82 per cent of the respondents had undertaken extra work in order to stock up on rice and paddy (see Figure 5.6).

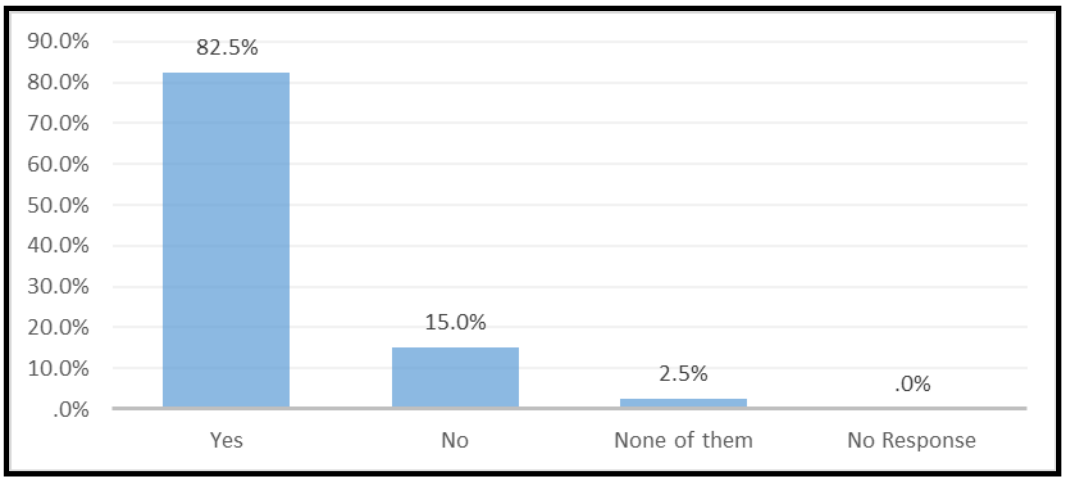


Figure 5.6: Survey result: Preserve paddy/rice by selling labour for flooding period

Storing dry food

Storing dry food was a common practice among those I spoke to in Tongi city. The survey showed that more than 88 per cent of the respondents saved some *chira/muri*, *gur*, pulses, oil, salt and more for such crisis times. However, the amount was never enough if flood waters stay for months rather than days.

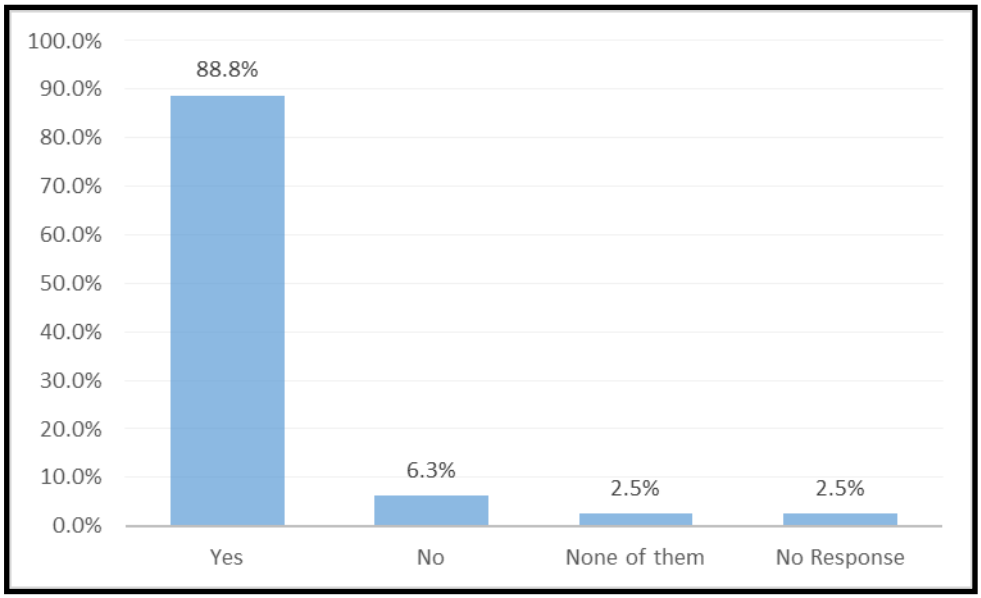


Figure 5.7: Survey result: Store dry food

Selling valuables

Perhaps the most common coping mechanism, if it can be called that, was that people sold their valuables in order to buy food. As Amena Khatun explained it:

> *My husband was working in a garment factory but during the flood the factory was closed and there was no job for him. I had to sell my bangle to feed the family. My parents gave me the bangle during my marriage.*

As well as personal jewellery women sold other valuables such as kitchen utensils and some of the women said their husbands had urged them to sell whatever they could.

Rationing food

As already mentioned, many of the women reduced their own food intake during the flood in order to feed their children or other family members first. Some told me that when relief food was available, they ate *roti* (flat bread) and *khichuri* whilst they gave more nutritious food to other family members. For example, Rahela Khatun said:

> *I received the relief roti and ate two rotis daily. I gave the rest, which was the major part of the relief, to my children. This way, I was able to provide food for my children.*

The women also consumed low-quality food such as rotten or unused vegetables and sometimes they had to use these for the family as well as themselves.

Seeking help from neighbours/relatives/friends

All of the women interviewed complained about the sudden rise in prices of daily necessities, especially food, as the flood persisted. The prices often doubled and sometimes tripled, they said. Wherever possible, the women turned to neighbours, relatives of friends for food aid but, of course, many of them were also struggling to feed their own families. Help from such sources is not likely to endure when flood waters stay for months.

Cooking and food preparation

Most of the women who normally use gas stoves were obliged to find alternative ways to cook their food. They mostly resorted to using portable kerosene stoves but some said they gathered fuel such as dry wood, jute sticks, straw, dry leaves, branches of trees in order to cook using fire. Supplies of cooking fuel get harder to find the longer the flood waters stay and some of the women said they have to use plastic to cover what they collect to keep it from getting wet.

Healthcare

During severe floods, when the hospitals or medical facilities are not meeting the demand on them, most of the women I interviewed said that they turn to "traditional" medicines, such as local herbs. For example, they use *tulshi* leaf for treating the common cold, a mix of saline, molasses and salt for diarrhoea and dysentery, and *Dublar ras* (the juice of a local herb) for treating constipation, cuts and bruises. *Neem* leaves are used to treat worms in children. *Vadari* leaf usually grows in the paddy field and is used to treat snakebite. The survey showed that many people use the saline mix to treat diarrhoea (see Figure 5.8).

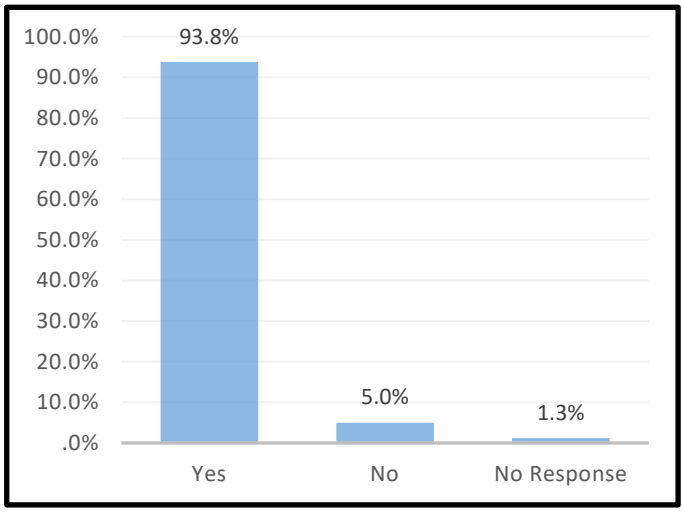


Figure 5.8: Survey result: Drink saline for diarrhoea

Sell poultry

Several women said that selling poultry is one of the best coping mechanisms available to them. This is partly because it is difficult to keep poultry when the flood waters are present and selling poultry is often the quickest way to get some money. The survey showed that more than 17 per

cent of the respondents reported that they sold their poultry during floods. Some women said they were forced to sell poultry to repay loans.

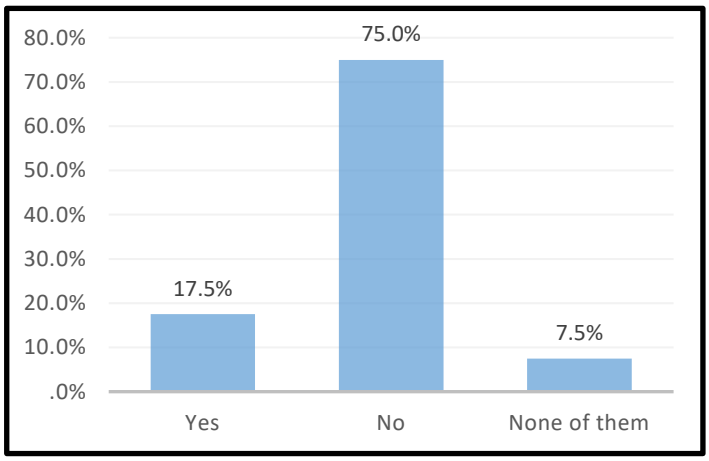


Figure 5.9: Survey result: Sale of poultry during flood

Caring for poultry/livestock

As mentioned earlier, it is generally the responsibility of women to look after poultry and family-owned livestock. Many women said that they keep their poultry close to them even though this made their shelter very crowded. Some said they were able to keep their poultry in the school yard while they took shelter in the school buildings. Cows pose a bigger challenge and one woman explained that taking them to high ground can pose other problems:

> *We keep our cow on the main road which was not inundated with floodwater. I was always worried to keep the cow on the road because the fear of theft at my house.*

5.4.7 Livelihood Considerations

People living in low-income households in Tongi Upazila generally rely on an array of insecure forms of paid employment, including rickshaw pulling, day labouring, and factory work or setting up micro-enterprises. In this study, I looked at households earning Tk400-500 per day (i.e. around US$4-6). Most of the people I interviewed in this category said that they tried hard to avoid taking loans when prolonged flooding disrupted their normal sources of employment but the duration of major floods made this difficult. For example, an interviewee with four children, Majeda Begum, said:

> *We don't want to take a loan. Who wants to take it? As we have to pay it back with high interest. I had to take a loan because there was no other choice. Government and Red Cross provide support only during the initial days of the flood. What would you do after the flood?*

The survey showed that more than 88 per cent of respondents were forced to borrow money during the 2008 flood. Some took formal loans while others tried to borrow from family or

friends.

The women I interviewed said that they tried to borrow money from relatives of friends before going to local moneylenders who charge high rates of interest. The duration of the flood meant that they had to borrow money just to buy enough food for the family although some also used loans to generate family income. For example, one interviewee said:

> *I borrowed some money to buy a sewing machine as I am good at sewing. I take orders from another and also supplied to the local market. But during flood there were no orders and I had to take more loans to manage food for the family.*

When flood waters disrupt normal activities for months at a time, interviewees told me that they have to reduce food intake to repay loans.

During focus group discussions some of the participants said that they had no choice but to send their children to work in a local garment factory or other places of employment. One interviewee, Momena Begum, said that it got to the point where everyone had to look for work:

> *My husband and son were looking for paid work during and after floods, but we were unable to find work. Many workplaces were submerged during the floods. Everyone was looking for a job which increased competition for work, making it impossible to find a job. Even if you get a job the employer offers a very low salary, and you had no other choice but to accept it.*

A similar story came from another interviewee Sajeda when she said:

> *My husband runs a small tea stall, but that was underwater during the flood. I worked part-time as a maid with a low salary. So, during flood my 14 years old son started working. He went to Dhaka and started working at a motor workshop. Without my son's income, the family would have found it very hard to get by.*

Another interviewee, Mena Rani, said that her children went to work because schools were closed and this became a permanent change:

> *My husband is a rickshaw puller, and I worked in people's homes. My daughter used to go to school, now she is working in a garment factory in Dhaka. We send our daughter to Dhaka to work in a garment factory during the last flood because my husband doesn't have work and we were struggling to cope with expenses. We think that her school was closed, she can work within this period, and it will also help us to recover the financial crisis. Now her mental focus has changed, and she doesn't want to go back to study.*

Women who did not have work before the flood, had little chance of finding work when the competition for jobs increased. Women from poor households who do not work include those with poor health, disabilities or very heavy domestic responsibilities. However, focus group discussions suggested that cultural requirements for women to maintain modesty--for example, by the *parda* veil—made it hard to engage in many kinds of work. For example, one of the

oldest women I interviewed, Khatun Begum, said that this was a matter of her family's 'prestige':

> *I never worked outside, and my daughter in law also stays at home and took care of family. Our family's prestige would be damaged if we left home and went to work. It is better to die than to lose your prestige. We are a very prestigious family.*

While some women were prepared to suffer financial hardship rather than cope with the embarrassment of going to work for the first time, others said that they had to increase their working time or even places of employment. Raishida Begun explained the burden of work:

> *I worked in a rich person's house as a maid. I worked there for three/four hours and after that I used to come back home and take care of my family. When I finished my work and went back home my children also came back from school, and I could take care of them. But during the flood, it was difficult for us to survive because my husband did not have work. So I started working at another person's house after finishing the first job. It was very hard time for me one. When I came back home in the evening, I felt tired and exhausted even though I had to take care of my family.*

During focus group discussions a number of women said that they had to stop work during the floods because their workplaces were inundated. When they were able to resume working most of them worked longer hours to make up for lost income.

All of the women who worked outside their homes during the flood told me that they found it extremely hard to do so while their homes and the surroundings were under water. They frequently experienced problems travelling to and from work, with many of them having to wade through water to get to work. Salma Begum, who worked as a domestic servant during the floods, said she could not afford the boat fare to the house where she worked so she either had to ask the boatman to give her a free ride or swim or wade across the water to get there. After some days of this, however, she became sick:

> *Once I got sick and could not work there was no other option for my family but to send my son to work. He was only fourteen years old boy. He started pulling rickshaw. He used to mention that it was hard to find passengers and took much longer to get anywhere as it was harder to pull the rickshaw through water. He also complained of pains in his chest.*

In Tongi, some of the women I interviewed said that they had lost their businesses because of the flood. As Shova Begum explained:

> *My husband mortgaged a pond and started a fishing business. But a flood washed away the whole thing and my husband has no job now. We don't have enough money to start again. I loan some money and try to do some small business. I tried to help my husband, but it is difficult to find a job.*

Another interviewee, Amena Begum, explained:

I worked in a cheap local restaurant which sold food for poor workers likes day labours, rickshaw pullers, etc. I washed dishes and helped to cook. During the flood, there was no work, and I was starving with my children. Sometimes my neighbours helped me with some food. I received relief from the government and Red Crescent which was not enough, but I was happy. At least I could have something to eat.

The small traders who lost their businesses during the flood had enormous problems in trying to start again when the flood waters finally receded. Some interviewees said they mortgaged or sold some land to start again but in urban areas few people have land to sell or mortgage.

5.5 Lessons for the Future

The findings of this study respond to the study's research questions and help achieve its goals, to investigate the experiences of women in pre, during and post flood periods. These findings have several significant implications in helping vulnerable women and their families cope with significant flooding. This study provided a snap shot of vulnerabilities and coping mechanism of women during natural disasters and how local government could become more effective in helping vulnerable women and their families cope with significant flooding. It also provided several lessons for the future that government agencies—at all levels from local to national—should recognise that people living in places like Tongi Upazila have historical experiences of flooding and have developed local knowledge and coping mechanism, sometimes across a number of generations that can help them cope with flooding. However, it was also widely acknowledged that many of these coping mechanisms become ineffective when flood waters stay for months at a time and this is when local government agencies, in particular, need to play a bigger role.

