CLIMATE RESILIENT AND EMPOWERING LIVELIHOODS FOR WOMEN

BCAS

NORWEGIAN EMBASSY

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Acronyms And Abbreviations

CBA	Community Based Approach
CBO	Community based Organizations
CVP	Climate Vulnerable Poor
CRA	Community Risk Assessment
DAE	Department of Public Health Engineering
DRR	Disaster Risk Reduction
DWA	Department of Women's Affairs
DPHE	Department of Agriculture Extension Department of Livestock and Fisheries
GOB	Government of Bangladesh
HH	Household
IGA	Incom e Generating activities
GBM	Ganges -Brahmaputra -Meghna
GDP	Gross Domestic Product
GHG	Green House Gas
KII	Key In -depth Interview
LDC	Least Developed Country
LGI	Local Government Institutions
NGO	Non -governmental organizations
SWOT	Strength, we akness, opportunity, threat
TOR	Terms of Reference
FGD	Focus group discussion
UDMC)	Union Parishad Disaster Management Committee
UN	United Nations
WTO	World Trade Organization

Executive Summary

Bangladesh is known globally as one of the most vulnerable country under climate change. The government of Bangladesh, the development and climate change practitioners has been trying to make the development strides resilient.

Rather than a techno-fix discourse, climate variability/ change have been evolved as a development issue since last one and half decade. The concept of "Community Based Adaptation" started to shape up into reality from early 2000, that too in Bangladesh, for the first time at global level. It is also revealed in the process of identifying "climate change activities" that Bangladesh has been practicing institutional adaptation since ages in its development initiatives. Different theoretical approaches have been used to address both the modalities of adaptation. Acknowledging the limitation of adaptation within an uncertain regime of future Green House Gas (GHG) emission scenario, it is now widely accepted that adaptation has its limitations.

In this back drop, different concepts and frameworks have been tossed to substantiate this limitation. "Resilience" is one of the recently evolving jargons by the development practitioners through "mainstreaming" climate change/ variability issues in development initiatives. The linkages between climate resilience and women's livelihoods are gaining relevance in the light of the climate change debate and its increased impact on development. Gender differences are continuously reinforced by the impact of climate change and the response provided in their aftermath. It has been documented in the literature that women are disproportionately vulnerable to climate change/ variability in Bangladesh.

The South Western Region (SWR) is judged to be the region with the highest vulnerability to climate change within the country. The hydrology of the SWR is affected by the tributaries of Ganges, creating a vast network of waterways. Most of the SWR, with the exception of a few parts of Jessore District, is having an elevation of less than 3 meters above mean sea level, and have been subject to natural disaster such as flood, cyclones and tidal waves.

As such, no specific climate change scenario for the SWR is found in the literature. A number of studies, based on Global Climate Models (GCM)- driven scenarios, suggest that the average change in temperature for the entire country over a

100-year period can be as high as 3.6 0C. Using more rigorous Regional Climate Models (RCM), the following climate scenario can be found for the country;

- The will be a general rise in surface temperature, ranging from 1.0 to 2.4^{0}C between 2030 and 2100;
- Rise in mean winter (December, January and February) temperature will be slightly higher than that for monsoon (i.e., June, July and August);
- The peak-monsoon rainfall will increase significantly, with a range of 4.7 to 11.8% within the time frame of 2030 to 2100;
- There will be a general reduction in already low winter rainfall; and
- The mean sea level will rise in the order of 43cm by 2070

Reduction in winter rainfall will likely to reduce available lean river flow further and subsequently it will increase salinity intrusion throughout the SWR. Crop agriculture requiring surface irrigation will be further constrained due to a combination of salinity and drought, particularly in the western parts of the country (and also the south western parts of the SWR).

A rise in sea level along the low lying coastal zone will cause permanent inundation of low-lying coastal lands outside embankment areas and a higher susceptibility of coastal embanked areas to tidal inundation.

Coastal morphological balance will also be disturbed due to effects caused by sea level rise, having severe consequences in terms of drainage congestion, water logging and coastal erosion.

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Salinity has been one of the major impediments of developing agriculture in the coastal zones with a likelihood of increasing significantly under future climate change scenarios. In this backdrop, a host of initiatives have been taken in the SWR as institutional as well as community based adaptation.

Any primary measure for adaptation must consider that these are suitable, acceptable and implementable responses to climate-induced vulnerabilities in a bid to stabilize the income and livelihoods of the local vulnerable population. The current ongoing practices by the communities themselves and the NGOs demonstrate a number of traditional and innovative measures for alternative income generation. The traditional measures are slightly modified that suits to local vulnerability contexts and conditions. Greater emphasis is found to be attached to simple improvisations using traditional knowledge and locally available tools so that the larger majority of the uneducated strata of farming households can adopt techniques that will help them combat the increasing climate variability and extremes and simultaneously ensure income. Since poverty is perceived to be the primary concern, such adaptive measures primarily look into modalities that will help maintain unabated access to various forms of assets (streams of services and goods), enabling the participating households to build resilience. Many of these activities are innovative, simple, easy to use and replicable, socially accepted, and environmentally suited and non-destructive.

Promoting new practices through best use of the given hydro-geophysical Condition is one of the effective modalities for adaptation. Few alternative livelihood options have been recommended for the SWR (depending on the extent of salinity in different locations and time). For example: grass cultivation, Koera nursery and products,

Cage agriculture. Homestead gardening and hanging vegetables, Floating garden, Mele cultivation and products, Embankment cropping, Livestock rearing, Poultry/ duck rearing, Poly culture.

Community led initiative is recommended. Few options (among others) are discussed. For example: Honey processing SME industrial set up, Products from Kewra , Tailoring (skill training) and set ting up of Mini-garments, Handbag production and marketing, Pottery, Bakery, small-scale food processing, Commercial scale handicraft production, Tree Plantation on embankment side (suitable saline tolerant variety), Organic compost prepare (vermi compost) as small scale commercial activity, Training on Solar Home System installation and maintenance.

Livelihood Options for less saline areas (along with practiced approaches) are also marked among which:

Alfalfa production in Fallow Lands, Dairy at commercial scale, Embankment vegetable production and marketing, Chili production at commercial scale, New high value crops (capcicum, strawberries, zuccini, ...) Horticulture garden (jujube, guava, ...), Saline tolerant varieties (maize, paddy such as BINA-8),Promotion of early varieties of crops (early beans), Promotion of summer varieties of winter/Rabi vegetables, Year round Napier grass production (feeding into local dairies).

Inclusion of women specific issues or gender related activities in current CBA practices in the SWR are found to be limited only to the inclusion of women as target group and provide them with a minimal grant (also in cases provide skills), mostly restricted to the activities within domestic periphery. While doing so, there is hardly any initiative for market linkage, widening mobility sphere, or to address related access and ownership issues.

There are efforts in Bangladesh to enhance adaptive capacity of men and women in vulnerable areas under climate change Community based Adaptation since early 2000. Bangladesh has been pioneer in this. Involvement of women with different income generating activities is also tried. However, there is a general lack of understanding how to address women empowerment through such activities. Combining income generating activities in a way which will help poor women in the communities to graduate from certain degree of poverty, help them to become independent and contribute to address empowerment- there is hardly any initiative through community based adaptation, even at the global level.

Unlike, many other “women only” development work” or “development work with women’s engagement among others”, a gender sensitive adaptation program can initiate few innovative initiatives to address women empowerment through climate change adaptation projects. Formation of CBOs can be helpful to create ample scope for community members to regularly meet and interact on common issues and raise voices in a collective manner. The project must explore beyond domestic periphery, connect market through value chain support, and also give attention to other components of women empowerment. A holistic approach, also involving advocacy with different actors can contribute in a major way. Women in the community are one of the major drivers of this advocacy.

An adaptation project addressing women’s empowerment can set a mark to graduate from poverty in a significant way. A holistic approach is required to achieve women’s empowerment through adaptation activities. Adaptation must be seen as a development activity and it should be interconnected to different development strides. Activities around women’s empowerment coupled with engagement of women in income generating activities in the given context of the SWR needs to be integrated.

Individual household level project assistance often fails to help poor men and women to graduate from poverty. Small scale industrial production, if possible large scale production are recommended where women can get engaged. Formal employment is an important modality to address empowerment which functions beyond domestic periphery. At the end, adaptation project must incorporate/ connect to different development activities in a given context.

CHAPTER 1:
Background

Bangladesh is a low-lying deltaic country located in South Asia. Its landmass occupies only about 7 percent of the combined catchment areas of Ganges-Brahmaputra-Meghna river system, while the rivers generally drain over 92 percent of flow generated from a catchment area of over 1.75 million km2– that too in the four months between June and September. As a result, the landmass often faces flooding (Ahmad et al., 1994). In sharp contrast to monsoon season, there is hardly any rainfall during the prolonged dry season (November to April) which gives rise to moisture stress and phonological drought (Karim et al., 1990). The lack of rainfall also induces low flow in rivers, which in turn gives rise to salinity ingress along the coastal river systems (Ahmed, 2006). The coastal areas are prone to cyclonic activities (Ali, 1999). Since a significantly large part of the deltaic land lies within 10 meters from the mean sea level, cyclone-driven surges inundate such low-lying lands and can cause death and destruction of dwellings, infrastructure and livelihoods of the coastal population (Agrawala et al., 2003). Having a large population confined within a small landmass and prone to natural hazards such as flood, drought, river erosion, salinity ingress, and cyclonic storm surge make Bangladesh one of the worst-affected countries for climate variability and change (World Bank, 2000).

It is evident that an extreme weather event in a given year (or multiple stressors) can lead to a significant loss of Gross Domestic Product (GDP) of Bangladesh (Dorosh, P and Del Nino). Apart from the macro-level loss, it incurs huge loss at micro-level household income with an eventual outcome of asset erosion among others; perpetuating poverty as a vicious circle.

Rather than a techno-fix discourse, climate variability and change has evolved as a development issue since last 15 years. The concept of “community-based adaptation” started to shape into reality from early 2000, for the first time at global level. In the process of identifying “climate change activities”, it has

been noted that Bangladesh has been practicing institutional adaptation since quite some time in its development initiatives. Different theoretical approaches have been used to address both the modalities of adaptation. Acknowledging the limitation of adaptation within an uncertain regime of future Green House Gas emissions scenario, it is now widely accepted that adaptation has its limitations.

In this backdrop, different concepts and frameworks have been used to substantiate this limitation. "Resilience" is one of the more recently evolved concepts by development practitioners through "mainstreaming" climate change and variability issues in development initiatives. The linkages between climate resilience and women's livelihoods are gaining relevance in the light of the climate change debate and its increased impact on development. Gender differences are continuously reinforced by the impact of climate change and the response provided in their aftermath. Inequalities between women and men in the spheres of health, economy, education, and workload are deepened by the consequences of cyclones, floods, and other natural disasters, and further by acute climate change response programmes which have a short-term rationale and fail to address the deeper causes of the vulnerability, exploitation, and insecurity of communities to natural disasters. It has widely been recognized that in a bid to develop resilience among communities against different shocks, the issues of climate change and variability need to be embedded within the activity and intervention framework. To sustain the process of being resilient seems a continuum; and intrinsic social norms and practices, differences, feeling of deprivations need to be addressed. "Connecting Market" is one of the most common modality towards "empowerment". However, without significantly and effectively addressing the process of creating social inequalities, resilience can hardly be achieved.

1.1. Why gender matters

Gender refers to the social attributes and opportunities associated with being male or female and the relationships between women and men, girls and boys, as well as the relationships between women and those between men. These attributes, opportunities, and relationships are socially constructed (UN Women, 2012). This means that they are constructed or produced by society and as such can be modified or changed.

Gendered divisions of labour often result in the over-representation of women in agriculture and the informal sector, which is vulnerable to climate change and climate variability. Lack of access to clean and safe water, safe sanitation, health, and energy sources, often put extra burdens on women's shoulders, adding to their reproductive and care-giving tasks (Enarson, 2000). When a slow or sudden onset disaster strikes, this adds to the double burden of productive and reproductive labour (Patt et al, 2007). Going beyond market-centric assessment and approaches, the continuum of learning and development discourse must acknowledge the sphere of non-market activities and

find ways to address those giving due emphasis on differential needs and priorities of women and men in a given society.

Although there have been attempts to establish the fact that hazard and disaster responses are generally gender-blind, which often disregard special needs and abilities of women in various stages of disaster, impacts of disasters are not so gender-blind. In many societies, vulnerability to climate change and extreme weather events differs for women and men. It is important to find out the causes of vulnerability to disaster and how it discussed in the community and addressed in the disaster response programmes and action plans, including gender concerns as one of key elements that determine vulnerability. All three dimensions of vulnerability i.e. susceptibility to hazard, possibility of suffering damage, and recovery capacity (Watts & Bohle 1993; Adger 2006), are affected by gender patterns of access and control over resources, gender roles and responsibilities, and norms (Enarson & Morrow 1998). In many cases women are more vulnerable than men to climate change and variability, especially in times of disasters through their socially constructed roles and responsibilities (Dankelman, 2010), and because they lack adequate power and assets (Mitchell et al, 2007). As climate-induced disasters unfold, the interplay of traditional gender relations often exacerbate existing inequalities, leaving women even more vulnerable to subsequent disasters (Hoffman, 1998) and hardships. The capacity of societies to endure disasters is determined by the internal strengths and weaknesses of the society – the level of social, economic and cultural vulnerability. The ability to cope differs depending on its social conditions: poor and rich, women and men, young and old, indigenous, etc. (Rashid, 2002). Gender cuts across these various groups and sheds important light on the development of specific strategies to cope with disasters (Salvano Briceno, 2002). Though there is an absence of systematic gender-sensitive statistics, it is observed that higher vulnerability and marginalization results affected more women than men. In addition, women's active agency and crucial role in helping families pull through this period are usually ignored (Rahman, Tahmina, 1996). Images of a woman giving birth in a tree, a child looking for his parents, or a woman selling off her only jewelry assets to manage post flood household necessity, demonstrate that gender issues are seldom just a woman's issue but more often, a family affair, a community concern, and a social issue. Usually the psychosocial and emotional affects of the damage such disasters are overlooked in favor of focusing on the economic aspects of the damage (Hussein Maliha and Husain, Tariq 2000). Women's social, economic and political position in societies differs, making them more or less vulnerable to these situations. It is well understood that gender relations structure people's ability to anticipate, prepare for, survive, cope with, and recover from disasters (Salvano Briceno, 2002). In the context of Bangladesh, a large part of women's vulnerability is caused by gender norms, expectations, and social roles. Women are disadvantaged because of their


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subordinate position in the family arising out of patriarchy and traditionally embedded cultural values. Therefore, women are doubly disadvantaged during a disaster time and in climate change context as they have limited, and more risky, mobility concerns due to cultural norms of honor and shame, and purdah and most are extremely dependent on male members of the household (Rashid, 2002).

1.2 Women in the backdrop of climate change in Bangladesh

Patriarchy controls women's spheres of influence in Bangladesh; yet gender relations have been undergoing a process of considerable transformation over the last three decades as part of broader economic transition and social change (Halim, 2001). In Bangladesh, women's experience and interests are strongly differentiated by their class position, with poor women more marginalized (Neelormi, 2010). However, available statistics on health, nutrition, education, employment, and political participation reveal continuing struggles to achieve equality (Neelormi, 2010). Despite many of the affirmative policies and steps to facilitate stronger gender parity in the economic and social sphere, Bangladeshi women lag far behind their male counterparts under the prevailing economic and social circumstances. Significant disparities in employment and wage rates persist which; combined with considerable gaps in asset ownership, seriously limit women's economic opportunities, as well as restricting their social sphere.

Literature indicates that women are disproportionately vulnerable to climate change/ variability (Neelormi, 2010; CCC, 2008; BCCSAP, 2009) in Bangladesh. A brief account of differentiated vulnerability in different hydro-geo-physical realities in Bangladesh are provided in Table-1

Table-1: Differential and disproportionate vulnerabilities of women under climate change/ variability in Bangladesh

The hydro-geophysical situation specific vulnerability contexts for the women are summarized below
(taken from Ahmed et al., 2007a; Ahmed, 2008).

Cyclonic storm surge

- The design of shelters being gender-insensitive, women do not feel like going there, increasing their risk;
- Women anticipate 'sexual harassment' on route to remotely-placed shelters, which forces them to stay at their respective shanty dwellings and increases risk of drowning;
- Managing menstruation, pregnancy, and breast-feeding is gender-insensitive in shelter centres;
- With increasing population, there is increasing competition for refuge space in shelters, which deters females;
- During post-cyclone periods, intra-household food insecurity and sanitation become major concerns for women.

Water logging

- This phenomenon disrupts land-based productive systems, which in turn aggravates women's malnutrition in affected areas;
- Water logging-induced prolonged exposure to filthy water causes severe skin diseases and gynecological problems for women;
- Collection of fuel and potable water becomes extremely hazardous;
- Women cannot send their children to school during prolonged water logging and young girls are fo rced into child marriage;
- Men often leave their families back home in search of employment, leaving household responsibilities to women, thereby adding to their vulnerability;
- Young girls with skin ailments are ill-treated in arranged marriages, often required to pay an increased amount of dowry.

Salinity ingress

- During the dry season, salinity is more intense and lack of suitable drinking water becomes an acute problem for affected communities;
- Women and adolescent girls are usually required to fetch drinking water from distant sources, walking five to six kilometers each day in some southern areas;
- Women and girls suffer from various long-term gynecological problems by using saline water during menstruation;
- Premature births, miscarriages, and still-births are reported in alarmingly high numbers in these areas (especially in Satkhira).

Drought

- In drought-prone areas the major concerns of local women include food insecurity, problems in collecting drinking water, and disease outbreaks;
- Women's lives are adversely affected due to difficulties of maintaining homestead vegetable gardens and managing water and fodder for livestock;

Flood

- When floods hit, children and women often remain within marooned dwellings (as long as possible) and are subject to snake-related deaths;
- Unemployed women are compelled to migrate elsewhere, and face acute conditions of physical and social insecurity;
- Poor women find it extremely difficult to ensure food and drinking water security when they struggle to live in flooded conditions;
- During floods women's privacy concerns are challenged. Sanitation activities decrease, especially for pregnant women. In the absence of freshwater, adolescent girls cannot maintain hygienic reproductive health care and often report perinea rashes and urinary tract infections;
- Moving on the embankments or on the higher roadside, often puts women in danger of sexual harassment and assault;
- Women-headed households in flood-affected areas are increasing in number as male counterparts leave flooded areas for employment opportunities, often migrating permanently;
- During flash floods, food insecurity and sanitation are considered to be major issues for the affected women;
- Women face relief distribution-related discrimination in the rehabilitation processes.

Urban flood

- Slum dwellers suffer most from urban drainage congestion;
- Being responsible for collecting safe drinking water is the biggest challenge for women. Slum-dwelling temporary housemaids (Thika Jhee) often lose employment when their dwellings become inundated, and they cannot work as they attempt to safeguard or repair their dwellings;
- Many slum-dwelling women are self-employed as food producers or food vendors. They face enormous hardship during periods of torrential rainfall followed by temporary water logging, when their prime customers do not appear on city roads;
- Poor women with young children face the double burden of childcare, and having to work.

River bank erosion

- In erosion-prone areas, women are concerned about losing homesteads, losing housing for months or years at a time, physical insecurity, loss of self as well as family esteem, lack of production opportunities, and lack of food security in the aftermath of the event;
- In the absence of males in the household, the onus of household wellbeing falls onto the shoulders of women;
- Often men never return from their migration, causing an enormous burden for women, especially those with children;
- In dire poverty situations, trafficking is very common.

Food insecurity, hurdles in collecting safe drinking water, mental and physical trauma, health and sanitation issues post-disaster, are cross-cutting problems in almost all the hydro-geophysical contexts in Bangladesh. Bangladeshi people have been accustomed to climate-induced hazards for many years. As a result they have developed various coping practices against such hazards (Nasreen, 1995; Ikeda, 1995). Since agriculture has a profound impact on the economy of the country, farmers practice innovative coping mechanisms for survival. Millennia-old traditional knowledge plays a significant role towards modifying and adjusting coping practices. As women are more vulnerable than men under climate variability, they also have developed their own 'survival coping' mechanisms (Ahmed et al., 2007a). Many of their practices been passed down, and have contributed immensely to reduce their immediate vulnerabilities against vagaries of nature. Women possess a strong body of traditional knowledge, which is used in disaster risk reduction and survival coping. Proper acknowledgement of the contribution of women, provision of protections and financial support should be made available to them sustain and develop this knowledge base. Women-friendly technologies should be properly adapted where suited (Ahmed et al., 2007c).