It was suggested to me, for example, that local government can play a vital role in urban areas in reducing disaster risks by improving urban drainage and infrastructure systems. It was suggested that most disaster management strategies in Bangladesh focus on non-urban settings, where food security is often the biggest concern. Urban dwellers tend to have more livelihood options than their rural counterparts but poor communities have the same problems with disaster-related debts and it was suggested that local government should look at working with banks and insurance companies to make low-interest loans available or increase options for micro-credit programs.

In Tongi Upazila, I found that communication between local government and non-government relief agencies was rather poor and that local government had done little to find out about the particular needs of different sectors of the population in the event of major flooding events. Not enough had been done to reflect on the experiences of the 2008 flood in regard to relationships between local government agencies and the community in the transition from short-term relief to longer term disaster recovery.

In Tongi Upazila, as in Shilai Union villages, many of the flood-related health challenges faced by women and children could be addressed, although this would require a co-ordinated effort by local government authorities, health agencies and disaster relief agencies. In the wake of a

big flood, local government authorities, in particular, could consider what might be done to improve access to safe drinking water, functioning toilets and emergency supplies of medicines and food for the next major flood.

In asking residents and relief workers for their suggestions about what can be done I was able to compile the following list:

- Location specific early warning system should be developed for giving adequate time to the people for evacuation;
- Commercial banks could disburse wholesale credit to traders and group borrowers with a particular focus on helping low income households rebuild lost incomes;
- Those who lose paid employment because factories and other enterprises are closed by flooding need income support from a social security network;
- The landfill of canals and wetlands in and around Tongi Upazila has exacerbated flooding and storm water drains need urgent attention;
- Culverts should be placed where relevant to allow excess water to drain away;
- Public latrines and shower places should be built on raised grounds to improve sanitation facilities during floods;
- Public tube wells need to be built on raised homesteads to ensure that people can still access safe drinking water;
- Disaster management information centres need to be established in this and other areas to help people prepare for future floods;
- All government and non-government people involved in disaster preparation and recovery work need regular training and capacity development to ensure that lessons of past disasters are not forgotten;
- The school curriculum and schedule should be amended to ensure that all students learn about disaster preparation and response.

CHAPTER SIX: THEMATIC ANALYSIS OF COMPARATIVE CASE STUDY OUTCOMES

6.0 INTRODUCTION

This chapter compares the findings from the two case studies to identify common and divergent experiences between the urban and rural communities. This comparison can draw out implications for responding to the particular needs of vulnerable women in rural and urban settings. The content analysis of interviews transcripts has shown that there are four principal categories of issues are faced by women.

1) Socio-cultural, religious norms that make women more vulnerable than men in times of disasters.

2) Women role and expectation from them in the society

3) Poverty and livelihood

4) Natural difference of Women from Man and subsequent implications

This, in turn, will have implications for national policies and practices regarding flood management and that will be the focus of chapter 7.

6.1 Flood Forecasting and Preparedness

This study suggests that there has been no effective flood warning system in place in Bangladesh. The Bangladesh Flood Forecasting and Warning Centre was established in 1972 and has been operated by the Bangladesh Water Development Board. It has been developing flood risk maps based on water levels in the country's major rivers and publishing this information on its website. However, this study showed that very little of this information even reached the communities and that flood risk maps were not effective for communicating likely flood impact. The flood warning system compares unfavourably with the cyclone warning system (see Appendix 1) which does convey more specific information to vulnerable coastal communities.

In both the case study areas surveyed, respondents said that they knew nothing of the Flood Forecasting and Warning Centre website and none of the women interviewed had the computer skills to access the site. Several interviewees said that some attempts were made to communicate flood warnings through radio broadcasts or as mobile phone text messages. However, the information did not convey anticipated local impacts and it was not communicated consistently or persistently.

The research found that most of the inhabitants of the rural villages relied on traditional methods for anticipating disasters, such as observed changes in the behaviour of animals or insects. The capacity to detect such warning signs has been passed from generation to

generation and is embedded in some proverbs called *Khanar Bachan*[9]. The traditional forecasting methods include:

a) Animal/insect behaviour pattern;
b) Weather observation; and
c) Climate and rainfall anomalies.

Some elderly women interviewed told me that they knew of an impending flood when ants with eggs in their mouth start climbing for shelter and grasshoppers fly in clusters. Other warnings include dogs crying in a distressed manner, foxes calling during the day and crows calling at night.

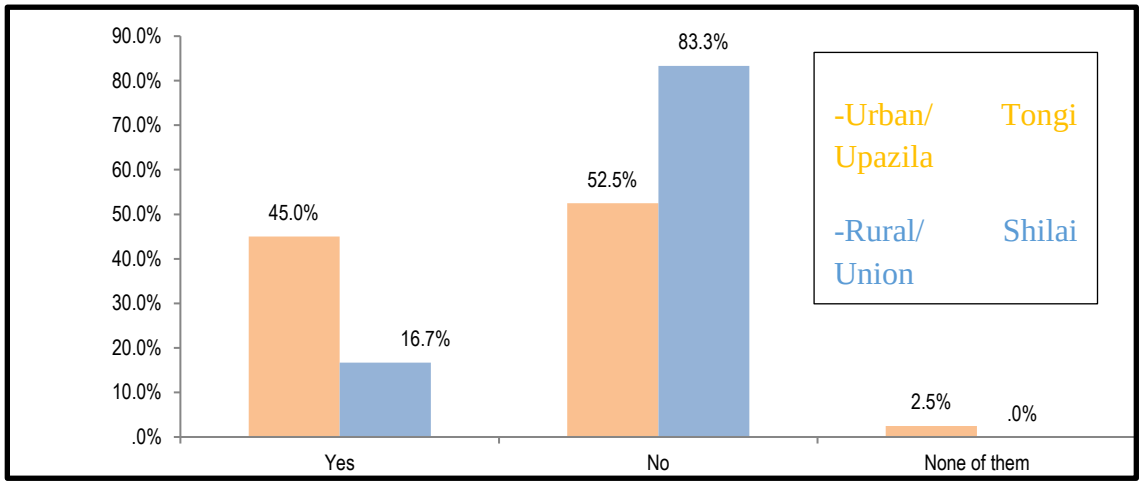


Figure 6.1: Survey result: Regularly receive flood forecast.

(Source: Field Survey, 2018)

In the urban area older residents also said that they rely on traditional methods for predicting a flood. However, they also check television and radio broadcasts when floods are expected to get information about what is happening beyond the local area. Some people in the rural villages said that they hear about floods from male family members who have travelled to other districts for work. Most news travels by word-of-mouth communication, with tea stalls being a popualr place for exchanging information. However, the survey results show that people living in the rural villages have much less confidence in the reliability of the non-traditional flood forecasts they receive compared to those living in the urban setting (see Figure 6.2)

[9] Khanar Bachan (or Vachan) (meaning Khana's words'), among the earliest compositions in Bengali literature, is known for its agricultural themes (Source: http://www.infobridge.org/asp/documents/4341.doc)

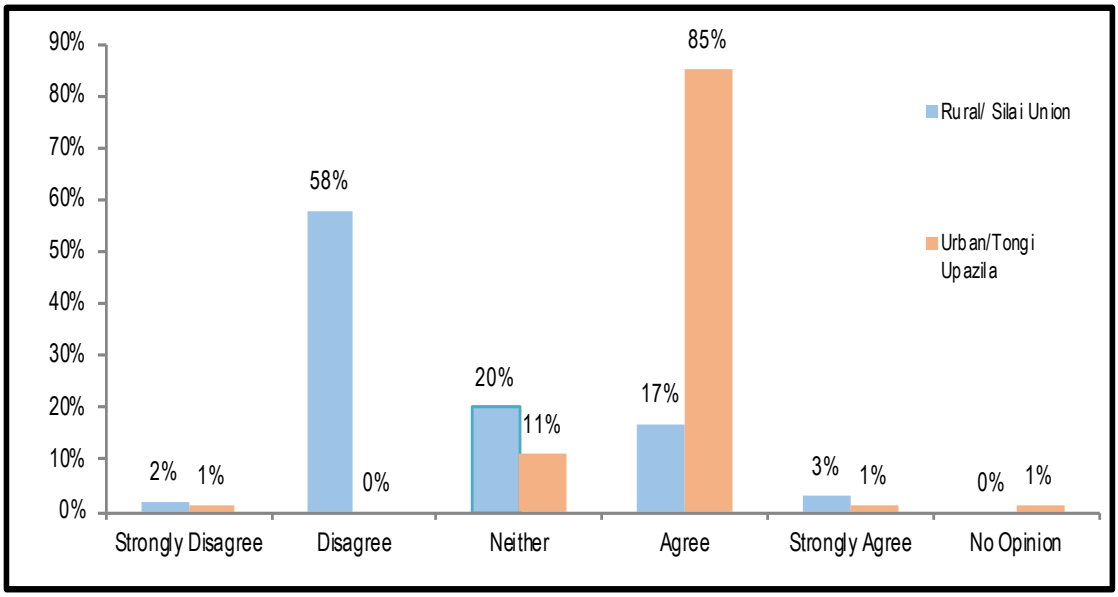


Figure 6.2: Survey result: Importance of flood forecast news

The study showed that young people living in the urban area are more likely to depend on radio and television broadcasts because they have little knowledge of traditional forecasting techniques while men are more likely to hear news of impending floods because they travel more often and more widely in search of work.

People living in the case study communities who had received official flood warnings complained that the information was often very vague because it concentrates on flood zones and not particular places. Some felt that scientific forecasting could never be as place-specific as the old traditional techniques. Despite these reservations, the survey showed that 75 per cent of rural respondents and 85 per cent of urban respondents felt that official forcasts are important. The biggest limiting factor in poor communities is access to appropriate communication technologies becase the survey suggested that a minority of people in both areas had access to televisions, mobile phones or radios. Less than five per cent of the survey respondents in the rural villages while elderly people in both case study areas had little knowledge of mobile phones.

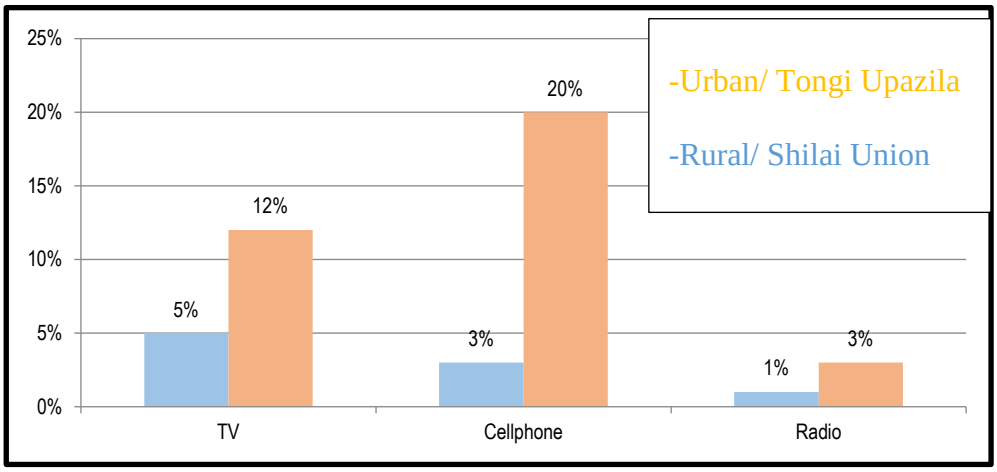


Figure 6.3: Survey result: Ownership of modern technical communication instruments

6.2 Temporary Shelter Issues

In the 2008 flood, the local Union Parishad Chairman of Tongi Upazila assisted some of the participants interviewed move to the designated flood shelter. Most of these people were part-time maids or servants (*Buas*[10]), while others were garment and cottage industry workers, small traders, rickshaw pullers, or people running informal businesses or small enterprises. Most of the flood victims were residents of the urban slums, which were heavily inundated, and most people took refuge in the primary school. As noted in chapter 5, women complained that conditions in the school were very cramped and that the lack of privacy for women and girls was a major concern. Flood victims in Silai Union did not have a flood shelter to go to so they took refuge on *machas* (see Figure 6.4) which also became very crowded causing the same problems in regard to a total lack of privacy. It was bad enough when women and girls have to share a *macha* with other family members but when the flood levels made their own *machas* ineffective, they were forced to share *machas* with other people. While *machas* are effective for dealing with short duration floods, they pose major problems for women who have to cook food and look after children and elderly family members during prolonged flooding. Living on *machas* poses major health and safety risks for women and children during prolonged flooding.

10 *Buas* - In Bangladesh, women working as house-maids are not called by name but rather as '*Bua'*

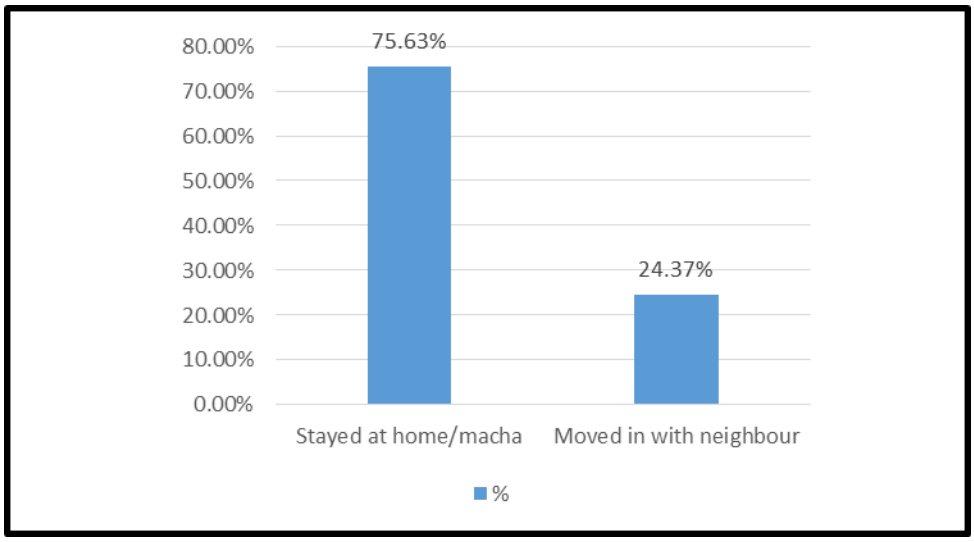


Figure 6.4: Survey result: Shelter options during flood in Shilai Union villages

Women feared for the safety of their adolescent girls in both the urban flood shelter and on *machas* in the rural villages. Although none of the women I met reported incidents of rape or severe harassment, all of them told me that they felt that adolescent girls were at high risk. Cultural beliefs and practices make it very difficult for women to talk openly about sexual abuse or rape, so it is likely that such information was withheld from me.

Lack of access to toilets was a major problem in both the urban temporary shelter and for women living on the *machas* in Silai Union The lack of access to toilets in both case study areas posed major health problems but this was particularly so in Silai Union when the flood vicitms were commonly forced to defecate in the floodwater. Furthermore, temporary toilets that were constructed by people living on *machas* were often difficult to use and unsafe for children and in particular, the elderly people.