1.3. Achieving women's empowerment through adaptation

Adaptation practices involving women as target groups as well as direct beneficiaries have been tried in Bangladesh since early 2000. The first ever community-based climate change adaptation (CBA) project, "Reducing Vulnerability to Climate Change" (RVCC), was implemented in the south-west belt in Bangladesh. Since the RVCC model, adaptation through enhancing livelihoods has been showcasing different livelihood options for adaptation. It is widely recognized that women, children and differently-abled people are the most vulnerable segment of the poor population under climate change. To enhance their adaptive capacity, different modalities of climate-resilient livelihood options have been tried through community-based adaptation practices.

There is a gap in the understanding of the global literature of adaptation on how to frame gender-sensitive CBA. There is little understanding on how to link livelihood adaptation initiatives to equality. The classical theoretical debate centers on the increased workload on women while directly involving them in livelihood development projects, gender equality, and sustainable practices. The question remains whether only focusing on engagement of vulnerable women in enhanced livelihood practices and ignoring the inherent expression of gender equality, for example, ownership of and access to asset/ productive resources, access to credit and services, embedded patriarchy in the society among others, can contribute towards resilience against climate change or extreme weather events. Income potential can contribute in a major way towards empowering women. However, the broader perspective of gender equality goes beyond mere income potential of women. This is largely missing in CBA practices.

Supported by the Norwegian Embassy in Bangladesh, UN Women has pioneered a rights-based approach to addressing the gender equality dimensions of climate change through the project "Reducing Vulnerability of Women Affected by Climate Change through Livelihood Options". The project had two main outcomes;

1) To have 'gender-sensitive policy measures adopted to mitigate women's vulnerability to the effects of climate change'. With this outcome in mind, a number of activities and outputs took place that advocated to policy-makers the importance of mainstreaming gender in climate change and environmental policies, strategies, and programmes. In particular, working towards creating policy dialogues and influencing key decision-makers, and trainings for gender, climate change, and planning focal points within relevant ministries was identified as an important item to be pursued that built the capacity of key focal points.

2) To provide alternative livelihood support to climate-vulnerable women and develop their leadership capacity. Work was undertaken in the most flood-prone districts in Sirajganj, Shariatpur, and Sunamganj where flash floods are a regular phenomenon; in Khulna, Bagerhat, Satkhira, Patuakhali, Cox's Bazaar, which are highly cyclone-prone, and in the drought-prone Natore, and Nawabganj districts.

Under the project 20,000 of the poorest women in Bangladesh received livelihood support. They were provided with livelihood skills, leadership training, tree saplings, psychosocial training, and livelihood inputs. The types of livelihood inputs they received were mostly for traditional livelihood practices, such as small retail shops, rice processing and trading, fish-net making, crab fattening, small poultry farming, tailoring, processing and selling dried fish. These were all selected as per the preferences of the target women.

1.4. Objective of the study

Experiences and evidence from this project suggest that a deeper understanding of how these livelihoods contribute to the increased resilience of women and communities is needed. In many cases, these options might not match with the traditional business-as-usual livelihood practices; innovation is key in CBA. Keeping development imperative as the basic premise, it is a challenge for climate change professionals and practitioners as to what livelihood options can be promoted, how to design practices so that these can contribute towards gender equality, and addressing the unequal power relationship in a patriarchy.

On this premise, UN women Bangladesh initiated a study to explore potential livelihoods that build resilience and contribute towards women's empowerment in the areas vulnerable to climate change/variability. The study also explores the opportunities and challenges of pursuing/implementing green jobs contributing towards resilience building of the vulnerable communities where women's empowerment is embedded as inherent feature.

The team explored alternative potential livelihoods for south-west coastal areas of Bangladesh which enable communities to build climate change resilience. As a core development imperative, it is expected that this resilience building process would enhance and ensure women's empowerment.


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1.5 Methodology

The study team comprised two members who worked in close collaboration with UN Women team. The study team conducted an intensive literature review, which covers CBA practices, climate change science and modeling-related literature available for Bangladesh, relevant policy/ strategy directives, development and gender equality experiences and theoretical constructs. The literature entailed both global and national-level published documents.

The team convened meetings with the partners of the project to harness their experience in addressing gender equality and to understand how the project frames resilience, linking it with equality. Partners also helped in stakeholder-mapping at a local level.

Shatkhira was chosen among the project areas for carrying out the study. The team visited both the Burigoaliny Union and Munshiganj Union of Shyamnagar Upazila of Shatkira District. Before going to the field, the list and timing of key informant interviews (KII) and Focus Group Discussions (FGD) were finalized in association with local project partner BRAC.

The team convened five FGDs with local communities (each group was attended by no more than 20 people). One meeting was convened with the officials of local Union Parishad (the lowest tier of the governance) where the chairman, members and female members of the Union Parishad and the members of Union Parishad Disaster Management Committee (UDMC) were present. One FGD was conducted with the male members of Burigoalini Union who have been involved in different types of professions. Two FGDs were conducted involving women in the community not involved in the project and with the project beneficiaries separately. One FGD was convened with the development practitioners of local NGOs (especially those who had been practicing CBA).

The team interviewed officials from the Department of Agriculture Extension (DAE), Department of Women's Affairs (DWA), Department of Livestock and Fisheries, Department of Public Health Engineering (DPHE), Water Development Board at Shyamnagar, chairmen of the Upazila Disaster management committee (UDMC), Union Parishad chairmen and female members.

1.6. Scope and limitations of the study

The timeline for conducting the intended review was short, therefore a detailed and robust methodology could not be considered for the review. Thus, a rapid review was considered which has been primarily based on a rapid field-level data collection process.

Climate change and variability-related issues along the south-west part of Bangladesh vary considerably. Limiting the study was the fact that the team was able to consider the situation only of Shatkhira, and only in two unions of one Upazila in Shatkhira. While exploring the options of alternative livelihoods for the entire south-west coastal areas in Bangladesh, the team heavily relied on the existing literature on diverse hydro-geo-physical realities and related climate change and variability-related information of this belt.

The study was designed to be a 'light touch' exercise, involving quick reflection from field observation, and discussion with project proponents.

CHAPTER 2:

The context of achieving community resilience

2.1 Working definition of resilience

Resilience in a socio-economic system is defined as the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks (Holling, 1973; Walker et al., 2004). One of the measures of resilience is the speed at which return to equilibrium takes place. However it cannot be the only measure of resilience towards defining 'ecological resilience' (Walker et al., 2004). It is understood that resilience, robustness, vulnerability and risk are characteristics of socioeconomic systems that determine ability of the system to adapt to, and benefit from, change. It is argued that the stability dynamics of all linked systems of humans and nature emerge from three attributes – resilience, adaptability and transformability – which are essentially complementary to each other (Walker et al., 2004).

A system is considered to be resilient if its 'equilibrium state' is perturbed and it comes back successfully by avoiding crossing into an undesirable system regime.

What is different about climate-resilient development

Climate-resilient development means ensuring that people, communities, businesses, and other organizations are able to cope with current climate variability as well as adapt to future climate change, preserving development gains, and minimizing damages. Climate-resilient development is about adding consideration of climate impacts and opportunities to development decision-making in order to improve development outcomes, rather than implementing development activities in a completely new way. Climate risks cannot be eliminated, but negative impacts on people and economies can be reduced or managed. Climate-resilient development helps minimize the costs and consequences of climate impacts so they do not hinder progress toward development goals.

Source: USAID, 2014

2.2 What makes Bangladeshi communities vulnerable?

Bangladesh continuously faces various natural shocks, owing to its hydro-geophysical realities; geographic location, land form, and in recent decades due to its population density, and political affairs. The following types of shocks are most commonly observed in Bangladesh.

Table 2: Types of shocks commonly observed in Bangladesh

Natural phenomenon	– Flood and flash flood – Erosion (both riverine and coastal) – Cyclone and storm surge – Thunder	– Drought – Tornado – Fog – Hill slide
Man-made hazards	– Salinity ingress – Water logging – Urban drainage congestion	– Climate change – Fire – Forest denudation – Political instability
Market driven	– Price volatility (as observed during the early-2008 price escalation of wheat and rice) – Family disintegration (seasonal/permanent, where job markets are located far away from villages of vulnerable populations)	
Other aspects/phenomena	– Land/Water grabbing (including encroachment, fragmentation of habitat and denying access of the poor to productive natural resources) – Seasonal unemployment (as in the case of Monga)	

2.3. Attributes of Community Resilience

There are various attributes, which can influence community resilience; some of those are listed in Table 3.

Table 3: Various attributes of community resilience

Attributes of Resilience	Criteria/indicators	Examples of shocks being addressed
Knowledge and skills	Knowledge base, education, training etc.	Seaso nal unemployment Responsive to early warning system for flood and cyclone
Natural	Endowment of natural resources (land, water, forest, air, etc.), quality of resources, access to natural resources	Green belt protecting communities from storm surge Natura l resource -based livelihoods (e.g., fishing) Salinity tolerant staple crop
Physical/ infrastructural	Pres ence of suitable infrastructure , quality of such infrastructure	Storm/flood protecting embankments/polders Cyclone shelters Drainage infrastructure Ra ised plinths above flood level Dwelling on stilts Rural roads
Social capital	Kinship, relationship, family coherence, social norms and practices, customary laws and practices	Community food bank Community ponds Sharing of food with neighbours Personal lo ans without collateral & interest
Institutional and policy	Presence of institutions, policies, laws & regulations	Flood f orecasting and warning c entre Bangladesh Meteorological Department Vulnerable group f eeding Card under SSN Agriculture input assistanc e c ard Credit institutions (e.g. banks) Health care centre Rural market
Economic/Financial	Ability to purchase/acquire shock averting goods and services	Income/employment potential Asset Access to financial services Savings

2.4. "Resilience" frameworks as a continuum of development pathways

In most literature, "resilience" is understood mostly from an ecological point of view, where sustenance is a critical issue. However, for communities, "resilience" is seen within the broader development imperative in a given context. That is why "the capacity to bounce back", to maintain "equilibrium state' or getting back to "the same function, structure, identity, and feedbacks" after disturbances or shocks does not reflect a "resilience framework" for communities.

In climate change discourse, the climate-vulnerable poor (CVP) refers to those who may be pushed into poverty and vulnerability by climate change impacts (ARCAB, 2012). Resilience means achieving resilience at scale, resulting in the successful long-term adaptation of the CVP to climate change impacts through sustainable adaptation strategies (ARCAB, 2012). "At scale" includes three components.

Geographical scale

Resilience is achieved beyond isolated CBA projects. CBA should be mainstreamed into long-term institutional structures, and activities to be replicated beyond immediate project boundaries.

Time scale

This means resilience is sustainable, with CVP communities continuing to maintain and build resilience after project activities have finished. It implies that communities are not only ready for current shocks, but also are capable of anticipating future threats and getting themselves ready for future uncertainties.

Beyond business as usual

This means resilience-building initiatives challenge existing development and disaster risk reduction (DRR) approaches. It explores new knowledge and information, particularly improved scientific information on future climate change impacts, particularly improved scientific information on future climate change and variability impacts blended with community-driven knowledge on past climate trends and links with vulnerability, integrated into decision-making processes across scales.

Pathways towards building resilience of climate-vulnerable communities

For resilience to be built at scale, the following pathways are required:

1. Sustainable over an anticipated period:

It requires the ability of the outcome of an activity (as per objective) / a capacity to sustain beyond the project timeframe. For this, the people/ community in a given context must be aware of future uncertainties/ shocks over an anticipated period prepare themselves for that which will enable them to continue their journey over development trajectory. In-depth understanding on climate change model driven information is required.

2. Commensurate with the development trend

The process of resilience building does not envisage an outcome which maintains "status quo" or "equilibrium". Rather it frames a development pathway which will not only protect the people/community from shock, but also enables them to thrive along with the development trend both at the scale of time and pace.

3. Transformative beyond BAU development and adaptation to climate variability

Future threats to different scales of shocks over an anticipated period must be addressed within development planning and initiatives. Regular development activities that do not consider these threats might not help to safeguard people's lives and livelihoods, and therefore, the outcome of the development initiatives might be at stake. It requires innovative and transformative approaches, technologies, and initiatives which are beyond BAU and which entails both CBA and Institutional adaptation.

4.Scaled up

Refers to mainstreaming CBA and institutional adaptation into existing institutional process, not pursuing adaptation as a stand-alone climate change project. Rather, seeing climate change as an embedded development issue might be effective.

2.5 The current state of delivery and limitations in building community resilience

Although the international community has been full of praise for Bangladesh in its resilience efforts, the concept of resilience has only started to penetrate in the mindset of actors and promoters locally. There has been little noticeable effort amongst various stakeholders at national level to unpack the concept and analyze various attributes of resilience, particularly against the sociocultural and political economy prevailing in the country. Resilience has been regarded by many as a sustainable outcome, without attaching it to a reference scenario that determines the extent of perturbation and ability likely to be gained or added to the system in order to bounce back.

In an initial attempt to unpack elements of practicing resilience in Bangladesh, the study team identified a set of elements, each of which contributes either individually or works in connection with other elements, to influence the journey to achieve resilience. Key elements of achieving resilience in Bangladesh include:

- Resilience must be based on a thorough vulnerability assessment, involving scientific as well as indigenous knowledge and information, which should also take into account communities' skills and capacities to influence resilience.
- The communities in question must have the following:
  - Full awareness regarding data sources and levels of information
  - Prior information/documentation on best practices (even if those are applicable elsewhere in the country) for testing in relation to their capabilities
  - Access to technologies and capacities to acquire and adopt such technologies
  - Access to resources including financial resources, assets, and endowments
  - Access to infrastructure which enable them to bounce back following perturbation
  - Access to institutions which might create or add greater capacities within the community in question
  - Endowment of social norms, national policies, and practices so that they may exercise power, if not individually, at least collectively
  - Access to common pool natural resources, in conditions which ensures self-rejuvenation, so that those may be tapped as the last resort in pursuit of achieving resilience
  - Access to services where individuals' rights and entitlement can be fully exercised un-hindered
  - Mobility, visibility, and solidarity building
  - Neighborhood connectivity

- Government institutions operating at various tiers know their respective roles and responsibilities and perform their duties judiciously, without prejudice, bias and being subject to political interference
- There must be inter-institutional coordination mechanisms, extending to local non-registered bodies (i.e. clubs), registered non-governmental organizations (NGO), community-based organizations (CBO), and various other organized forces (such as associations) including media
- Collective efforts towards creating, re-creating and strengthening the following:
  - Natural resource base and ecosystem specific elements of natural capital
  - Physical infrastructure
  - National policies, including pro-poor policies and their legal regime
- A mechanism involving all tiers of governance for capturing new and innovative ideas, knowledge management, periodic updates, and knowledge generation
- A mechanism, irrespective of tiers and institutions, for enhancing capacity of practitioners as well as community people
- A mechanism to tie local/regional/national resilience building efforts to international development agencies
- Mechanisms to allocate and channelize financial resources and spending of such resources judiciously, with full accountability and transparency
- A modality to share experiences and learnings so that good practices propagate faster and ineffective practices are discarded.

Recognizing that some of the known distresses are regional (such as regional sharing of water from common rivers) and even global in nature (such as climate change, international trade, and price shocks), there must be regional as well as global policies, agreements, and practices which would extend support to overcome immediate perturbations so that systems may bounce back without losing their properties beyond repair. Bangladesh has made a number of steps toward resilience building, which include: (i) the Treaty on the Sharing of the Ganges water (with India), (ii) signing and ratifying the United Nations Framework Convention on Climate Change (UNFCCC), (iii) signing and ratifying the WTO talks (World Trade Organization) including Doha agreements and subsequent outcomes.

Although Bangladesh has been steadily achieving economic progress in recent years, the overall national delivery of resilience for vulnerable populations is far below satisfactory. There are systemic as well as systematic flaws in delivery mechanisms. Despite the fact that the state of governance has improved significantly over the past two and half decades, delivery mechanisms have not been able to devoid themselves of undue political interferences, nepotism, rampant corruption, misappropriation of already low level of availability of government financing, lack of transparency and accountability amongst duty-bearers and political stakeholders. As a result, although resources are earmarked and allocated, judicious utilization hardly ever occurs.

Lack of coordination too, leads to duplication of efforts that causes wastage of scant resources. Lack of proper monitoring leaves gaps in fiduciary management and results in lack of accountability. Political interferences not only aggravate corruption, but also diverts resources and services away from the most deserving population – the group with high vulnerability and capacity to bounce back from shocks.

There is little understanding amongst practitioners regarding approaches to achieve resilience and empowerment, let alone holistic approaches. Government institutions generally operate as per sectoral guidelines and need not reinforce efforts under one holistic (and integrated) approach. Many NGOs often behave the same way, without having to coordinate between various activities. Project-specific activities take priority over necessities on the ground. Project-based activities are often time bound (a few years at the most) and therefore often fail to leave a lasting impression and a significant (collective) learning. Often 'development objectives' are not adequately shared with the 'target beneficiaries'; there is a tendency to perform duties mechanically. Donors and development partners often shift from one (globally determined) priority and approach to other (shifting from livelihoods to gender equity to resilience), disrespecting the opportunity that might have emanated from focused interventions on the issues being left behind.

There are almost always limitations in terms of financing (typical of an least developed country). Even if financing is made available through some grant or budgetary allocation, due to procedures determined at the central level there is minimal effort to spend the allocation by involving local government institutions (LGI). There is a growing culture of developing local area development plans at Union level. LGIs have very limited capacity to integrate vulnerability and resilience building through local area development planning. The DRR-focused Community Risk Assessment (CRA) tool is not well utilized and local capacities are hardly reflected in CRAs, therefore the planning outcomes remain mostly ineffective. The prevailing political economy does not tend to empower LGIs; their capacities are perhaps deliberately kept low. It is the LGIs who are at the forefront of any major changes occurring in vulnerable pockets and they are sought after for provisioning of services following shock occurrences.

National policies are mostly sector-specific yet despite this sector-specificity, some policy elements do work with other sectoral policy elements. However, conflict does occur between policy elements, which have the capacity to nullify optimization of efforts. The policy regime has remained largely ineffective due to lack of implementation of policies. Policies are often mistaken as documents, as if the intent to 'do something' need not be translated into any perceived action. This is why priority programmatic ideas enshrined in a five-year development plan are often not found in developing annual development plans.

There is limited effort to capture evidence so that policy making may be facilitated. There is a problem in communicating scientific evidence to policy-making processes. There are advocacy and lobby groups that work toward making policy provisions on certain issues. However, the current level of engagement is inadequate and needs additional efforts. Advocacy efforts must utilize popular means and mediums, and for that, media campaigning is a prerequisite. Collaboration in policy advocacy is yet to occur.

The institutional resilience could have been aided heavily had there been adequate analytical data on adverse impacts from any perturbation and subsequent shocks/implications (segregated by sex and geographic locations). There is a dearth of scientific data. Climate change modeling, for example, has remained as cryptic as ever. The tools are often not available in public domain; even if tools are available, there is hardly any capacity outside major urban areas towards utilizing such tools to understand vulnerability.

2.6 Understanding women's empowerment in resilience frameworks

Women's empowerment is typically discussed in relation to political, social, and economic empowerment. Economic empowerment of women has received particular attention and is often cited as one of the most important ways to promote gender equality, reduce poverty, and improve the wellbeing of not only women, but also children and societies.

Economic empowerment includes women's participation in economic activities as well as women's economic decision-making and power control. Employment, specifically paid employment, is seen as the fundamental component of economic empowerment. The assumption that there is a link between employment and women's empowerment, both in terms of economics and gender relations, is widely accepted and supported by NGOs, multi and bilateral organizations and by academics and development workers around the globe.

In this study, women's "empowerment" is assessed beyond participation in economic activities, rather across four indicators: decision making, freedom of movement, access to, and control over resources, and views on violence against women. Unlike, many "women only" development works or "development work with women's engagement among others", the study team uses innovative approaches to address women empowerment.

2.7 Women's empowerment and economic development

The persistence of gender inequality is most starkly seen in the phenomenon of "missing women." The term was coined by Amartya Sen in the New York Review of Books (Sen 1990) to capture the fact that the proportion of women is lower than what would be expected if girls and women throughout the developing world were born and died at the same rate, relative to boys and men, as they do in sub-Saharan Africa. Today, it is estimated that 6 million women are missing every year (World Bank 2011). Of these, 23 percent are never born, 10 percent are missing in early childhood, 21 percent in the reproductive years, and 38 percent above the age of 60. Yet this does not capture the fact that throughout their lives, even before birth, women in developing countries are treated differently than men, lagging behind men in many domains. For each missing woman, there are many more women who fail to get an education, a job, or a political responsibility, that they would have obtained if they had been men.