As discussed in chapter 5, life in the Tongi Upazila flood shelter posed major problems for pregnant women who were not able to get the help they needed from the local hosptital while the situation was even worse for the pregnant women living on *machas* in Silai Union who no access to a hospital at all. There were long queues to use inadequate cooking facilties in the urban shelter while it was very difficult to cook on crowded *machas* and very hard to collect dry firewood. Indeed, access to cooking fuel was a major problem for the women in both case study areas.

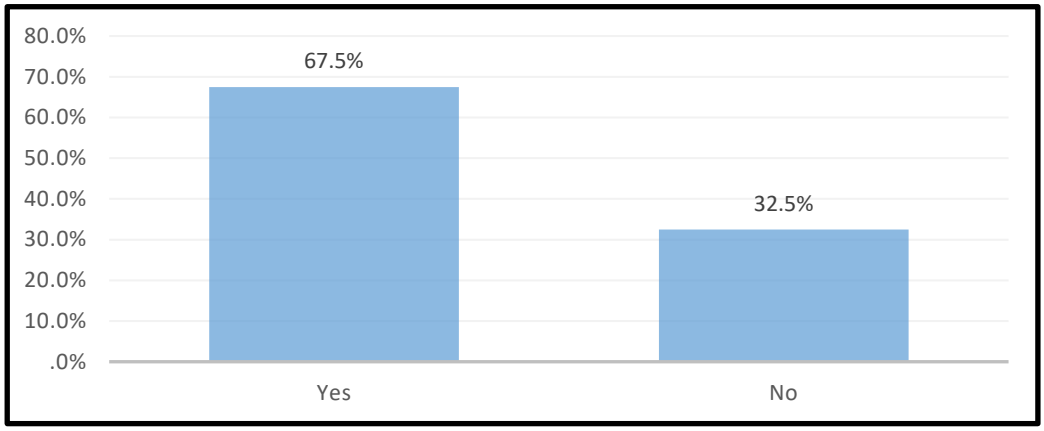


Figure 6.5: Survey result: Take shelter during flood in Tongi Upazila

In Tongi Upazila, many people brought their poultry and goats to the temporary flood shelter, exacerbating the problem of crowding. The combination of people and poultry lving in the same crowded rooms posed major health threats. However, it was even more difficult for women in Silai Union who tried to keep their poultry and goats on top of the *macha*. Sometimes, two or more families took shelter on one *macha* and the conditions became very crowded and unhealthy. While the women persisted on keeping their poultry on the *machas,* they often had to find somewhere else to keep their goats. Knowing that the temporary shelter would be very crowded, a significant number of flood vicitms in Tongi Upazila opted to stay in the flooded homes (see Figure 6.5).

Of course, it was not possible to keep cattle and goats in the crowded urban shelter or on the rural *machas* so in both areas the flood vicitms went in search of high ground, such as road embankments, where they could be kept. However, several interviewees reported that cattle and goats sometimes went missing when their owners could not keep an eye on them. Theft was also a constant concern for people living in the crowded urban shelter.

6.3 Sanitation Issues

As discussed in chapter 4, people living in Silai Union mostly use ring-slab sanitary latrines which are commonly submerged during floods. Sometimes the toilets can be kept functional by rasing the toilet pan and by constructing temporary bamboo bridges to reach unflooded toilets. However, in big and prolonged flooding events, these people have to resort to more desperate measurs, such as building hanging latrines or by defecating openly from rafts and boats into the floodwater. In view of prevailing culutural norms about women and girls having to behave modestly, such toilet arrangments caused acute embarrassment and many women told me they felt degraded as a result. Things were not much better in the flood shelter in Tongi Upazila where women said they had little or no privacy when using a toilet or when bathing. There were no separate facilities for men and women and many women said they had to bathe or use the toilet in front of strangers. Women I spoke to said they tried to hang on to use the

toilet late at night, often enduring bladder pain in the process. The lack of privacy in the flood shelter was cited as a reason for women preferring to stay in their partially submerged houses but they were commonly forced to share functioning toilets with other families and suffered similar problems with the lack of privacy.

As discussed in chapters 4 and 5, women and adolescent girls in both case study areas faced very uncomfortable situations during their menstruation because the cultural taboos about maintaining privacy are even more stringent for women going through menstruation. In both areas, women said they had to use old cloth and rags when they could not get sanitary pads and they often had to get help from other women to maintain a level of privacy when changing used cloth. In both case study areas, women told me they had little choice but to put used cloth and rags into plastic bags that were then thrown into the floodwater. It was especially hard for women living on *machas* with other families to obtain privacy for changing used cloth so women told me they were not able to change the cloth as often as they would have liked to

6.4 Health Issues During and After Flooding

This study suggests that the additional work that women have to undertake during flooding increases their levels of stress and anxiety. For example, 75 per cent of survey respondents in Shilai Union said that they experienced protracted stress during the 2008 flood, although around 20 per cent felt that their stress was related to general hardship rather than the itself. During the interviews, a number of women suggested that the floods exacerbated underlying stresses and strains because they casued additional physical, emotional and financial hardship.

While it is difficult to establish the health effects of flood-related stress, it is easier to note that floods increase the prevalence of several diseases, including:

- Waterborne diseases such as diarrhoea; paratyphoid; intestinal parasites; and skin, and eye infections.
- Vector borne diseases such as malaria and yellow fever.
- Other illnesses related to increased hazards or poor living conditions, including malnutrition, infection from injury and snakebites.

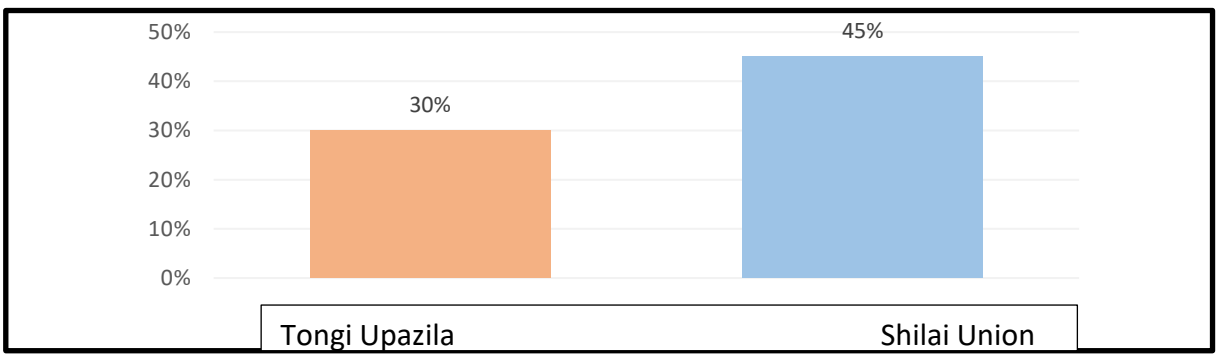


Figure 6.6: Survey result: Percentage of women affected by skin disease during flooding

Skin infections undoubtedly increase with the duration of a flood when the water becomes more polluted and people find it increasingly hard to reduce their exposure. The survey of women indicated that in Tongi Upazila around 30 per cent had suffered from such skin conditions during the last flood while the situation was even worse in in Silai Union where 45 per cent of respondents reported skin conditions (See Figure 6.6). The higher level of skin infections in Silai Union can probably be attributed to the fact that they had to move about more in the floodwater to obtain clean drinking water, food and cooking fuel. Some even bathed in the floodwater due to the lack of access to clean water.

Women in Tongi Upazila had access to a district hospital while the women in Shilai Union were forced to rely herbal medicine and tonics and this probably meant that the skin diseases stayed for longer in the flood-affected rural villages.

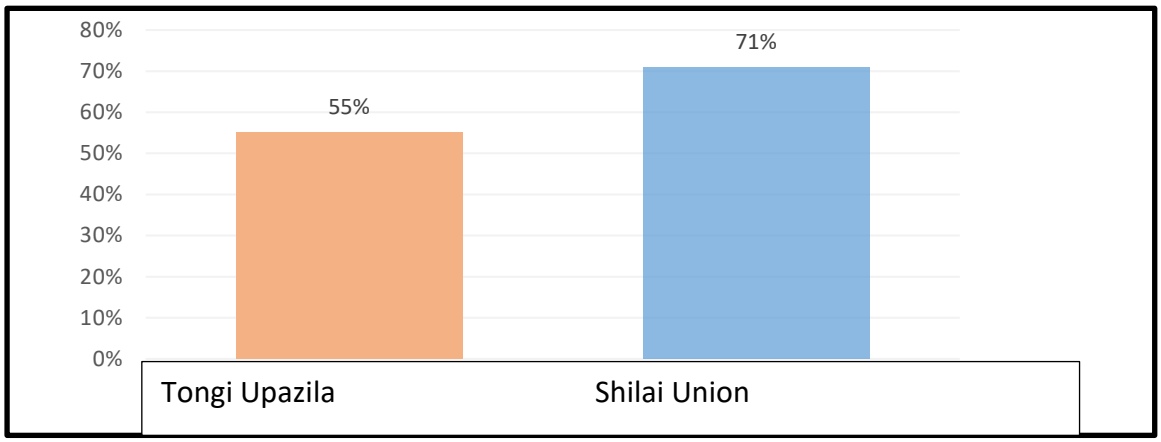


Figure 6.7: Survey result: Percentage of women affected by diarrhoea

Diarrhoea is associated with lack of access to clean drinking water and 55 per cent of survey resopndents in Tongi Upazila and 71 per cent in Silai Union reported that they experienced diarrhoea at some point during the major 2008 floods (see Figure 6.7). Others reported experiencing intestinal diseases and cholera after drinking contaminated water. Some women in the rural villages said the nearest source of clean drinking water was around five miles from where they lived. Women in the urban setting had better access to clearn water through tube wells that remained above the floodwater levels. Some of the women in the urban area also reported that they received water purifying tablets from government agencies while these were not available to the rural women.

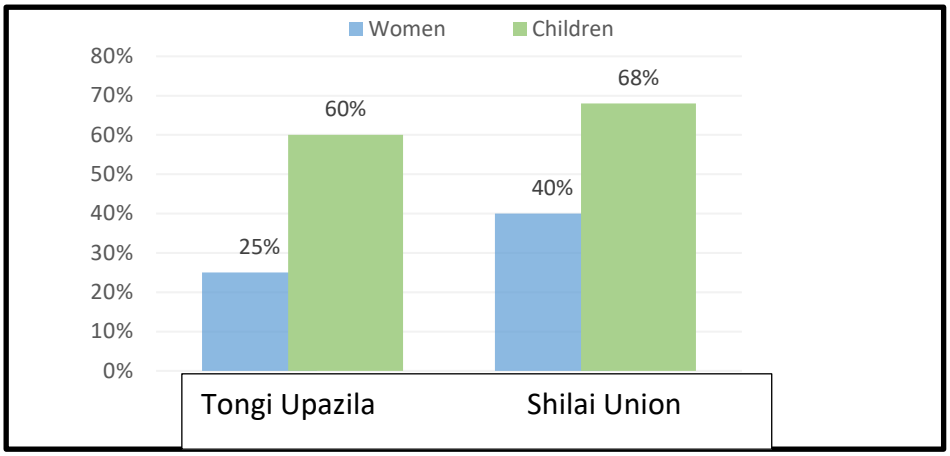


Figure 6.8: Survey result: Percentage of women and children who suffered from colds and high temperatures

Many of the women in both case studies reported that they suffered from colds and fevers during the major 2008 flood without being able to really know the cause (See Figure 6.8). High temperatures were widespread among children and the survey showed that 25 per cent of the respondents in Tongi Upazila and 40 per cent in in Silai Union suffered from fevers. In most cases the women did not seek treatment for colds and fevers, although many used traditional herbal remedies. Women in Silai Union had little choice other than to use traditional remedies where the survey showed that 68 per cent of the respondents' children suffered from high temperatures.

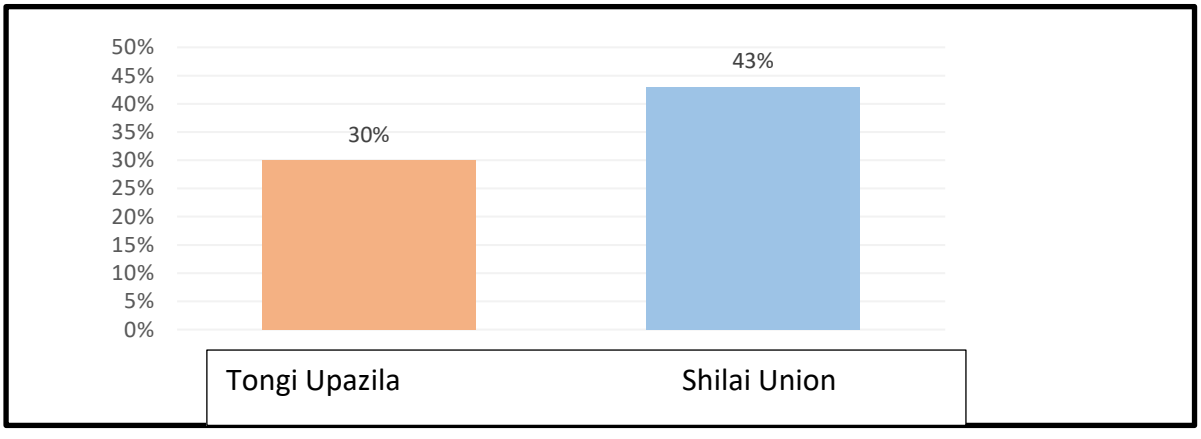


Figure 6.9: Survey result: Percentage of women affected by Yellow Fever

While I was told that Yellow Fever did not reach epidemic proportions during the 2008 floods in either case study area, my survey results suggest that an alarming 43 per cent of the survey respondents in Silai Union reported having had the disease at the time while the result for Tongi Upazila was 30 per cent (see Figure 6.9). Women told me that they found it hard to identify the symptoms of Yellow Fever and some said that the delay in seeking treatment had made them very ill. The survey respondents also reported rather alarming rates of Paratyphoid for women and intestinal parasites for children (see Figures 6.10 and 6.11). While Paratyphoid was not as prevalent as Yellow Fever women said that they also had difficulty knowing if they had this disease and those who had it delayed getting treatment. It is possible that the prevalence of both Yellow Fever and Paratyphoid was greater than what is indicated by the survey results even though the latter is a particular debilitating disease. In Silai Union, in particular, it was very difficult for sick people to get a proper diagnosis.