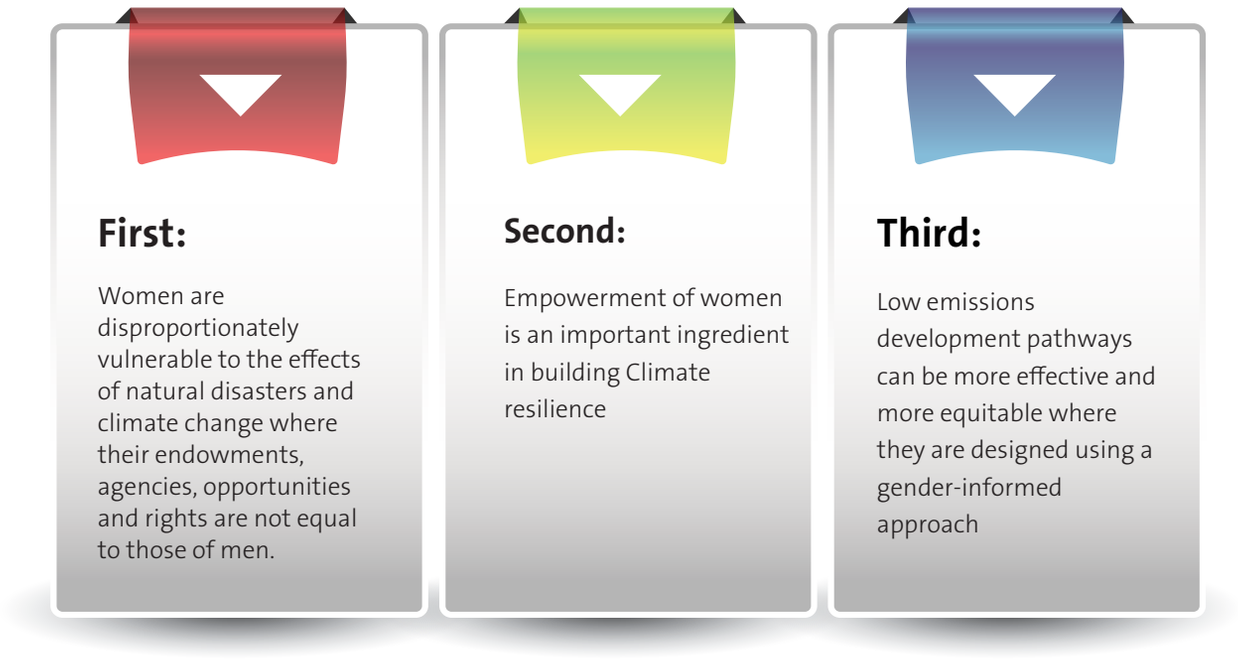
There is a bi-directional relationship between economic development and women's empowerment - defined as improving the ability of women to access the constituents of development, in particular health, education, earning opportunities, rights, and political participation. In one direction, development alone can play a major role in driving down inequality between women and men; in the other, continuing discrimination against women can, as Sen has argued, hinder development. Empowerment can, in other words, accelerate development.

Empirically, there is a strong correlation between economic development and women's legal rights, in areas as diverse as property rights, access to land, access to bank loans, violence against women, and abortion policy. Doepke and Tertilt (2009) show a robust negative correlation of 0.4 or higher across countries between the lack of rights and GDP per capita. Historically, the expansion of economic rights to women in the United States and Europe preceded their access to political rights (Doepke and Tertilt 2009; Fernandez 2009). While it is impossible to infer causality from the data, two lines of argument suggest why economic growth could lead men to willingly surrender economic rights to their wives.

2.8 Addressing women's empowerment in building climate resilience

Gender equality matters, and it matters for effective climate action

The 2012 World Development Report makes the case that gender equality is intrinsically important to development, as well as being smart economics. In the context of climate change, three issues are critical to consider



Source: World Bank, 2011

The issues of food and nutrition security, health, human security, gender equality, environmental degradation and climate change are closely interrelated. Climate change and environmental degradation undermine the full enjoyment of human rights and have a direct impact on the health and the food and nutrition security of millions of people – particularly women and their children - and on their ability to move out of poverty. At the same time, women's empowerment, engagement and transformational leadership are critical to build resilience to climate change and embark on sustainable development pathways that ensure global health, food and nutrition security, human security and lead to higher incomes. Likewise rights-based approaches with an emphasis on participation, transparency, and accountability play an important role in making development more inclusive and equitable. Unfortunately, these critical issues are often addressed through singular approaches that reduce their effectiveness and impact.

There are a few frameworks on "resilience", most of which are ignorant about women's empowerment and gender equality in an explicit manner. However, each of the frameworks envisages climate-resilience building processes as a development issue.

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CHAPTER 3:

Climate change in Bangladesh

3.1 Climate change within the south-west region

Vulnerability within the south-west region in Bangladesh is spatially and temporally different to the rest of the country. A plethora of published literature provides plenty of information in relation to the country's high vulnerability to climate change (BCAS-RA-Approtech, 1994; Warrick and Ahmad, 1996; Huq et al, 1998; Ali, 1999). The water resources sector of Bangladesh has been highly sensitive to climate variability. Timing of onset of monsoon as well as withdrawal of water upstream primarily have been defining the hydrological regime of the country.

In the literature it is reported that the livelihoods of the majority of people are predominantly dependent on natural resources, which in turn are affected largely by climate variability (Warrick and Ahmad, 1996). Agriculture, the major economic activity of the rural population, is has adapted well to natural climate variability. Crop calendars have been developed on the basis of long-term climate trends prevailing in the country. Yet a change in the climate regime, with a possibility of frequent extreme climate events, will pose significant threats to the livelihoods of majority of rural people in Bangladesh (Ahmed et al, 1998; World Bank, 2000).

The south-west region (SWR) is judged to be the region with the highest vulnerability to climate change within the country (BCAS-RA-Approtech, 1994). The hydrology of the SWR is affected by the tributaries of Ganges, creating a vast network of waterways (Halcrow-WARPO, 2001). Most of the SWR, with the exception of a few parts of Jessore District, has an elevation of less than three meters above mean sea level, and has been subject to natural disasters such as flood, cyclones and tidal waves.

As such, no specific climate change scenario for the SWR is found in the literature. A number of studies, based on Global Climate Model-driven scenarios, suggest that the average change in temperature for the entire country over a 100-year period can be as high as 3.6 ^{0}C (Ahmed and Alam, 1998; World Bank, 2000). Using more rigorous Regional Climate Models, the following climate scenario can be found for the country (Agrawala et al., 2003);

- The will be a general rise in surface temperature, ranging from 1.0 to 2.4^{0}C between 2030 and 2100;
- Rise in mean winter (December, January and February) temperature will be slightly higher than that for monsoon (i.e., June, July and August);
- The peak-monsoon rainfall will increase significantly, with a range of 4.7 to 11.8 percent within the time frame of 2030 to 2100;
- There will be a general reduction in already low winter rainfall; and
- The mean sea level will rise in the order of 43cm by 2070

From the climate scenario published in the literature, the following inferences can be drawn (Ahmed and Schaerer, 2004):

An increase in peak monsoon rainfall will most likely to increase flood vulnerability of the country. However, given the hydrological realities in the SWR, it is postulated that monsoon flood will not be a major issue in the region under climate change.

Reduction in winter rainfall will likely reduce available lean river flow further, and subsequently increase salinity intrusion throughout the SWR. Crop agriculture requiring surface irrigation will be further constrained due to a combination of salinity and drought, particularly in the western parts of the country (and also the south western parts of the SWR).

A rise in sea level along the low-lying coastal zone will cause permanent inundation of low-lying coastal lands outside embankment areas and a higher susceptibility of coastal embanked areas to tidal inundation.

Coastal morphological balance will also be disturbed due to effects caused by sea level rise, having severe consequences in terms of drainage congestion, water logging and coastal erosion.

Net increase in temperature will have severe health implications. The prevailing susceptibility to outbreaks of vector-borne deadly diseases is expected to increase, posing much higher threat to public health. Heat stress and subsequent trauma is expected to be common cause for the sufferings of children and elderly. Women will be particularly affected.

The above changes will have severe impacts on coastal resources, water resources, agriculture, human health and biodiversity, with special reference to the SWR (World Bank, 2000). Such hydro- geophysical realities prevailing in the region guide the inference that the adverse impacts will in turn exacerbate environmental stresses faced by many rural communities across the SWR.

3.2 Livelihoods in the south-west region

Salinity

Salinity has been one of the major impediments of developing agriculture in the coastal zones. There is a likelihood of this increasing significantly under future climate change scenarios (Karim et al., 1990; Habibullah et al.,1998). According to the Bangladesh Soil Resources Development Institute (2000), soil salinity is increasing at significantly faster rates in the SWR of the country in comparison with the south-eastern region. Karim and Iqbal (2003), have noted that by the beginning of the millennia, about 3.05 million hectares of agricultural land in the country were affected by various degrees of salinity. High salinity will decrease the yield of most of the crops grown along the coastal zone (Karim et al., 1990).

Salinity starts to climb sharply at the start of the rabi (usually November to March) season and reaches a peak at the start of pre-kharif (usually April to end May) season. Surface salinity shows clear links with available moisture on the surface as well as diminishing rainfall intensity throughout the dry season. Consequently, little is produced in the coastal SWR during the rabi season, with an exception of shrimp production. High seasonal salinity is

generally attributed to low cropping diversity and intensity prevailing in the SWR. Cropping is largely possible only in the kharif cropping period, where abundant rainfall keeps salinity very low, or almost negligible. Taking advantage of low-salinity regime during monsoon and post-monsoon seasons, farmers grow the mail cereal crop, locally known as Aman. The cropping season during the drier part of the year, the rabi season, cannot be utilized by the farmers in a cost-effective manner due to high salinity and associated risks.

The challenge is to make best use of the condition during a period when lands are kept fallow. Commercial shrimp enclosures (locally known as ghers) generally complete the production cycle by the end of the dry season. Owing to high salinity on topsoil, these shrimp enclosures cannot be used for cultivation following the shrimp harvest. However, with increasing rainfall in monsoon, salinity condition becomes conducive enough to allow purposeful high-yielding grass production.

As a sharp contrast, the fallow strips of lands are kept unused due to high salinity during the dry season. However, where these strips are in the proximity of tidal creeks, the land can be purposefully made more saline by adding saline-laden top-layers of the creeks. High saline contents, in addition to adequate moisture (as it is soaked by saline tidal water) make the land suitable for establishing nurseries for Keora saplings.