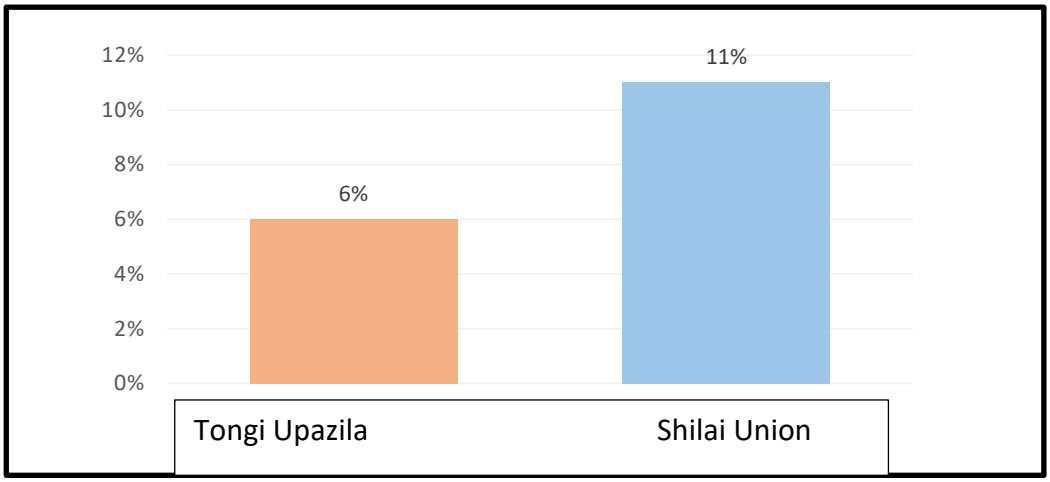


Figure 6.10: Survey result: Percentage of women affected by Paratyphoid

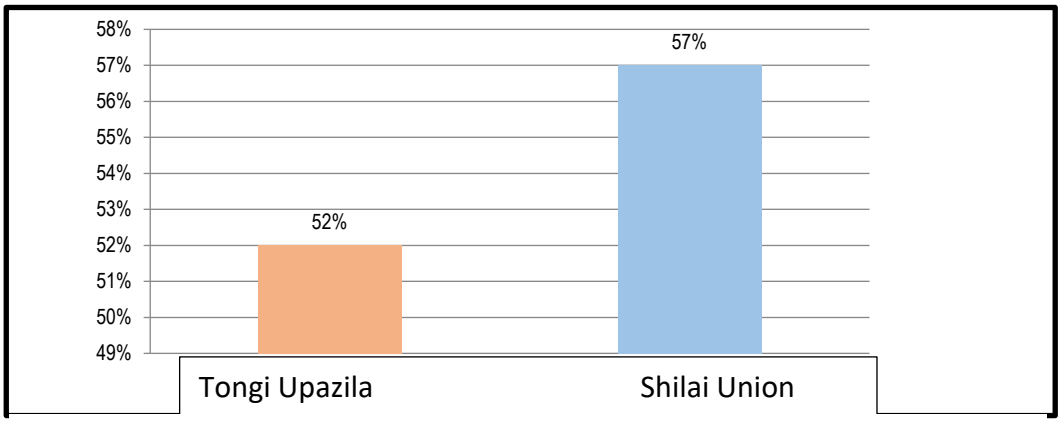


Figure 6.11: Survey result: Percentage of children affected by intestine parasites

According to the survey results more than 50 per cent of children in both case study areas suffered with intestinal parasites during the major 2008 floods (see Figure 6.11). Undoubtedly this was because they came into contact with contaminated floodwater and the risk of such exposure increases with the duration of the flood. Women reported to me that treatment for intestinal parasites rarely got rid of them and many children continued to suffer from this affliction long after the flooding had subsided. Intestinal parasites cause more problems for malnourished, sick or underweight children so the problems compound each other.

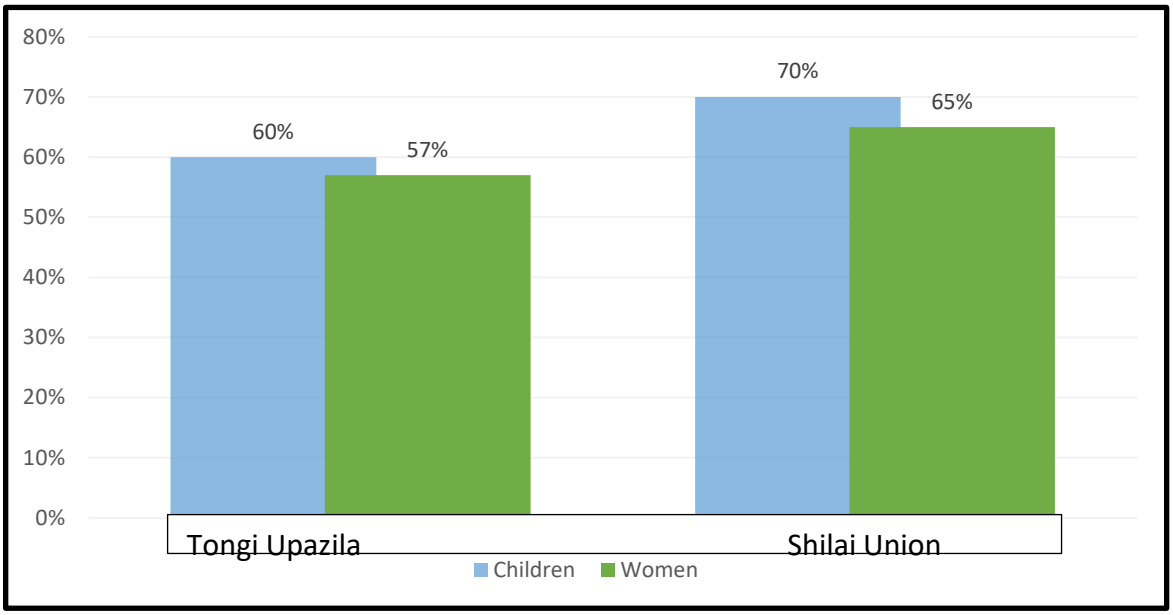


Figure 6.12: Percentage of women and children who suffered from malnutrition

In poorer communities, malnutrition is not confined to times of flooding and pre-existing malnutrition can make flood victims more susceptible to flood-related illnesses. As shown in chapters 4 and 5, most people living in the two case study areas experience chronic poverty and they acquire very few assets that might enable them to cope with a prolonged crisis. As this study has shown that women in poorer communities often deprive themselves of food during flooding events so that they can feed their children and elderly family members. It is interesting to note that the survey results indicate that malnutrition is a greater problem for women and children in urban settings because foraging for food is likely to be more successful in areas where agriculture is prevalent. The rural women had alternative sources of food such as local herbs which grow in water and fish that they can catch in the floodwater. Some were able to continue growing food in raised garden beds and were able to get supplies of milk, eggs and some fruit. In Tongi Upazila, people did not have these alternative food sources, however they did get more relief food aid. Around 88 per cent of survey respondents in both case study areas said they were able to store dry foods such *chira/muri* (parched rice), *gur* (molasses), rice, pulses, oil and salt.

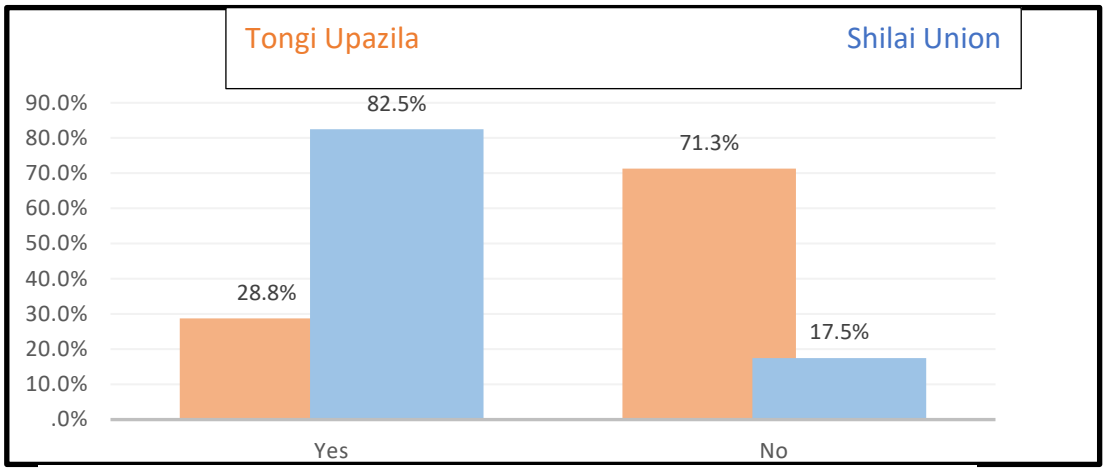


Figure 6.13: Survey result: See Quack Doctor for treatment

Chapters 4 and 5 also revealed that the danger of snakebite increases considerable during flooding events. Women told me that they know how to watch out for snakes and are more vigilant when the floodwater is around. None of them reported snakebites in the 2008 flood but the risk is high because the hospital in Tongi Upazila is not equipped to deal with snakebites and people who experience snakebite in Modhya and Dhakin Silai go to local snake charmers for treatment. The fact that they had no hospital in the area meant that the women in the rural villages were much more likely to use unqualified 'quack doctors' compared to those in the urban area (see Figure 6.13). The fact that over a third of survey respondents in Tongi Upazila reported visiting Quack Doctors relates to the fact that they often could not afford the treatment of qualified doctors.

In both case study areas, focus group discussions highlighted financial stress as the reason why so many people continue to rely on traditional remedies. Women in the urban area could go to the government hospital but many could not afford to buy the prescribed medicine. In Modho or Dhakhin Silai a very high 75 per cent of survey respondents said they rely on traditional medicines and some of the women told me that many women also rely on traditional birth assistants (TBAs) to help deliver babies. Such assistants rarely have sterile equipment.

As mentioned above, the stress of having to look after children and other family members during prolonged flooding takes its toll on the women with a number of interviewees reporting loss of appetite, lack of sleep, headaches, tiredness, irritability, forgetfulness, and general inability to concentrate on tasks. Furthermore, disruptions caused by flooding do not go away as soon as the flood waters recede and the additional stresses and strains on the women can endure for many months.

6.5 Coping Mechanism

As discussed in chapters 4 and 5, people who experience flooding on a regular basis develop a range of coping mechanisms and resilience which are effective when the floodwater does not stay for a prolonged period. People living in Shilai Union villages have perfected the art of builing *machas* with the materials available to them and they have developed a remarkable ability to share their *machas* with crowds of people and poultry for prolonged periods of time. Many of the coping mechanisms are the same for people living in rural and urban areas, including the use of traditional flood forecasting techniques (discussed above), the rising of house plinths to keep out low floodwater, the elevation of tube wells to prevent the flooding of clear water supplies, and the storing of dry food before floods arrive (see Figures 6.14 and 6.15).

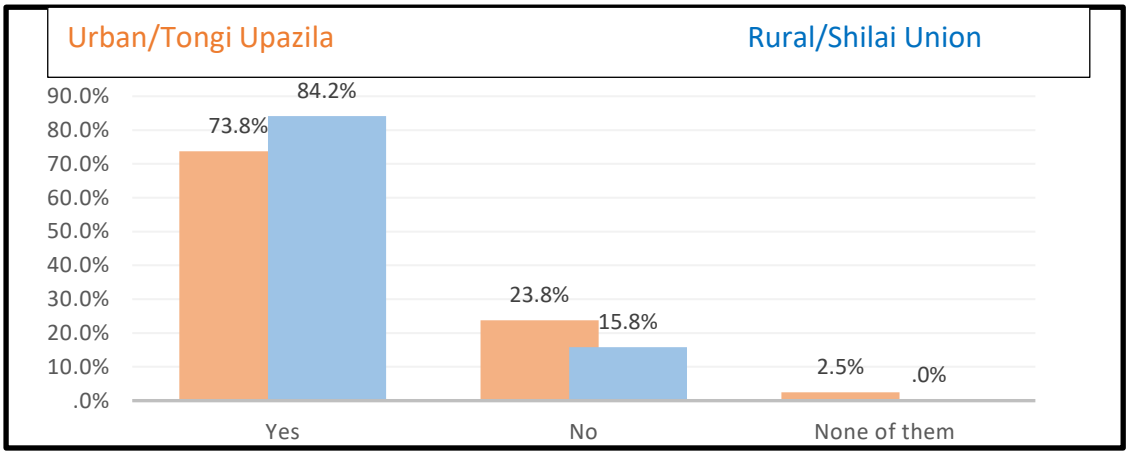


Figure 6.14: Survey result: Set the tube-well platform on higher ground

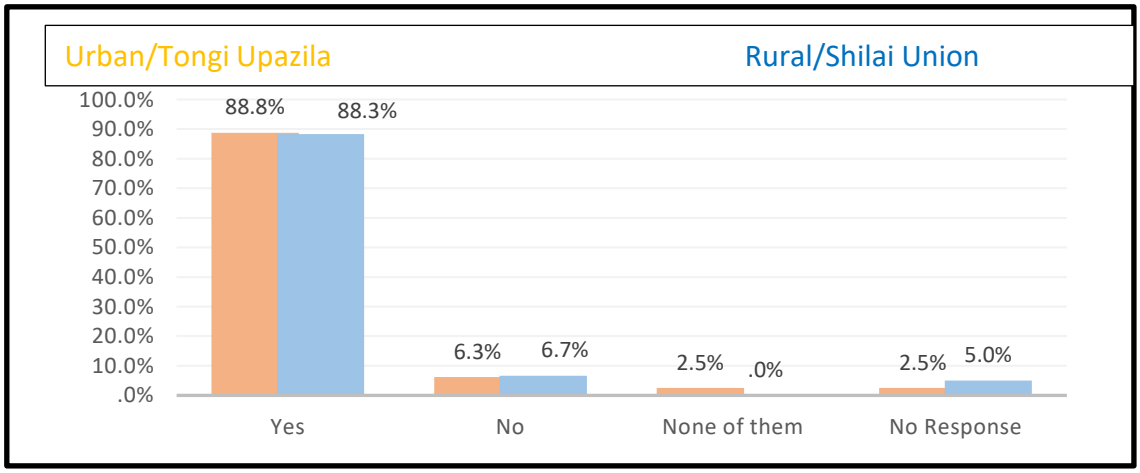


Figure 6.15: Survey result: Store dry food/rice as a coping strategy

Rising the level of tube wells only works when the floodwaters remain below the levels of the tube wells and it is impossible for poor household to store enough dry food to see them through floods that last a longer time during floods such as the one in 2008. People in the urban area had some access to water purifiers but the normal costs of these, puts them beyond the financial reach of poor households. The kinds of coping mechanisms that are common to the rural and urban areas have worked for many past experiences of flooding but the land-use changes and onset of global climate change, discussed in chapter 1, have increased the frequency and sheer volume of flooding events and traditional coping mechanisms can only have limited success in such disasters.

This study suggests that the importance of traditional coping mechanisms should not be downplayed because the communities studied have shown a remarkable coping capacity that may not be found in communities that have not experienced flooding on a regular basis. The traditional knowledge that allowed women in the rural villages to turn to alternative sources of food when normal food supplies ran out should not be discounted and neither should the ability of women in both case study areas to rally around and help each other. The inventiveness of poor people to keep building new kinds of *machas* in order to keep themselves above rising waters is to be admired. They might begin by building an elevated platform inside their home but go on to relocate on top of their roofs while removing side walls to ensure that the house was not destabilised by the swirling water. Using a host of local materials—including bamboo, banana trunks, water hyacinths and straw, floating *machas* are constructed to accommodate more than one family and often their poultry as well.

The women of Shilai Union are also inventive in their use of portable mud stoves (*chula*) during floods. These mud stoves are easy to carry and can use locally available biomass fuel for cooking. They were able to use them to cook on *machas* or even boats using firewood kept dry in plastic wrapping. In Tongi Upazila, the women normally use a communal gas burner. However, when their homes were flooded, they used either kerosene stoves or mud ovens depending on affordability. Mud stoves were sold in the local market.

Many women told me that they were able to turn to neighbours and sometimes to better-off members of the local community for short-term help, including food and money. However, prolonged flooding stretches the resources of all households and mutual assistance becomes hard to sustain. Some people chose to leave the district to live with family or friends in non-flooded areas and a significant number of these people do not come back again; some women finding work in the garment factories of Dhaka.