Water logging

The long term impact of water logging impacts on in nutrition status due to the interactions between food insecurity, lack of dietary diversity, inappropriate infant and young child feeding practices, and poor sanitation and hygiene.

CHAPTER 4:

Setting up the primary adaptation goal: towards creating alternate income opportunities

4.1 Shaping the primary adaptation goal

Any primary measure for adaptation must consider that these measures are suitable, acceptable and implementable responses to climate-induced vulnerabilities in a bid to stabilize the income and livelihoods of the local vulnerable population. The current ongoing practices by the communities and NGOs demonstrate a number of traditional and innovative measures for alternative income generation. Many traditional measures have been slightly modified to suit local vulnerability contexts and conditions. Emphasis is given to simple improvisations of traditional knowledge and locally available tools so that farming households can adopt techniques that will help them combat the increasing climate variability and extremes and simultaneously ensure income. Since poverty is perceived to be the primary concern, adaptive measures primarily look into modalities that will help maintain unabated access to various forms of assets (streams of services and goods), enabling participating households to build resilience. Many of these activities are innovative, simple, easy to use and replicable, socially accepted, environmentally suited and non-destructive.

Alternative income-generating activities can involve both household-level activities and community-level activities. When choosing suitable income-earning activities, the primary emphasis, for local people/ recipients is usually financial gain to be able to purchase goods and services. Other major considerations may include:

1. Keeping an eye on foreseen/ projected hydro-geophysical conditions in the neighbourhood and to check how best the conditions can be utilized for their benefits;
2. To examine whether diversification of income can be possible through the usage of traditional knowledge-base available in the locality
3. To ensure that community-knowledge will be enhanced (by means of capacity building) in order to safeguard assets and resources available within the community and the know-how can be utilized for earning LHs.

Inclusion of women-specific issues or gender related activities in current CBA practices in the SWR are found to be limited only to the inclusion of women as a target group, providing them with a minimal grant (and in some cases skills training), mostly restricted to the activities within domestic periphery. While doing so, there is hardly any initiative for market linkage, widening their mobility sphere, or to address related access and ownership issues.

This chapter will look into the modalities of income-earning activities which can contribute to pave the way of resilience building of the local communities in the SWR through CBA. As elaborated in Chapter 2, resilience cannot be achieved without ensuring gender equality in the given community in a given context. The proposed modalities will carefully examine how gender equality can be addressed though all these, which will further examined in Chapter 5.

4.2 Promoting best practices

In addition to addressing vulnerability and enhancing the adaptive capacity of an affected system, adaptation calls for making the best use of changing conditions to a community's advantage (Tompkins and Adger, 2003). Salinity has been one of the major impediments of developing agriculture in the coastal zones, specially the south-west part of the SWR as explained in Chapter 3, with a likelihood of increasing significantly under future climate change scenarios (Karin et al., 1990; Habibullah et al.,1998).

The hydro geo-physical adversities may be used as positive force towards economic opportunities through adaptation. Some of these modalities have already been tested in the SWR through different NGOs.

Grass cultivation

Grass has been a common vegetation cover in the SWR of Bangladesh, especially on the banks of rivers/creeks/ponds and adjacent areas of water bodies. Grass mainly grows in the rains (June till October, kharif season) when soil salinity becomes less, due to heavy monsoon rainfall. Local people use this grass as fodder. Since in the SWR paddy can be produced in only one season a year (especially in saline-affected areas), the farmers of the area cannot support healthy cattle density due to scarcity of fodder. Therefore the naturally-grown grass on the embankments, banks of the rivers/bills and other water shades are immensely valuable as supplementary fodder for the existing cattle population. In this context, commercial cultivation of grass can be promoted, thereby reducing the prevailing scarcity of cattle feed and boosting cattle farming in the area. Households, especially those who culture shrimp on their land, may take the opportunity of using their apparently fallow lands during the rainy season. "Napier" is a preferred species considering its higher growth performance in the given condition and its social acceptability as fodder. Based on technical instruction from the Livestock Research Institute, necessary capacity building training can be provided to the interested farmers, both male and female.

Napier grass is sown in June-July, when the downpour starts to drive severe salinity away from the land. The harvesting period is around September-October while the yield ranges from 1,000-1,500 kg/decimal of land. Growing Napier in only three decimals of land is enough for a local cow to feed year-round, with some supplementary dry food. Business selling seeds of this grass can also be profitable. This technique not only takes advantage of the condition, it turns a non-productive resource into a reasonably productive one, enabling practitioners to earn during agriculturally-barren months. In addition, people can start cattle rearing with an expectation of profit, where increased salinity will not cause a reduction in availability of fodder.

Keora nursery and products

Keora, a mangrove species, grows well mainly in tidal areas where salinity is high (normally around 10-12 ppt). The fruit of keora is popular in the south-west coastal belt and can be used for food. Pickles and jam made of keora fruit have a reasonable local market. The ripe keora fruit also has a good market value.

The establishment of a nursery of keora saplings has the potential to be an active income-earning source. A number of products can be made from Keora, which have a huge market not only in Bangladesh, but across India and Middle Eastern countries. Keora water is a delicacy used in Indian dishes, and keora agarbatti is very popular within South Asia, and in the Middle East.

Raising a nursery is low-cost, as it only requires the cost of collecting seeds and occasional physical labour. Seeds are naturally available in areas near to Sundarbans mangrove forest. Nurseries are usually raised in lands with tidal influence, because tidal water is necessary for their growth.

Seedlings are raised best during August to November. Healthy, well-shaped yellow fruits are collected to make seeds. These fruits are kept in a dark place or container until they become adequately ripe and rotten. Seeds collected from these rotten fruits are washed well and are dried under natural sunlight for a day. These seeds then become ready to broadcast in the moist nursery beds. At this stage, tidal water is prevented from entering into the seed beds until full germination. Following this germination stage, limited tidal water is allowed to enter the bed for about 10 days. Newly germinated and established seedlings generally require the influence of saline-laden tidal water following the initial 10 days. When a seedling grows up to one foot, it is ready for the market.

Establishing a keora nursery is gaining increasing popularity among the people of the adjacent areas of Sundarbans. Despite this, problems remain in terms of market accessibility. Even though there is a potential market for keora fruit and keora pickle, a proper marketing system and a stable price for seedlings cannot be developed yet. The pricing system and the market mechanism largely depend on intermediate entrepreneurs who raise keora orchards and process keora products. Integration of market chain, from the nursery to marketing of keora products, is a necessary step. There is also a lack of initiative to take the local products to the national market.

Keora can assist in lifting communities out of poverty, if it can be mass-produced at community level at commercial basis. The products produced by the women in the community can collectively work with markets both at a national and international level. NGOs, as well as private investors, and the Bangladesh government, can assist in the establishment of small-scale industries in the SWR where keora products can be processed.

Cage Aquaculture

Cage aquaculture is a new concept in the local communities. It has been an effective practice for small-scale income generation in cases where practitioners have had submerged land unsuitable for crop production in flood-prone or water logging-prone areas. This practice can be done at a household level and community level in the common wetlands. Women can be trained in simple techniques to take advantage of waterlogging through this new income-generating source.

While submerged in two to three meters of water, low-cost cages are prepared and kept under water with fish larvae and juvenile fish in it. Fish are given supplementary food to grow quickly. Within eight to 12 weeks of nurturing, fish become valuable products with adequate market demand. The know-how required for cage aquaculture involves producing cages, locating it properly in wetland and caring for the captive fish.

The practice works well in the local context since it exploits the submergence conditions and maintains a viable income stream. Each cage costs less than twelve dollars if purchased from local markets, even less if produced by the producers themselves. Cage aquaculture can be small scale if it is run by an individual or a family with minimal investment yet still produce high economic returns. It is neither as capital intensive as pond aquaculture, nor at risk of frequent viral attack. It is culturally acceptable to poor households, as even children can take care of cage fish during their bathing time.

The choice of fish is critical. Culture of golda shrimp (fresh water), tilapia, grass carp, punti, katla, and koi, are the most popular species in cage aquaculture. But since cage aquaculture is not an indigenous practice in rural Bangladesh, many are not aware of the practice and how to get involved. As this is a new concept in the communities, proper learning materials, trainings and campaigns are necessary to facilitate the extension of the technique.

Since large areas of the country are supposedly at risk of seasonal inundation each year, cage culture offers an excellent adaptive modality that can help maintain income by taking advantage of otherwise hazardous environmental condition. If the potential conflict towards accessing common property can be resolved by the involvement of local government bodies, this promises a good and safe opportunity for poor people to work with climate change-related hazards to become self-reliant.

Homestead gardening/ Hanging vegetables

Hanging vegetables is the technique of growing vegetables without the vegetable-producing creepers/ plants touching the saline bed. This technique is now widely popular in saline-affected areas in the SWR. In this technique earth-made pots are used where the soil is placed. Even though the pots are placed on saline-affected land, the layer of impermeable earth keeps the soil in the pot virtually saline free. In non-saline "protected" soil, vegetable seeds (generally gourd, pumpkins, spinach, etc.) are germinated and vegetables can grow freely.

As vital inputs, the plants require watering twice a day. At the tender and flowering stages, application of potassium, urea and Triple Super Phosphate (TSP) fertilizer yield good results. When the vegetable plants are matured, these earth-made pots are hung from bamboo, and a roof-like structure made of net locally known as chala is laid out. The vegetables can then grow on the chala while they are rooted in the earth-made pots and the entire productive system has no direct contact with saline land. Once the vegetables climb up on the roof, the earth made pots become immobile.

Two or three types of vegetables can be grown simultaneously in the same earth-made pot. This type of growing technique only takes two to two and half months for complete production. Critical months are when the saline reaches its peak - at the end of the dry season). The choice of vegetables during this period must consider low water required species. Viral and fungal attacks are common in this type of cropping. In addition, there are frequent attacks of red bucks and some other insects. A locally available solution is spray of of soap water, chili, powder, copper sulphate, and lime.

Floating garden: Exchange, transfer and replication of knowledge

Communities in the Pirojpur district have been practicing floating garden technique (hydroponics) for producing vegetables for approximately the last 150 years. This area is characterized by prolonged inundation predominantly by non-tidal water. However, due to a poor drainage system vast areas of this region were flooded and became seasonally waterlogged every year. Floating gardens are made by tying together water hyacinths, with rice stub and coconut husk to form a bed, which can be used for growing short rotation crops or vegetables. Since such beds can easily float on top of stagnant water, these are knows as floating gardens (Haq et al., 2004). Locally these are called 'baira'.