In Shilai Union, the women tried their best to save and protect their livestock which were, in many cases, the only family assets. During the flood they usually kept chicken and ducks on a *macha* or rooftop. They also made floating *machas* or rafts specifically for their livestock with straw and leaves for fodder. In Tongi Upazila, women also told me they tried to keep livestock with them but sometimes they had to find higher land far from where they were living.

According to relief agencies, people in the case study areas had little knowledge or the health issues faced by their livestock and the survey showed that only 16 per cent of respondents in Tongi Upazila and 10 per cent in Shilai Union had received any training course on poultry and livestock disease (see Figure 6.16).

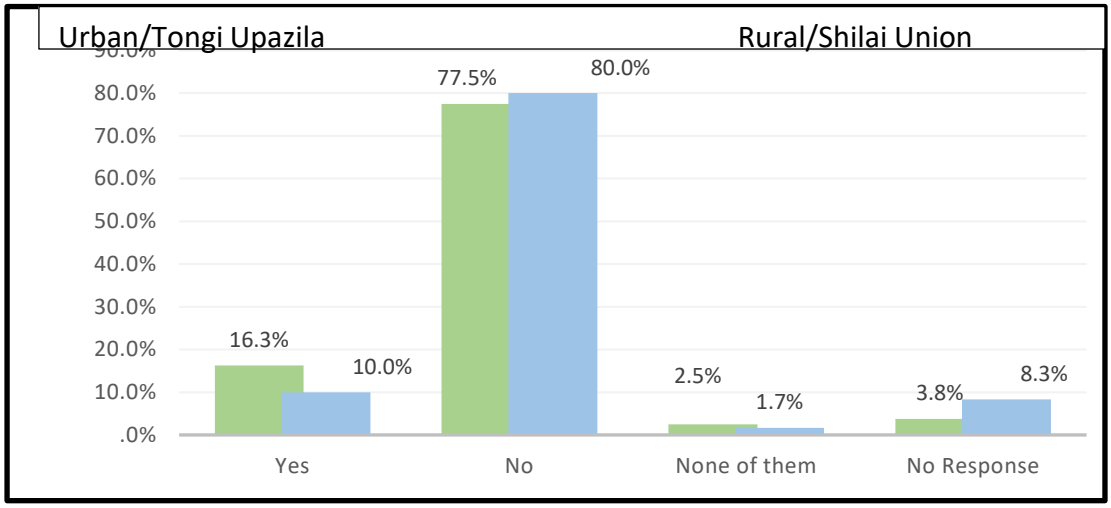


Figure 6.16: Survey result: Received orientation from NGO on poultry disease.

As well as poultry, cattle provide poor households in the case study areas with food (e.g. milk) and assets. Even during prolonged flooding, the women tried to keep their livestock as long as they could but sometimes, they were forced to either slaughter them for food or sell them for money. More than 95 per cent of survey respondents in Silai Union said that they were forced to sell poultry during the 2008 flood. This figure was much lower for people living Tongi Upazila--only 5 per cent of respondents—but the urban dwellers tend to have fewer livestock and they received more relief aid in the 2008 flood.

During short duration floods, women in the case study areas said they can help each other by exchanging food, lending money or contributing labour to support others. However, it is hard to sustain this kind of mutual help in long duration floods and a large majority of survey respondents in both case study areas reported that they were forced to take out more formal loans (see Figure 6.16). In Tongi Upazila, only four survey respondents reported that they were able to borrow money from their relatives and six reported borrowing from a neighbour; the said that they took loans from local moneylenders (mahajans) or NGOs with high interest rates.

Only a small proportion of survey respondents said that they save money in local co-operatives (*somity*) for use in times of crisis (see Figure 6.17). Obviously, the fact that these people struggle to survive a the best of times largely accounts for the lack of savings, however some interviewees also told me that people do not have a lot of trust in the management of local co-operatives

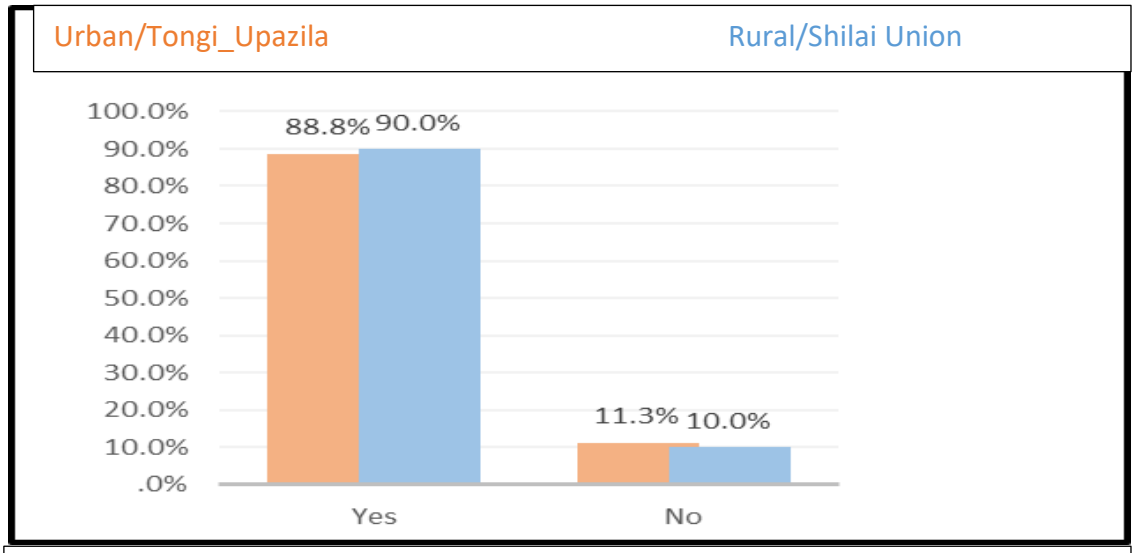


Figure 6:17 Savings for Disaster in Local cooperatives

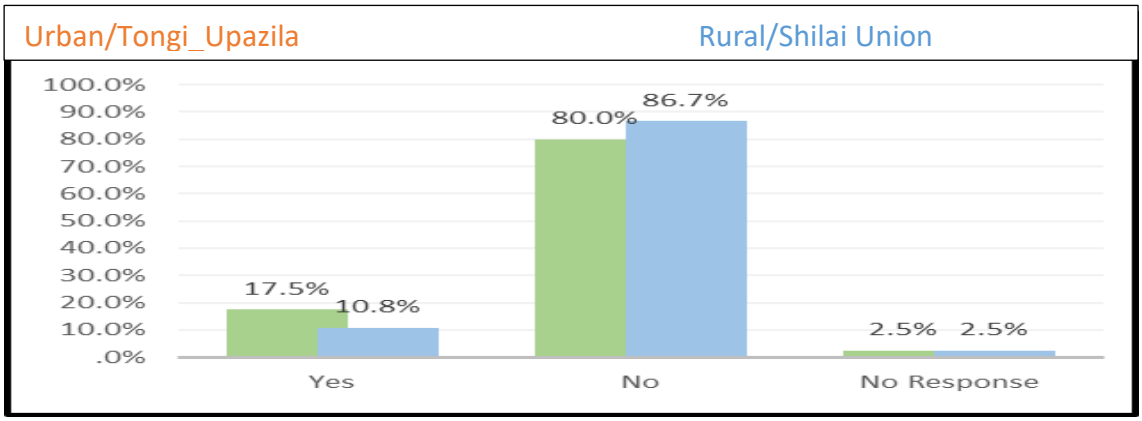


Figure 6.18: Survey result: Save money in somity (co-operative).

Transport is obviously a major problem during prolonged flooding. Boats become the main mode of transport but while many of the households in the rural villagers had a boat this was not the case in Tongi Upazila where the people with boats were able to earn money by ferrying other people around. In Shilai Union, people also made rafts using banana trunks while some even used large cooking pots or water containers as flotation devices. In some parts of the Shilai Union, people built bamboo walkways to travel from one house to another.

6.6 Livelihoods Before, During, and After Flood and Rural Urban Migration

In Silai Union, women were involved in agricultural work, livestock rearing, and handicraft

stitching. Whereas in Tongi Upazila, women were involved in livestock rearing and other activities such as formal and informal industrial employment. The distribution of livelihood activities indicates that in rural and urban areas, women's informal livelihood differs in the way employment activities are combined.

These differences may be related to household socio-cultural backgrounds of the women and the types of resources available in the respective locations. In the absence of agricultural activities, livestock selling was the most common informal livelihood practised by more than 50% of women in Silai Union. However, in the Tongi Upazila, selling of livestock was commonly practised during a flood. Fishing was a common informal livelihood activity in Silai Union during floods. It was not mentioned as an informal livelihood activity in Tongi Upazila, but selling vegetables was one of the alternative livelihoods for some women. In both areas, home-based work became a major source of income for poor women during floods. One of the major informal livelihoods during a flood was crafting and selling handicrafts. Women stitched nakshi khatha and other hand-crafted products during floods and sold them in the local market. Other sources of informal livelihood activities included knitting and petty trading, tailoring, fishing, and working as a bua (maid) in another's house.

An interesting pattern of in- and out-migration had been observed in the case study areas. Tongi Upazila had a high rate of in-migration with people from different parts of the country moving into the city. Although the sample size was not big enough to identify a particular pattern, about 30% of the respondents had migrated into the area looking for work (See Figure 6.2). Only 6% of respondents reported that they have moved temporarily during or after a flood.

Silai Union demonstrated the opposite. None of the respondents were migrants. About 44% of the respondents migrated to other areas or to Dhaka during flooding. Some families sent their able-bodied members to nearby towns or Dhaka in search for work. The difference in migration patterns resulted from difference in occupation patterns and job opportunities. While Silai Union has an economy highly dependent on agriculture, it failed to provide employment opportunities during and after floods, while Tongi Upazila provided industrial employment opportunities.

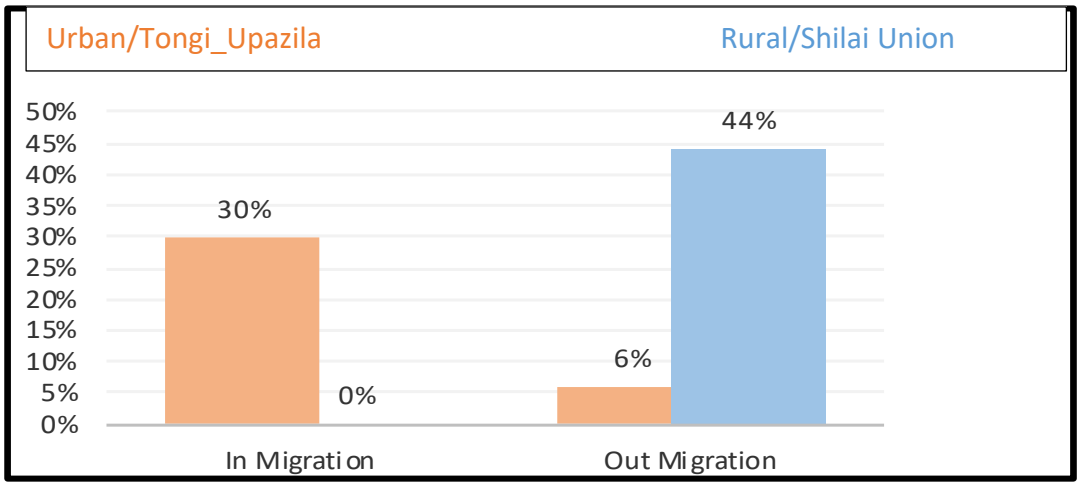
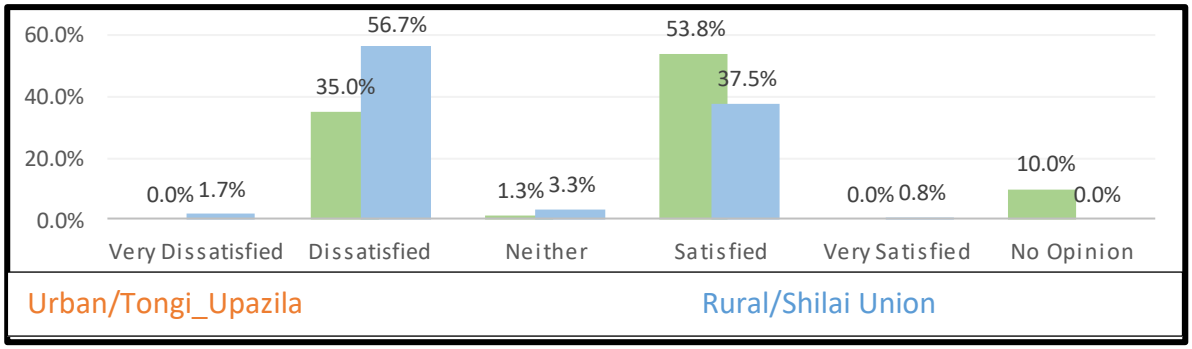


Figure 6.19: Migration Pattern in Case Study Areas

6.7 Relief Phase Issues

In Tongi Upazila, the relief provided by the government and Red Crescent did not cover all of the affected people. Some respondents reported corruption and favouritism in the distribution of relief. When asked about the relief assistance, its adequacy as well as the attitude and behaviour of the service providers towards them, I received mixed reactions from both research areas. In Tongi Upazila, most of the respondents who received relief from different organisations were satisfied with the relief service as a short-term measure. In Modhya and Dhahin Silai, respondents reported that the relief activities provided by the government and NGOs were the bare minimum. There were, however, some discontinuous relief distribution activities which did not cover all. When questioned about the satisfaction level, they reported it was very inadequate and biased due to political leaders preferring their relatives over vulnerable and needy people (See Figure 6.20).