During the 1990s, waterlogging became a common phenomenon in parts of Jessore, Khulna and Shatkhira districts. Despite the costly attempts of the Bangladesh Water Development Board, the situation became worse every year. Land-based production systems had to be abandoned since most of the land in the affected areas was under water for a significant period in a year. This situation has continued unabated since.

Table 4: Strategic approaches to increase household-level adaptive capacity through farm activities

Strategy	Measure	Brief Description of the Measure
Increase food through agriculture	Drought tolerant crops/vegetables	Introduction of drought -tolerant crops such as groundnuts, watermelon, etc., that can be grown under drought conditions
	Embankment cropping	Cultivation of beans, gourds, okra and other vegetables on the embankments between prawn ponds/ shrimp ghers
	Floating gardens	Cultivation of vegetables on floating beds of water hyacinth (hydroponics)
	Homestead gardening	Cultivation of vegetables and fruits on homestead plots for HH consumption and market
	Saline tolerant non -saline crops	Introduction of sali ne tolerant varieties of chili, mustard, maize and potato
	Low-cost irrigation	Demonstration of treadle pumps and other simple technologies for irrigation

Mele cultivation and products

Mele is a natural product of the Sundarbans and its periphery. Mele is a type of reed which grows well in both tidally-influenced brackish water and fresh water inside enclosures. People in the south-west coastal areas traditionally use naturally grown mele to prepare durable mats which are used on beds, yards, among others. When raw, mele is used as cattle fodder. After drying it can be used as cooking fuel or to make local handicrafts.

However, commercial cultivation of mele is a recent practice that has been spreading throughout the region through the initiatives of local farmers. As mele grows in brackish water and has good market demand, promoting innovative mele products as a commercial venture in areas, which are subject to certain levels of salinity, may resonate. In a growing global market for biodegradable natural products, innovative usage of mele can be explored at global level.

Mele is normally sown in May-June under two inches of water. Once sown, it can be harvested up to 12 consecutive years. Farmers generally harvest mele in October and November when it has grown up to two to three feet. As the timing of mele production largely coincides with that of aman paddy production, and the land can be occupied for consecutive 12 years, initially farmers prefer to initiate mele production in fallow lands.

Though mele cultivation has been a known practice in the south SWR of the country, recent cultivation has not been easy. Mele is not a saline-tolerant species, but a brackish water crop. The prevailing extent of salinity in water has significantly hindered the natural production of mele. In addition, the crop needs water year-round. Irrigation is required in the dry season for better production. But lack of proper training

and adequate scientific knowledge about the cultivation techniques and irrigation process also deter the extension of mele cultivation. Lack of capital of the farmers, and lack of available seeds at market is also a deterrent.

Mele mat production requires little technical knowledge, and is usually performed by women, while men take care of the marketing of these products.

Though vulnerable to moderate to high salinity, mele cultivation and subsequent production still holds potential as an alternate livelihood in open brackish water areas and permanently waterlogged (freshwater or brackish) areas. If the impediments of mele cultivation are well negotiated, it may be a profitable option for alternative livelihoods under the projected waterlogging scenarios involving climate change.

Embankment Cropping

Embankment cropping has been a common traditional practice among coastal communities in Bangladesh especially in providing protection against soil erosion. Small shrimp farmers, who earlier could not use their lands for agriculture due to high salinity, have been attracted by the prospect of embankment cropping. Many farmers too, in the saline-affected areas who were previously only able to use their crop lands for one season and forfeited cropping potential in the dry season are becoming interested in the embankment cropping practice.

The practice involves growing vegetables along the heightened embankment of shrimp enclosures (artificial ponds of saline water, created for the production of brackish water shrimp) or along the coastal embankments/polders during the rabi season. These heightened embankments are much less saline than the adjoining fields and provide safety against potential flooding. Since the platforms are above the tidal flooding regime, these can be used for growing vegetables year-round, particularly during the dry season. The root zones of vegetables, generally creepers, are usually established alongside embankments, while the creeping branches of the plant are gently guided in a hanging platform made of bamboo.

A growing community of farmers is now practicing embankment cropping as an alternative occupation in saline and flood-affected areas. Recently, some drought-resistant crops, like arum, have also been introduced in embankment cropping. However, proper training is required for this practice.

Rearing livestock

Livestock rearing is a traditional practice in rural Bangladesh. Until recently, every rural household used to possess two or three heads of livestock - either goats or cows. Severe salinity in the south-west parts of the SWR along with occasional flooding has resulted in a drastic reduction of vegetation. As a consequence, depletion of cattle fodder has been spreading throughout in the entire region, which has forced communities to let go of this traditional practice of cattle rearing.

As income opportunities decline due to the environmental changes, the potential of cattle rearing as a supplementary income provider may renew impetus for this traditional practice. Goat rearing has been popular among communities in drought and saline-prone areas due to its low-cost involvement; goats require little space and grow quickly. Goat meat has good local market demand and survives better than cows. “Black Bengal” is the most chosen species of goat because of their fast growth and survival rate. They are smaller, require less fodder, and are more resilient to drought or saline conditions.

Cows are also valued, both for milk, and beef production. But given the existing scarcity of cattle fodder, cow and goat rearing are always supplemented by cropping vegetables, grass or other grain crops to provide necessary feed for the cattle. Beef rearing coupled with grass production can be attempted in saline and waterlogged-free areas in the SWR.

Pork is not widely accepted, as it is prohibited in Islamic religious practice. However, it has a limited market demand amongst non-Muslim communities. Pig rearing, therefore, possesses moderate potential for generating extra income. The ethnic communities in the SWR traditionally rear pigs for non-commercial purposes as a part of their livelihoods. Pig rearing can generate alternative income for ethnic communities, such as the Munda. Like cow and goat rearing, pig rearing should also be supplemented by cultivation of fodder and transfer of know-how for livestock health-care services.

Polyculture

The practice of polyculture (cultivating various local varieties of fish together with shrimp) has been traditional in the Khulna and Shatkhira districts, though there has been a general reluctance amongst gher owners to make this more widespread, due to a fear that fish might compete with shrimp for costly feed. The traditional practice has therefore been confined in naturally grown shrimp ghers where no feed is applied.

In monsoon, when water levels are high in paddy fields, farmers usually cultivate freshwater shrimp. This process provides organic matter in soil as well as offering extra income for the farmers. Adding fish offers a win-win situation due to the fact that such culture helps increase organic matter content in the topsoil. Retention of freshwater in paddy fields reduces salinity in the monsoon. Polyculture therefore offers a good adaptation practice in saline-prone areas. However, lack of proper knowledge has restricted the practice among the communities.

In this process, saline-water bagda shrimp cultivation ends before June-July, at pre-kharif monsoon. After that, transplanted aman paddy is sown. Along with aman paddy, cultivation of freshwater golda shrimp takes place simultaneously. At the end of June, farmers drain saline water from their paddy fields and flush the topsoil with fresh water. Generally, fresh water is brought through sluice gates built in the polder system. While bringing fresh water in paddy fields or enclosures, some white fish species such as parshe, vetki, tengra, and bele, also get in through sluice gates. While transplanted aman grows, the fish find nutrition from naturally occurring planktons.

Different species of fish prefer different water depths, which suits these natural ponds. Many farmers usually take the opportunity to cultivate different varieties of fish species in these ponds. Normally, golda shrimp and paddy is harvested by October- November. Then the rest of the fish are harvested as a bonus crop at the end of November or early December. Following the harvest of polycultured products, the dry season sets in and salinity starts to rise. Crop agriculture becomes impossible with increasing salinity. The fields are then converted into saline water ghers, where bagda shrimps are nurtured in captivity. That completes the year-round production cycle.

Though the farmers in the region are practicing polyculture, there are difficulties. There is a lack of proper knowledge among the farmers regarding polyculture and the potential to adapt with salinity. Critical in this regard is knowledge of time-adjusted rotation of crops, controlling eutrophication, selection criteria of crop and fish species, control over fish population, the availability of seeds, time management, and water management. Practical training is required for farmers (male and female) to properly adopt polyculture.

Rearing poultry

Poultry and duck rearing is a common traditional practice across Bangladesh, as ducks do well in wetland areas. Their food habit largely depends on scavenging in wetland ecosystems. Under the waterlogging conditions in the greater Jessore district duck rearing as a low-cost and low-maintenance income opportunity has emerged as a popular practice among the poor households. Its simple nature means it has increased in popularity among women as they can look after the ducks alongside their work in households with little time commitment or external support.

Rearing duck species provides meat and eggs, which has been useful as a source of income as well as nutrition to poverty-stricken families. International species of ducks are preferred over local breeds, as they grow faster, bigger and lay more eggs. Indian varieties of layer ducks like runner and ash-coloured camble are popular among the communities as they lay at least four to five times higher the number of eggs compared to that of the native varieties,

Proper know-how is required for commercial rearing of ducks. Supplementary food management and vaccinations are the two of the most critical predicaments for the extension of commercial duck rearing. Other than difficult transportation services in waterlogged areas, marketing eggs never is not problematic.

Rearing of poultry has also gained popularity among some communities as a source of extra income in addition to agriculture. Like duck rearing, poultry rearing is an occupation predominantly practiced by women. In this case, layer chickens are preferred over consumable chickens. This is because a farm of layer chickens is found to be easier to manage in terms of poultry feed management and market accessibility. However, poultry rearing usually faces a major hindrance in the form of unreliable electricity supply. Non-availability of electricity or frequent power outages severely disrupts the production processes, which culminates in lower egg production.

4.3 Potential community initiatives

Apiculture

Although honey collecting and processing has been part of traditional livelihoods in the adjacent communities of the Sundarbans, the adoption of commercial apiculture is a new concept in the region. Apiculture practiced in the SWR has been mainly mobile and cooperative.

Apiculture depends on the choice of crops, availability and production of flowering plants. Therefore, farmers keep this culture mobile. For marginal farmers it is difficult to invest heavily in construction of beekeeping boxes and move from region to region in search of crops and flowering plants. The concept of a cooperative society in apiculture developed from these difficulties. Cooperatives, usually in a group of up to 10 marginal farmers contribute to the apiculture, employ people to take care of it, and share the profit amongst themselves.