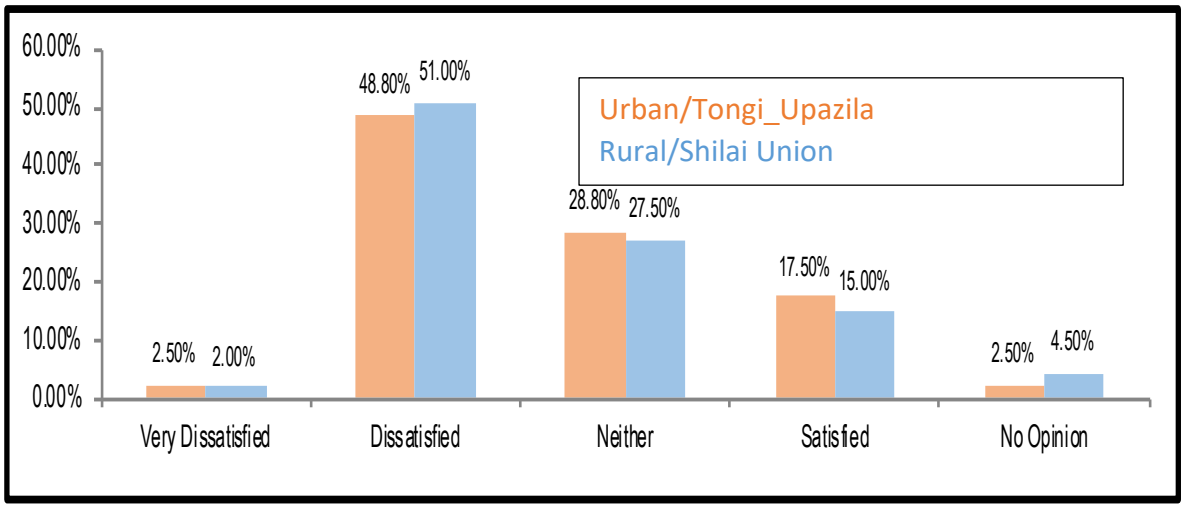
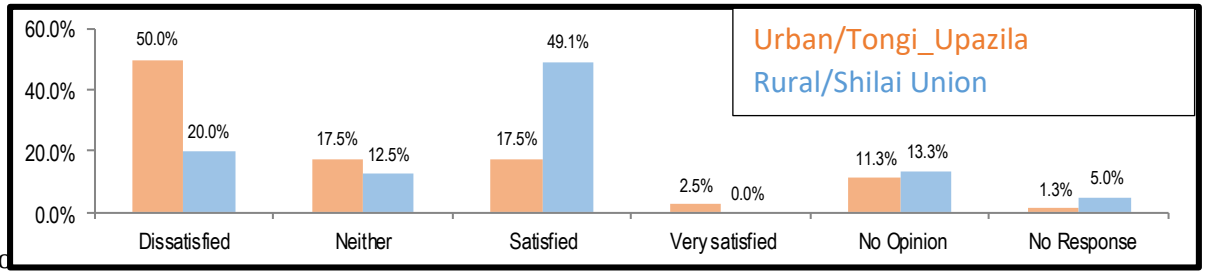


Figure 6.21: Relief material addresses the gender-specific needs of women

(Source: Field Survey, 2018)

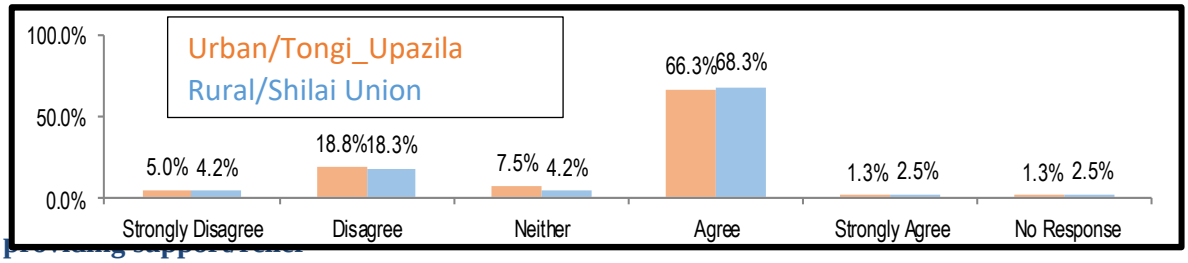
As to whether relief materials met the gender-specific needs of women, the result suggests a high level of dissatisfaction among women respondents (See Figure 6.21).

The survey included four questions related to the service, relief, and the service provider's attitude towards the flood-affected people. The survey on affected people's views with the support provided for them during their stay in shelters demonstrates that in the rural areas of Shilai Union, respondents did not answer the question because they did not attend any shelter during flood periods. Respondents said that they built *machas* inside their houses or on their house compound and stayed there during the flood period. The results show a high level of dissatisfaction among women regarding the safe arrangement of relief provision by the government and NGOs (See Figure 6.22).



(Source: Field Survey, 2018)

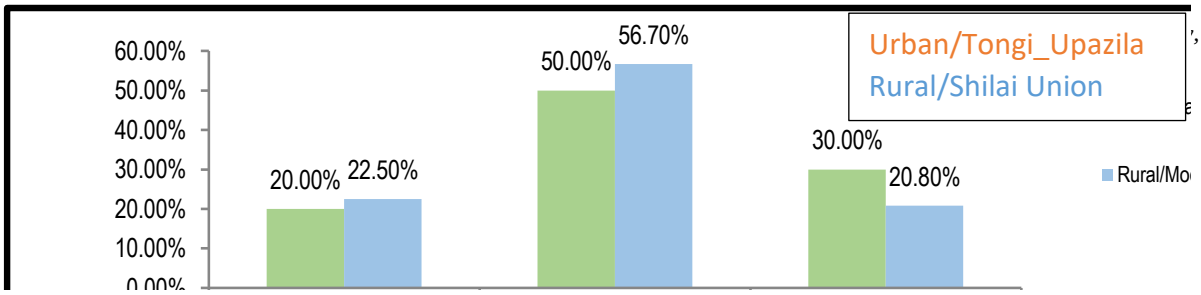
The response related to the attitude and behaviour of the service provider. The survey result shows that more than 50% of respondents in both areas were satisfied with the attitude and behaviour of the service provider organisation. Another topic in the survey was comfort or otherwise that the affected people enjoyed in meeting and talking with those providing support to them. The result revealed that 66.3% of people in the urban area agreed that they were comfortable with the service provider (See Figure 6.23). In rural case study areas 68.3% agreed that they were comfortable with the service provider.



(Source: Field Survey, 2018)

About 30% of respondents trusted the service providers in the urban area and around 20% trust them in the rural area. However, a significant number of respondents in both areas ticked 'neither' indicating the reluctance of respondents to respond to the question (See Figure 6.24).

Figure 6.24: Trust service provider



6.8 Summary of Similarities and Differences in the Comparative Analysis

Below are the similarities and dissimilarities found from the thematic analysis of the case study areas (rural vs. semi-urban area) that help put the research findings into perspective:

Criteri	Similarities	Differences
Flood Warning	▪ In both areas' respondents reported not being informed prior to flood events. ▪ In both areas, elderly people had a high level of reliance on traditional flood forecasting system.	▪ In Tongi Upazila people generally have more reliance on and acceptance of modern disaster forecasting techniques. ▪ Ownership of modern technical equipment (radio, television, mobile phones) is higher in Tongi Upazila. ▪ In Silai Union people mostly rely on traditional flood forecasting techniques whereas in Tongi Upazila people mostly rely on modern flood forecasting techniques.
Temporary Shelter Issues	▪ In both areas women complained about a lack of privacy in temporary disaster shelter/*macha* where they sought refuge during floods. ▪ In both areas, migrating or moving women and children to other non-flooded areas or relatives' houses during floods was a popular coping strategy.	▪ Tongi Upazila had a multipurpose disaster shelter which was used by people in times of floods/disasters. Shilai Union did not have any disaster shelter which could be used during crisis.
Toilet	▪ In both areas women complained about poor toilet conditions and lack of privacy in toilets. Women in Shilai Union were in a higher risk as they had to use hanging toilets which were even harder for elderly women and children as using such toilets requires good balance and physical ability.	
Pregnancy and Child Birth	▪ In both areas women suffered a lot during childbirth.	▪ Women in Shilai Union suffered more as they did not have any hospital within proximity or pharmacy to buy medicine from.
Cooking and Firewood Crisis	▪ In both areas women suffered from scarcity of cooking space and firewood.	
Living with Poultry	▪ Women from both case study areas reported living with poultry during flood created highly unhygienic living conditions.	
Choosing to not move to disaster shelter	▪ In both areas people had a general fear of being robbed if they fled their homes during a disaster. Although Shilai Union did not have a disaster shelter there was a general fear among people that leaving their homes would make their properties more susceptible of being looted. ▪ Women in both areas with adolescent children feared for their safety.	
Health Issues	▪ In both research areas, women mentioned that most of the time if they did not have money to visit a doctor they depend on their own remedies and traditional knowledge. ▪ None of the areas had any special facilities for pregnant women.	▪ More women from the Shilai Union than Tongi Upazila reported to have contracted skin diseases during flood. ▪ More women in Shilai Union were affected by skin disease, diarrhoea, general fever, yellow fever, paratyphoid, and parasites. ▪ More women in Tongi Upazila suffered from malnutrition. ▪ Women in Shilai Union had a higher tendency to see an unqualified doctor. ▪ There are no proper hospital facilities in Shilai Union which has resulted in high dependence of the villagers on the local unqualified

Criteri	Similarities	Differences
		doctor.
Temporary Sanitation Issues	▪ Women in both study areas suffered during menstruation as they could not change in front of other people.	
Coping Mechanism	▪ In both areas women reported providing informal help to each other in the form of providing materials and contributing labour work in house construction, food provision, interest-free loans, and moral encouragement to the flood victims. ▪ In both areas women relied on traditional herbal medicine for treatment due to lack of financial credit to see a qualified doctor. ▪ In both areas people set their tube well platform high enough to escape the flood waters.	
Food Preparation and Storage	▪ In both research areas, women store dry food or essential food items in advance for using in flood period. ▪ Women from both case study areas reported they stored dry food ahead of floods to be able to use them during floods. ▪ Rationing food was a common practice during food crisis in both areas.	▪ Cooking place and firewood crisis were more severe on Shilai Union as people could not move to a disaster shelter. ▪ Catching fish, growing vegetables in the homestead garden and raising the house plinth were common strategies in Shilai Union. Women living the slums in Tongi Upazila could not adopt any of these measures as coping strategies. ▪ In Shilai Union people solely depended on portable mud stoves for cooking whereas in Tongi Upazila, people relied on either gas, kerosene, or mud stoves.
Transport	▪ Boats become primary mode of transport in both areas during flood.	▪ In Shilai Union, for intra-house movements, *sankos* (bamboo bridges) were used. In Tongi Upazila, for intra-house movements or those who live in lowland area use a boat or walk through knee high floodwater. They used boats to go to markets and to get to the centre of the town. Once they reach the high road or where the water was not so deep, they might use rickshaws, vans, or auto rickshaws.
Selling poultry and livestock	▪ Selling poultry and livestock is a common coping mechanism in both areas, however women try to keep their poultry and livestock as long as possible because these are also their source of income.	
Savings, loans, and debts	▪ The practice of saving money was extremely undeveloped in both areas. In contrast, it was observed that in both areas women had an extremely high tendency to borrow money from the local money lenders with high interest rates.	
Rural Urban Migration		▪ Shilai Union showed a high rate of out-migration rate in the aftermath of floods. People left their homes and migrated to major cities in search for work to provide for the family they left back home. ▪ In contrast, Tongi Upazila displayed lower out-migration and high in-migration rates as there were big industries in that area which provided enough work for the poor to survive.

Criteri	Similarities	Differences
Livelihood rehabilitation	▪ There was no support from local, national, or international level for livelihood rehabilitation in any of the case study areas. The poor communities had to seek for ways to rehabilitate themselves which often resulted in selling their belongings, land, seeking work elsewhere, or migrating to other big cities.	
Relief	▪ In both of the case study areas there was a reasonable level of satisfaction among the recipients of the relief about the distribution of although in both study areas women complained that the frequency and duration of relief distribution was inadequate. ▪ Numerous women from both study areas complained about political biases in the process of preparation of the "vulnerable group list" which identified the recipients of relief. ▪ A high level of dissatisfaction was observed among the women from both case study areas on whether the relief materials met the gender-specific needs. Most felt that it did not.. ▪ Women had a fairly high level of satisfaction in both areas in regard to the behaviour and attitude of the relief workers. ▪ Women from both study areas expressed a fairly high level of trust and comfort towards the relief distributors.	▪ In Tongi Upazila, the affected people were unhappy and critical about the management of the flood shelter and the timing of short-term relief distribution. ▪ In Shilai Union area where people did not receive relief during the initial period of the flood they remained without food, medicine and drinking water for days in a row. ▪ The women from Tongi Upazila had a low level of satisfaction about their safety in relation to relief provision.
Informal livelihood	▪ In both areas, women participated in various informal livelihood activities, including sewing, knitting, and petty trading, tailoring, working as *buas* (maids) and fishing which could help reduce their vulnerability.	

The table shows some similarities and differences of impact of disaster between rural versus semi-urban areas. Relative socio-economic and infrastructure development in semi-urban area lessens some vulnerabilities . However, women are always in a disadvantage position both in rural and urban area.

CHAPTER SEVEN: RESEARCH IMPLICATIONS

7.0 INTRODUCTION

This chapter explores the implications of this research for government policy and practice on flood and disaster management in Bangladesh. It considers whether existing policies address the needs of women in poor communities and examines the extent to which policies which purport to support women are implemented. A challenge for the government of Bangladesh is how to coordinate the efforts of the increasing number of NGOs involved in disaster management and this challenge is discussed in the light of the case study outcomes.

7.1 Current Disaster Management Policy

The Bangladesh government has Standing Orders on Disasters (SOD) as well as a Disaster Management Act (DMA 2012). The SOD was first published in 1997 and was modified and translated into English in 1999. The SOD was formulated to provide a legal framework for all disaster management activities performed by different ministries and at different levels of government. Its ineffectiveness prompted a review in 1999 which suggested the need for new legislation. However, it was not until 2012 that the parliament eventually adopted the Disaster Management Act.

The DMA reflects earlier criticism of top-down approaches to disaster management (Islam, 1995; Murshed, 2003). The critics had agreed that top-down approaches do not address specific community dynamics, perceptions, and needs whilst ignoring local resources and capacities. Such approaches to disaster management can actually worsen the situation of vulnerable people (Murshed, 2003) and the Bangladesh experience confirmed this (Islam, 1995).

The government of Bangladesh began to shift its stance in favour of community-based disaster management with new policies, plans, and programmes emanating from the Ministry of Food and Disaster Management (MoFDM) in 2007 and with the creation of a Disaster Management Board in 2010. The combination of the Standing Orders on Disaster and the 2012 Disaster Management Act define the roles and responsibilities of all key disaster respondents[11]. However, critics suggest they have not gone far enough in ensuring co-ordination of the role of government and non-government agencies (Bannerman et al., 2011). Furthermore, the central government has done little to ensure that local government has the capacity to co-ordinate operations at the local level.[12]

Even before the DMA was proclaimed in 2012 a National Plan for Disaster Management 2010-2015 was prepared in 2010. This plan aimed to introduce a paradigm shift from a focus on

[11] (http://www.odihpn.org/humanitarian-exchange-magazine/issue-50/ngo%E2%80%93govern...)

[12] (http://www.odihpn.org/humanitarian-exchange-magazine/issue-50/ngo%E2%80%93govern...)

disaster relief to an emphasis on risk reduction[13], especially for poor and disadvantaged communities[14]. The key aims of the new plan were:

- Strengthening mechanisms to build capacities for the community and institution at all levels;
- Enhancing professional skills and knowledge of key personnel and strengthening capacities for risk assessment;
- Community-based programming for preparedness, mitigation and risk reduction;
- Promoting livelihood strategies and options for poor people that incorporate disaster management and risk reduction practices;
- Addressing the issues of vulnerable groups, i.e. the issues of women, children, disabled and other marginalised groups;
- Developing a partnership approach to disaster management involving all stakeholders, including: the government, local communities, NGOs, media, private sector, academia, and donor communities; and
- Mainstreaming disaster management and risk reduction into national policies and development processes.

Such goals reflected the United Nations Millennium Development Goals of 2000. They also reflect earlier commitments of the government of Bangladesh to provide better protection for children and others who suffer disproportionately from any disaster (MoFDM, 2007, p 32, Unpan1.un.org). The 2010 plan also built on earlier government efforts to implement such plans in 1993 and 2001 and the launch in 2003 of the Comprehensive Disaster Management Project. A draft plan was released in 2007 before it was finalised in 2010.

Whereas earlier plans and policies had emphasised disaster mitigation infrastructure work, the NPDM 2010-2015 focused on community engagement in disaster management and it stressed the need for co-ordination across all levels of government. This was the strategy encased with the proclamation of the DMA in 2012.

The NPDM incorporates a number of hazard-specific management plans, including the Flood Management Plan, the Cyclone and Storm Surge and Tsunami Management Plan, the Earthquake Management Plan, the Drought Management Plan, and the River Erosion Management Plan. It lays out a detailed Disaster Management Plan for each district, *Upazila*, (sub-drict) Union Council, and *Paurashava* (Municipality) and City Corporation throughout the country. The district-level disaster management plan (DDMP) is a compilation of all its

[13] (http://www.preventionweb.net/english/professional/policies/v.php?id=16676

[14] (http://www.nirapad.org.bd/admin/soft_archive/1308551375_Draft%20National%20Disas...).

Upazila, (sub-drict) Union Council, and *Paurashava* (Municipality) plans with an administrative unit (disaster committee) envisaged for each local community.

The Institutional Framework of Disaster Management at the Ministry of Food and Disaster Management is responsible for coordinating national disaster management initiatives across the country. This ministry is responsible for implementation of the SOD.

7.2 Policy implementation in the case study communities

7.2.1 Shilai Union

Very few of the people I interviewed in Silai Union villages were aware of the policy or even the existence of a local Disaster Response Committee. Only men who were in the *Union* council and religious and traditional leaders (*matabbar*) knew about the District Disaster Management Plan and only a few women had been consulted about the implementation of the plan at the village level.

After the 2008 flood, the Bangladesh Red Crescent Society anticipated the development of the new national plan by conducting a pilot project in Shilai Union villages aimed at training local people in vulnerability assessment, post-disaster needs assessment and project planning. The pilot project lasted a year and the women I spoke to said it had been the only such training they had received.

Interviewees assumed that the local Red Crescent committee would be responsible for drawing up lists of beneficiaries for the distribution of disaster relief with some input from political, religious and community leaders. They did not see this as a responsibility for local government.

7.2.2 Tongi Upazila (Sub-drict)

In Tongi Upazila, the disaster committees were formed, and action plans were prepared. Quite a few women were involved in the development of the plans, including many women such as leaders of poor women's societies, representatives of wider women's interest groups, female members of the *Union* council, and members of the Traditional Birth Attendants (TBAs). Interviewees said that women attended the monthly meetings of the disaster committee where women's issues were regularly discussed.

7.3 Gap between Policy and Practice

Participation by women in disaster management planning for Tongi Upazila, meant that some of the issues raised by my research had already been discussed in the community and it was much easier to generate discussion on the issues in interviews and focus group conversations. More thought had been given already about lessons learnt from the 2008 flood. However, it was noted that the emphasis in the disaster management policy on protecting vulnerable women, to the extent of prioritising their evacuation, implied that this responsibility needs to

be taken by men and this cuts across the other main policy requirement to ensure that women continue to participate in disaster-related decision making.

Even when women were able to participate in community meetings for disaster planning, they did not feel able to raise culturally sensitive issues related to reproductive health or domestic violence. Furthermore, plans emerging from local disaster committees were re-interpreted by *Union* councils which are inevitably dominated by relatively wealthy men. It was even worse in Shilai Union where local male elites took full responsibility for interpreting the needs of women in *Union* level disaster management plans.

The mere presence of women in disaster planning meetings does not mean that their concerns will be heard or addressed. Prevailing cultural norms encourage women to defer to men in the discussion of public affairs and even when women are represented on a *Union* council, they are likely to defer to the male members. It was noted in Tongi Upazila that women who are selected to represent microfinance enterprises may lack the knowledge and skill to represent the needs of women more broadly.

In Tongi Upazila, there are many women's groups, including associations for poor women and wider advocacy groups—and women elected to the *Union* council. Yet even here there was a feeling that the disaster planning processes did not get beyond traditional approaches to the protection of vulnerable women. They failed to understand the complexity of the issues facing women, as discussed in the case study focus groups.

There can be no doubt that a significant shift has taken place at the national level in regard to understanding the particular needs of disaster-affected women. For this research I interviewed a number of officials from the Bangladesh Disaster Management Bureau and Comprehensive Disaster Management Programme and they all said that the particular challenges faced by women are confirmed in regular surveys within Bangladesh and by a host of international studies. They said that agencies operating in Bangladesh are influenced by international research and trends, although the extent to which they have shifted their policies and practices depends on their specialisation, mission, mandate, and institutional culture. The policies and practices of international NGOs tend to reflect the beliefs and assumptions of their major donors, but this does not mean that they are sensitive to the particular cultural and social conditions operating in a country like Bangladesh. It is one thing to adopt policies favouring women in general and another thing altogether to work within particular local realities. For example, the difficulties women face in raising culturally sensitive issues in public local forums is not solved by simply assisting on greater female representation in decision-making bodies. Furthermore, this study has shown that poor women face very particular kinds of challenges during prolonged flooding and a 'one size fits all' approach to disaster management does not take this into account.

7.4 Government Efforts to Coordinate Multiple Agencies

As discussed in chapter 1, there has been a proliferation of disaster management agencies

operating in Bangladesh in recent years. As a result, it has been noted that government agencies have an increased responsibility to ensure the co-ordination of all relevant 'stakeholders' to develop effective local disaster management plans (Haque and Uddin, 2013).

Silai Union experienced major flooding in 1998 and 2008 and it stands to reason that the relief effort would have been better co-ordinated after the latter crisis. Yet I was told that NGOs operating at the *Upazila* level in 1998 had much more knowledge of what government agencies were doing than they did in 2008. In the latter flood the government agencies only co-ordinated their efforts with the Bangladesh Red Crescent Society. As mentioned above, few people I spoke to even knew that a local disaster committee existed.

In Tongi Upazila, the local government organised coordination meetings during the 1998, 2004, and 2008 floods. The local government also organised regular meetings with NGOs and community members. In this case, most of the NGOs were involved in the distribution of disaster relief to their own target beneficiary groups; with no effort made to co-ordinate the selection of beneficiaries. Clearly, more effort was made by local government in Tongi Upazila than in Shilai Union to work with NGOs but even here the effort fell way short of the need. The partnerships were haphazard, and the results were rather chaotic. The lack of transparency meant that local women I spoke to felt that political bias influenced the distribution of relief aid. Furthermore, the long duration of the 2008 flood meant that things went from bad to worse.

7.5 Research Implications for Policy Improvement

This research suggests that much more needs to be done to ensure that the intent of the national disaster management policies is implemented at local levels. In part, this may mean ensuring that local government agencies have the knowledge and capacity to understand the policies and implement local plans that address the particular needs of women. Indeed, the national Disaster Management Bureau. It should ensure that all members of *Union* councils receive appropriate training in the development of disaster management plans. However, capacity is only part of the problem because central government agencies need to monitor what is happening at district and *Union* levels to ensure that there is equity, transparency and proper co-ordination in the drawing up lists of beneficiaries and in ensuring that relief aid reaches those in need.

This research suggests that it is sometimes necessary for women to meet separately to discuss needs that are difficult to raise in more public forums and this needs to be taken into account in the development of local disaster plans and in reaching decisions about the distribution of relief aid. It is not realistic to assume that poor women who have never been encouraged to play a role in public affairs can easily step up to advocate for themselves and/or other women. They may need the support of their peers to take such a step.

The research suggests that central government agencies should encourage NGOs to spread their work to more rural areas and that the work of government and non-government agencies must always be co-ordinated at each local level. Prolonged flooding poses a range of very difficult challenges for poor women and this underlines the need for prolonged and co-ordinated aid.

The case study shows that poor women face many challenges when flood waters recede and this suggests the need to focus on the transition from relief aid to long-term recovery. Here the need is to support activities that can regenerate and diversify livelihoods for women who have lost assets and incurred debts to survive. As discussed in chapters 4-6, poor women have a range of flood coping mechanisms which can be supported by well-targeted relief aid. However, these are not enough to cope with a prolonged flood and very low interest loans may be the only way to prevent people abandoning their homes forever.

The fundamental contribution of this study is the exploration of women specific issues that women face during and after the disasters like flooding in Bangladesh. The highlight of women issues will certainly influence policy makers to integrate women sensitive strategies and mechanisms in their disaster management policies in a country where there is strong presence of women in national policy making bodies.

CHAPTER EIGHT: CONCLUSION

8.0 CONCLUSIONS

Participatory planning and action to identify and include women's concerns in disaster management policies are filtered by local contexts and wider socio-cultural settings. A lack of adequate attention to the local context and culture helps to explain why many disaster management policies and practices aggravate gender inequalities by reinforcing beliefs and ideologies which inherently treat women as being less important than men. The case studies confirmed that women are still largely invisible in both traditional and contemporary disaster management policies and practices in Bangladesh. Even where there is now a policy commitment to address the disaster-related concerns of women, the barriers to effective implementation are still remaining. It is widely assumed that women can easily move from being passive observers to active agents in disaster management practices and this assumption is, at best, naïve. If women are still marginalised in day-to-day decision making it is unrealistic to assume that they will be able to step up to an active role in times of crisis, especially when disasters impose an extra burden of work on them.

The discussion of policy and practice in chapter 7, suggested that much more needs to be done to turn formal policy commitments into practice. Disaster management and relief agencies need a much deeper understanding of barriers to participation by women both before and after disasters occur. This suggests that disaster management policy and practice need to be more closely integrated with wider social and community development strategies. This research project offers fresh insights into both the disaster-related needs of women living in poor and vulnerable communities and the barriers that currently prevent them from playing a much more active public role in ensuring that the needs of women are properly addressed. Consequently, the disaster management policy needs to incorporate social and mental wellbeing of venerable women severely affected by natural disasters. The fact that women are still marginalised in decision making yet majority of the women in case study proofed to be the breadwinners and carers, highlight that more needs to be done from the policy perspective to give women a genuine voice to lift them out of the poverty circle.

As anticipated, this study found that women living in both case study areas are more vulnerable to the negative impacts of flooding than men. It highlighted particular socio-economic factors and cultural norms that restrict women's access to decision-making in the two case study areas and demonstrated how disasters can make their marginalisation even worse. The research demonstrated that the multiple stresses that women face during prolonged flooding interact with each other to create complex 'wicked problems'. While many of the stresses that women in the two case study areas experienced have been identified by in other research within Bangladesh and in similar countries, this study was able to identify the concerns which are common to women in rural and urban settings and those which are different. In broad terms the research showed that the women have more in common than might be expected although it is critically important to understand the influence of context.

Women in both Tongi and Shilai Union bear roles and responsibilities that make them more vulnerable than men to flooding disasters yet, they have developed coping mechanisms of their own for dealing with gender-related challenges even if it means relegating themselves. The duration of flood disasters ultimately renders most of the coping mechanisms impotent as such, this study suggests that it is critical for disaster relief agencies to enhance, or build on, such coping mechanisms. While the women in Tongi have access to more facilities, including a hospital, the study showed that prolonged flooding effectively nullifies such advantages and the urban women were left in a dire circumstances as their counterparts in Modhaya and Dhakhin Shilai by the time the flood waters recede. The differences in the flood impacts for the women in the rural and urban settings are more subtle than stark, although they are still significant, and the research suggests that disaster relief needs to work with an understanding of particular geographic, social, and cultural contexts. The key findings of the comparative research can be presented under the following headings:

- The need to rethink some customs and beliefs that hamper women during and after floods
- Employment and livelihood challenges
- Maintaining assets
- Poorly targeted relief aid and lack of co-ordination between the relief providers
- The need for improved flood warnings
- Privacy and sexual abuse issues in disaster shelters
- The need to support and enhance coping mechanisms
- Health challenges for women
- Food and water security for flood affected households
- Disaster-induced migration.

8.1 Social norms and beliefs

Women are commonly restricted in their ability to access services by existing social and cultural norms which dictate that women should remain at homes or only go out when they can act with expected modesty. Such cultural norms are so deeply embedded in Bangladesh society that the women often act with extreme self-restraint and refrain from participating in public discussions or community decision-making. Moving about in flood waters in a traditional *shari* is very difficult and yet it is considered to raise the *shari* and expose skin. Most of the women in both case study areas said that they continued to wear *sharis* that cover their entire body during floods and as a result they commonly stay in wet *shari* for long periods of time, thus increasing the risk of flood-related illnesses.

8.2 Employment and livelihoods

The most severe challenges women face during prolonged flooding is the loss of paid employment and opportunities for the generation of more diversified livelihoods. The study

showed that around 90 per cent of women in the two case study areas resorted to borrowing money from the local money lenders with high interest rates on repayments. Some women reported that they were forced to sell their few valuables in an effort to pay back such loans. Lack of paid employment associated loss of family assets slows down the recovery and reconstruction in the post-flood period because the women have become highly dependent on relief and other forms of external support. To survive with limited resources, the women often ration their own food consumption and this can result in enduring health problems which further weaken their ability to care for children and other dependents. Flood-related unemployment was more acute at Shilai Union because flooding causes enormous disruptions to agricultural production than Tongi.

8.3 Maintaining assets

Asset management becomes a major challenge for poor women in both case study areas during prolonged flooding. Many are reluctant to move to disaster shelters or to other people's houses because they are desperate to preserve household assets, including livestock. This is a bigger problem for the women of Shilai Union—where 75 per cent of survey respondents said they opted to stay at home. Of course, they did not have a disaster shelter to go to but an unexpected 32 per cent of survey respondents in Tongi Upazila also stayed home voluntarily. While the women of Shilai Union are more dependent on retaining their livestock—especially poultry—some of the women in Tongi Upazila took their poultry to the disaster shelter, thus creating unhygienic living conditions for themselves and others. Many women in both case study areas reported having to sell their poultry and other livestock due to lack of credit as well as an acute lack of space for keeping them. This study confirmed that poverty is the biggest contributing factor for the flood vulnerability of women and all the women surveyed or interviewed said that they were in more dire poverty by the time the flood waters had receded. Very few had managed to retain any savings for the duration of the 2008 flood and these few had needed a co-operative saving arrangement to make this possible.

8.4 Relief distribution

This study suggests that the existing relief and recovery practices of the Bangladesh government and NGOs operating in the case study areas unwittingly made the women more vulnerable by not taking into account their gender-specific needs. In both areas the distribution of relief aid was rather chaotic and uncoordinated and most of it went to people who were most visible in the public sphere, i.e. men. In both case study areas, local government had responsibility for preparing the list of relief beneficiaries based on an assessment of needs. However, women in both areas complained about the lack of transparency in preparing such lists and it was commonly suggested that people with good political connections were unfairly favoured. Furthermore, the NGOs operating in the case study areas often provided relief within their own 'operational areas' with many vulnerable people outside such areas not receiving the relief they needed. Neither the local government nor the NGOs in the case study areas carried out any capacity assessment to determine how relief aid might complement existing resources

or capacity (e.g. coping mechanisms). While poverty is the biggest causal factor that pushes women into even more dire poverty after flooding, the disaster management policies are of a much greater concern as there are no coordinated effort from policy making bodies and aid agencies to synchronize their services. Consequently, the sporadic nature of disaster relief does not get to the core of the problems, issues and challenges faced by those the are in dire need for assistance during disaster and after disaster.

The distribution of relief aid in the rural villages of Silai Union was found to be even more spasmodic than for the urban villages of Tongi Upazila. However, women in both areas complained that the relief materials were often not appropriate to their needs; for example, some women reported that they were provided with a single *shari* without supporting garment/clothing (i.e. no petticoat and blouses) and many women complained of the absence of sanitary napkins to help them through menstruation periods.

This study highlights the severity of situations faced by flood victims especially women whose needs are not taken into consideration despite having a National Disaster Management Policy and Plan in place. As mentioned in earlier chapters, the Government of Bangladesh already have an established multi-layer institutional mechanism for disaster management in place with the recognition of the role of key stakeholders. However, it is fair to say that the current policies in place are inadequate and not fit for purpose. This study suggests that the institutional framework needs to be revisited in light of the findings from this study which clearly tells the stories of the poor and the sufferings endured by them during and after disasters. What will be critical for the government will be to develop the NDM framework into a collective decision-making body that is transparent, coherent and consistent in implementing disaster management policies for prevention, preparedness, response, and recovery phases.

8.5 Absence of adequate flood warnings

People I spoke to in both case study areas complained that they received little or no warning of the major 2008 floods and any information they did receive was too vague for any real use. While there were regular flood bulletins in radio and television they did not include any information about anticipated local impacts and interviewees told me that the language used in such reports was difficult for uneducated women to understand. Many people were caught unprepared when flood waters arrived without warning during the night and, as a result, they lost limited food supplies and some of their few valued possessions. The lack of warning was even worse for the rural women because they had no time to harvest crops or stockpile food. News of flooding conveyed by radio or television reached more of the urban women although few poor women, in either area, had media devices of their own and few could understand the language used anyway. Only five per cent of the women surveyed in Shilai Union had a television set in their home and only three per cent had mobile/cell phones. In Tongi Upazila, 20 per cent of those surveyed had a mobile/cell phone while 12 per cent of households had a television.

This study suggests that more should be done to disseminate information about predicted local flood impacts in easy-to-understand language and that more thought should also be given to the internal dissemination of this information within vulnerable communities.

The study at a broader level, also suggests that forging a collaboration with international partners to share knowledge will be an advantage as new technologies to combat disaster and minimise its negative impacts on lives, properties, assets and above all livelihood of the people affected by disaster are continuously emerging that has the capacity to provide early warning signs. As such, engaging both print media and digital (social media platforms) extensively to disseminate information and building awareness at a mass level will inform even the most remote villages for early preparation of disaster. Through education and engagement of communities, early preventative measures can be possible.

8.6 Disaster shelter issues

The women of Shilai Union did not even have the option of going to a disaster shelter yet this study has shown reluctance by women to use such shelters even where they do exist. The reason commonly given was the risk of sexual abuse and lack of privacy. I was not told of any particular incidents of sexual abuse but this may be because it is considered shameful to victims to discuss such events. Furthermore, the fear of sexual abuse was probably enough to deter many women from taking adolescent daughters into communal living spaces.

The disaster shelter in Tongi Upazila followed the design of a typical cyclone shelter and lacked the space to house a large number of people for a prolonged period. Women who moved into this shelter during a 2008 flood had to go about their daily activities as well as private activities in front of strangers. If they could not remain in their own homes, women in Shilai Union took refuge in unflooded homes of neighbours, on the *machas* of neighbours, or by moving to more distant higher ground. Living in such circumstances for prolonged periods also result in chronic lack of privacy.

The study suggests that these women specific issues needs to be addressed in the National Disaster Management Framework and the policy framework governs such issues with sensitivity and respect. This will require an education arm of the policy framework that will need to educate all involved in disaster management and relief work.

8.7 Coping mechanisms

As discussed in chapters 4-6, the women in both case study areas have developed a wide range of flood coping mechanisms, such as storing food, using innovative cooking methods, maintaining livestock as assets, and finding ways to diversify household incomes. Furthermore,

the communities they live in find ways to retain access to drinking water and to keep toilets functioning as long as they can. Perhaps the greatest coping mechanism of all is the construction of floating *machas* and the ability of the women to continue providing for their families while living on such confined platforms, surrounded by often polluted flood water. In parts of Bangladesh, NGOs have helped local communities raise house plinths to keep out minor flooding and they have helped them to elevate tube wells. However, many of these coping mechanisms only work in minor or medium-level flooding and they rarely help in major, prolonged flooding as the 2008.

Taking informal loans can also be described as a coping mechanism and it can be a major source of relief when poor people can borrow from their richer neighbours or acquaintances at low rates of repayment. However, many were forced to borrow from local moneylenders at very with high interest rates and this only delayed and exacerbated their longer-term problems. The study suggests that some relief aid should take the form of very low interest loans that could help people recover after prolonged flooding.

This study also suggests that female-headed households are less likely than those headed by men to have resources for flood preparation work. They need assistance to develop coping mechanisms *before* floods arrive.

At a broader level, the study suggests that the National Disaster Management Framework should incorporate a low interest loan scheme for the poor who gets pushed into dire poverty and gets caught into the poverty circle after borrowing from the money lenders/families/neighbours. This scheme can be means-tested to avoid a government handout but will benefit the most vulnerable in both long and short-term.

8.8 Health challenges

Lack of access to medical treatment was a particularly severe problem for the women of Shilai Union because there was no hospital within reasonable reach. Hence they relied heavily on traditional medicines or ‘quack doctors’ who have not medical training. The study showed that pregnant women in the rural area cannot get professional medical support for any complications or for childbirth during floods. The rural women also faced a greater risk of snakebite during floods.

In Tongi Upazila, women reported that the treatment they received from the local government hospital was not satisfactory and that the hospital was unable to cope with the increase in the number of people seeking help for flood-related illnesses and a significant number of the urban women also resorted to seeing ‘quack doctors’. They may have been in a better situation that their rural counterparts yet the medical support was clearly inadequate during a prolonged flood.

The study suggests that temporary Health Centres be set-up as a preventative measure before the disaster strikes given advanced technology can detect weather patterns and provide early warnings. This will help people get the basic necessity items such as water purifier tablets for

drinking water and other medications for common symptoms. These temporary Health Centre can increase with the severity of disaster and its impact as "coping mechanisms".

At a broader level, the study suggests that the set-up of the temporary Health Centres be part of the National Disaster Management Framework that will guide on such policy as peoples' health and preventative and coping measure as preventative risk.

8.9 Food and water security

Outside times of flooding, rural women undoubtedly have more food security than their urban counterparts, partly because they have more room for home gardens, and they probably have access to more sources of drinking water. However, flooding has a devastating impact on food production and it can easily contaminate sources of drinking water. Hence, in a prolonged flood the rural women have less food and water security than their urban counterparts because it is easier for the urban communities to access food from outside their local area. Food prices rise for the urban women when food is harder to get but at least they have less insecurity of supply.

8.10 Disaster-induced migration

Many women in Shilai Union told me that their husbands migrated to other areas and cities in search paid employment during floods. However, there are now more jobs for young women in urban garment factories and even some of the rural women moved to take up this kind of employment when they had no other options. Older women and single mothers, by contrast, were left without a choice but to stay at home. Some women in both case study areas reported that they migrated with their family to stay with their relatives during a flood and later came back when it was all over.

As an industrial hub, Tongi Upazila provides more employment options than Shilai Union yet even here some women said that they went to stay with their parents who lived in another district in order to survive the flood impacts.

8.11 Addressing the research questions

This research set out to answer three broad research questions. While the questions formed the bases of the analysis and discussion chapters, the following sections will specifically address them:

1. What preparation and coping mechanisms are currently in place for women to provide immediate relief from the natural disaster?

This study found that there are several strategies that are implemented by government and non-government organizations in Bangladesh to alleviate the sufferings from the chronic flooding problems in various part of the country. In many cases, those policies contributed to reduce the

suffering of affected people and helped the flood affected community to cope with this natural disaster. Most strategies, however, are generic and do not include the women sensitive issues faced by women during and after the flood. Despite the serious cultural, religious and socio-economic tabous that aggravate women sufferings during and after the flood, rarely any organization both public and private has addressed this issue. Socio-cultural backwardness, inadequate awareness, lack of proper education and strong influence of religion on society and politics have barred both government and non-government organizations in addressing women sensitive issues and empowering women to overcome odds creared by so called social norms and values.

2. What are the differences of vulnerabilities for women between rural and urban areas during the natural disaster management?

This comparative case study research suggests that rural and urban women have more shared than distinct flood vulnerabilities, especially when it comes to prolonged flooding. The urban women had access to a hospital and a disaster shelter and they had more options for finding paid employment. They were also slightly better off regarding flood warnings and there were more relief agencies operating in this area. However, the hospital and shelter were inadequate for their needs and the shelter, in particular, posed many difficulties for the women who took refuge in it. Prolonged flooding left both urban and rural women in entrenched poverty and debt and with huge challenges to face even when the flood waters receded. Relief aid was far from adequate to meet the gender-specific needs of the women in both settings and the unfair distribution of limited aid caused internal tensions.

The rural women certainly got less assistance and faced an even more difficult post-flood recovery. However, it is arguable that they benefited from stronger local bonds of kinship and long-term association because the poor women probably got more help from neighbours and friends. The rural communities also had the materials and skill to build machas.

3) To what extent does gender bias exist during natural disaster management in Bangladesh?

This study suggests that earlier research has resulted in some policy commitments to address the specific needs of women in relation to natural disasters in general and floods in particular. The national flood management strategy is not informed by research on how flooding affects women in particular but it does reflect some of the commitments of the wider disaster management policies. However, the lack of attention by relief agencies to local socio-economic needs and to local cultural beliefs and practices meant that the policy commitments made little or no difference. This study suggests that policy commitments will do little if the barriers to participation in public and community life which poor women face are not also addressed. Furthermore, the barriers to participation in public and community life that women face in normal times make it impossible to change the situation in times of disaster so policies related to the participation of women in disaster management need to be linked to wider policies on

the participation of women in public life and community affairs.

While national policy on disaster management includes rhetoric on gender-specific needs, there is little evidence in this study to suggest that relief aid reflected the particular needs of women. This suggests a gap between national policy and practice at a local level.

The research in Tongi Upazila showed that the existing disaster shelter failed to cater for the needs of women and girls. Given predictions about increased frequency and intensity of flooding into the future the government of Bangladesh should make the construction of adequate, all-purpose, disaster shelters a major priority.

This study suggests that relief workers in the two case study areas did not have a deep understanding of what women would need to endure a prolonged flood. Obviously, many people are involved in chains of decision-making about the delivery of relief aid and it is not reasonable to blame local workers for selections made at other levels. However, a detailed understanding of why relief aid was far from adequate in the past major flooding events needs to be investigated and findings incorporated within the National Disaster Framework as to avoid such mishaps. It will be important to allow feedback from relief workers at local level to get a deep level understanding of the dynamics surrounding such issues to enact on policy.

The post-flooding reconstruction phase is more complex than the relief aid phase and mistakes in the delivery of aid can be more costly. It is, of course, hard to predict the long-term needs of vulnerable women when forms and sources of employment can change. However, it is even more important that long-term recovery planning should start with detailed local knowledge and one aim needs to be to provide vulnerable women with knowledge and skills to take advantage of any local opportunities that may arise. It cannot be a matter of only rebuilding damaged infrastructure but of thinking about a diversity of ways in which women can recover from debt and loss and continue to provide for their families and households into the future. Of course, if relief aid has not addressed the particular needs of women, they will be in a worse position to begin long-term recovery so detailed local knowledge needs to underpin both relief and recovery and the experiences of relief workers can inform strategies for long-term recovery. However, the findings from the case studies shoes that the there is a gap between those who deliver relief aid and those who make decisions about investments in long-term recovery. The thinking behind the long-term recovery focuses on how men can support their families and households and the roles and responsibilities of women are too often neglected.

While it is important to distinguish disaster preparation, relief aid, and long-term recovery from each other gender awareness should begin with disaster preparation and flow all the way through to long-term recovery.

The key coping mechanisms identified from the case studies were: elevating house plinths; elevating tube wells; building *macha* platforms; storing dry food before a flood; protecting assets (including livestock) as long as possible; taking loans; and trying to diversify household

incomes. In Shilai Union, many households elevate their house plinths with mud to survive low level flooding, but this is of little use in higher and prolonged flooding. The government of Bangladesh has undertaken house elevation in Kuakata Upazila, Patuakhali District (see Figure 8.1) and this research suggests that this program should be extended into many other areas.

Figure 8.1: House elevation in Kuakata Upazila

Source: Author

Not every household can afford to elevate tube wells and nor is it essential for each household to have individual access to water in a crisis so development aid could be used to construct enough elevated tube wells for a community.

The research showed that in the major 2008 flood around 90 per cent of women surveyed said they were forced to borrow money and often they were forced to turn to local moneylenders who charged very high rates of interest. The national government and NGOs in Bangladesh could look at a scheme for making very low interest loans available to poor households during prolonged flooding.

4) How is disaster relief provided to affected communities?

The proliferation of agencies involved in disaster relief and recovery work in Bangladesh may have made it even harder to ensure that gender awareness moves from policy rhetoric into actual practice. There is some evidence of cross-fertilisation between agencies concerned with disaster management and others focusing on women's 'development' (DFID, 2011), but little evidence to suggest that this has had much impact on the practices of disaster management agencies. It is probably the responsibility of the national government to ensure that its policy commitments to understand the particular needs of women translate into the practices of both government agencies and NGOs which operate with government endorsement.

This study has tempted to investigate the barriers to the implementation of gender-sensitive disaster management policies in Bangladesh and more research is needed on that topic.

Since the devastating cyclone in 1991, Bangladesh has developed a much better cyclone

forecasting system and has constructed cyclone shelters along the cyclone-prone coast. I was told by a range of disaster relief workers that the government and a range of NGOs collaborate in disseminating news and information about impending cyclones and make sure that people are moved into shelters in time. However, flood forecasting has not received the same attention and there are no purpose-built flood shelters in which people can stay for the duration of a prolonged flood. Better flood forecasting alone could help people protect their critical assets.

Cyclone shelters are only designed for short-term accommodation and flood shelters need to pay more attention to the need for women and girls to have privacy. Much more thought needs to be put into the design of shelters in which families could live for weeks and months rather than days. Furthermore, relevant authorities need to ensure the safety of people when they are staying in such shelters.

The duration of floods also means that people need different kinds of relief aid than those who have experienced a cyclone. More thought needs to go into the differences between relief and recovery after floods compared to cyclones. However, in all disaster's government agencies need to make sure that the distribution of relief is fair and transparent with no tolerance for political bias.

In conclusion, I must say that both government and non-government organizations along with multilaterial organizations need to address the women's specific vulnerabilities and develop their disaster management strategies, mechanisms and policies to address those specific issues in order to improve overall disaster management performance.

8.12 Further research

The selection of case studies enabled this research to draw out implications for women living in rural and urban communities. However, case study research is always limited in scope and there is a need to undertake similar research in other flood-prone local areas. This study suggested that existing coping mechanisms could be enhanced to help people endure prolonged flooding, but this proposition needs to be tested by experience. Further research in other local areas might also identify more coping mechanisms which could be promoted more widely.

This research was not able to examine where critical decision about where and how critical decisions are made regarding disaster relief and recovery and further research could focus on mechanisms for ensuring that local knowledge properly informs such decisions.

This study has recommended the development of a new scheme for providing very low interest loans to women experiencing prolonged flooding and the rich experiences of Bangladesh's Grameen Bank—which provides loans to women to operate microcredit enterprises—could inform the development of this new fund.

Clearly there is a need to provide more education for disaster relief and recovery workers to

understand the complex needs of poor women experiencing prolonged flooding. This could be complemented by more public education which would help to ensure that the needs of women are not hidden from view. However, prevailing cultural norms in Bangladesh make this kind of work difficult and more research needs to go into culturally appropriate ways to undertake this kind of education work.

As discussed above, more effort needs to go into distinguishing flood relief and recovery work from other kinds of disaster management and an obvious starting point is to develop an effective nation-wide flood warning system.