The proximity of the Sundarbans and opportunity to foster community links have been major reasons to promote such adaptation modality. Since bees can fly considerable distances and beekeeping does not require land, if the initial investment, rolling capital, and skills are available, even landless farmers and poor women can earn livelihoods from these activities. Bees are also catalysts for pollination. In this context, apiculture has been found to be good for cropping and conserving the diversity of flowering plants. Mobility of this culture depends on the life cycles of concerned honey-bearing flowers. Apiculture in the region mainly depends on three kinds of flowers: mustard (life span: November to December), til (life span: January to February) and khalisha (life span: March to April). Beekeeping boxes have to be placed in the vicinity of these flowers when they are in full bloom. Among four species available in Bangladesh, Apis mellifera and Apis cerana are commercially profitable.

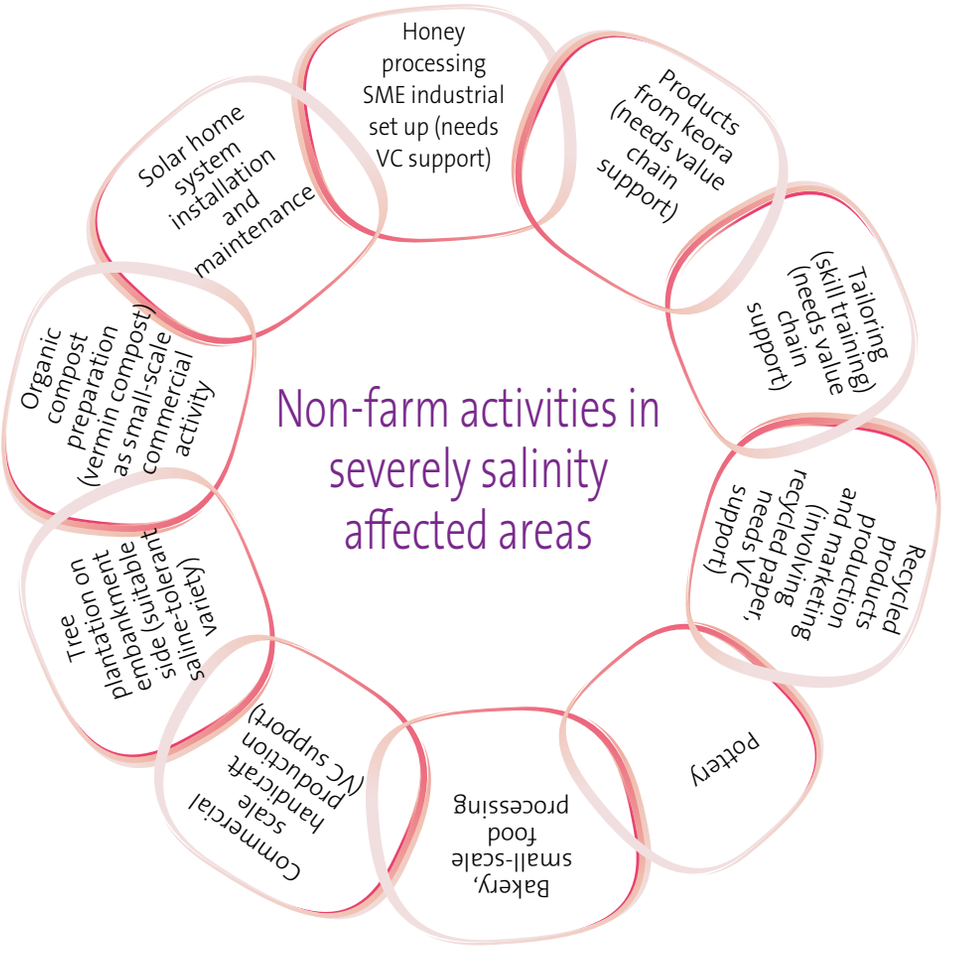
Between April and June, honey can be collected from the Sundarbans. Usually local people can enter the Sundarbans with a pass from the local forest office. They need to pay a certain amount for the pass, however, the charge is quite high. Women usually do not enter in Sundarbans for honey collection, because of security reasons. However, local men can be trained to collect honey in a more efficient manner. The honey collected from Sundarbans, is usually stored in jars and kept on boats. They usually stay in Sundarbans a month at a time. Because of the lack of proper storage of the raw honey, the honey has often fermented by the time the boat docks.

There is high potential for honey processing industries to profit through exploring not only the local market but also in international markets. “Sundarban Honey”, because of its connection to the world-famous Sundarbans, if managed properly, has the potential to become a global brand.

Table 5: Strategic approaches through potential community initiatives

Strategy	Measure	Brief description of the measure
Increasing income through alternative livelihoods	Apiculture and honey processing	Beekeeping and processing of honey for the market
	Cage aquaculture	Small-scale fish farming in cages, can be implemented in household ponds or common water bodies
	Cattle rearing	Raising cattle for consumption and market
	Cottage industries	Production of *mele* (reed) mats, recycled paper bags, bamboo baskets for market
	Drought-resistant tree plantation	Homestead planting of drought-resistant fruit and timber trees for longer-term income generation
	Duck rearing	Raising ducks to produce meat and eggs for household consumption and market
	Goat rearing	Raising goats for household consumption and market
	Mele cultivation	Cultivation of reeds that are used to produce mats, widely used for sitting and sleeping on
	Nursery and homestead forestation	Establishment of community nurseries and distribution (with handling instruction) of indigenous varieties of tree saplings (mango, coconut, guava, *sofeda, korai, mehegani, neem, kewra* etc.)
	Pig rearing	Raising pigs for consumption and market
	Poultry rearing	Raising chickens to produce meat and eggs for consumption and market
	Prawn and fish polyculture	Prawn and fish culture in fresh water *ghers* (ponds)
	Saline-tolerant tree plantation	Planting of saline-tolerant fruit and timber trees for longer-term income generation
	Shrimp and fish polyculture	Shrimp and fish culture in saltwater *ghers*
	Grass cultivation	Both Alphalpha and Napier grass can be produced commercially, for household usage and fodder for cows

4.4 Non-farm options for severely saline-affected areas



Honey processing

Setting up small-scale honey industries can be a good option to engage women in building sustainable livelihoods. However, comprehensive value chain support will be needed throughout the process.

Products from keora

The comparative advantage of Sundarban vicinity areas for keora availability and production has been elaborated earlier. There is a national and international market for keora products like keora water, pickle, agarbatti. With value chain support, small industries can be set up involving community women.

Tailoring

Women constitute the largest part of the workforce in the garment industry. However, small-scale clothing manufacture, and tailoring, can be set up in severely saline-affected areas where farm activities are not viable, or are less preferred.

Recycled products

With a full understanding of the value chain, the industrial setup for production based on recycling can be considered. Women from climate-affected areas can produce stationary, and handicrafts. This enables them to earn income and also contribute to environmental considerations.

Solar home system installation and maintenance

Bangladesh has been experiencing the fastest growing expansion of solar home systems (SHS). It has been increasingly popular in the rural areas, where grid electricity is not connected. This demand requires skilled workers who can install as well as attend to mechanical problems related to SHS. Involving women in these activities needs to be gender-sensitive. Women in the SWR, especially where farm activities are restricted, can be trained with such skills.

Organic compost preparation (vermin compost)

Producing organic compost (vermin compost) can be profitable for women and if the product is linked up appropriately with market.

4.5 Livelihood options for less-saline areas

With the help of Sub Assistant Agriculture Officers (in Department of Agriculture Extension) and Livestock Officer, the following activities suggested in the box can be tried.

Livelihood Options for less saline areas

- Alfalfa production in fallow lands
- Dairy at commercial scale (needs value chain approach)
- Embankment vegetable production and marketing
- Chilli production at commercial scale (VC support)
- New high value crops (e.g. capsicum, strawberries, zucchini) (needs VC support)
- Year-round Napier grass production (feeding into local dairies)
- Promotion of summer varieties of winter/rabi vegetables
- Promotion of early varieties of crops (early beans)
- Saline tolerant varieties (maize, paddy such as BINA-8)
- Horticultural garden (e.g. jujube, guava)

Alfalfa production in fallow lands (which are fallow during dry season) can be produced in less saline areas during April-June. This will contribute to the fodder chain of livestock and dairy sector.

Dairy has huge potential of increasing income. Technical know-how for insemination, proper feed, proper maintenance of cows, and good connectivity to market is critical for making a profit from the dairy sector. Women in the community can come together, form cooperatives and maintain dairy-related activities. Value chain support is strongly recommended for this.

The rate of participation of women in the rural sector in Bangladesh has been increasing, and has gained strong momentum in recent years. A new thrust of commercialization into agriculture, though small scale in most cases, means women farmers can benefit, if they are appropriately trained. Upazila Agriculture officers work with female farmers through female farmers clubs, and initiatives to produce high-value products. With proper market connectivity, cooperative production, and value chain support, the benefits to producers can greatly affect their ability to earn a profitable livelihood.

CHAPTER 5:

Towards gender equality: What adaptation in climate change can offer

Working with women has been a major thrust in government initiatives and with development practitioners to address poverty since the inception of Bangladesh. However, through the experience of microcredit activities, which largely involve women, it has been seen that livelihood enhancement activities at small scale may not help poor households to graduate from poverty in a substantial way. To address women's empowerment as a core development component, there have to be more, and varied efforts, apart from engaging women in income-generating activities.

There have been efforts in Bangladesh to enhance the adaptive capacity of men and women in vulnerable areas under climate change community based adaptation initiatives since early 2000. This has involved engaging women in different income-generating activities. However, there is a general lack of understanding in how to address women's empowerment through such activities. There have been few initiatives, even at a global level, in combining income generating activities in a way which will help poor women in the communities to graduate from poverty, helping them to become independent, and contribute to gender equality.

5. 1 Collective action at work: Potential modalities to address empowerment

Commonly, "collective action refers to the act of mobilising people around common or shared concerns. The action can be routine or sporadic; it can take place through an organization or a government structure or entirely informally; it can be localised or transnational; it can focus on the articulation of rights or the delivery of services; it can be "induced" from outside or, as is most often the case, it can evolve organically" (Mansuri & Rao 2013). Formation of community-based organizations (CBO) by the members of the community can be an effective modality to reach into the gender equality space.

CBO members, both women and men, must be trained in gender equality issues, such as violence against women, sharing responsibilities in domestic work, and many other aspects of women empowerment. Violence against women, like other historical manifestations of violence, is embedded in the socioeconomic and political context of power relationships. Strategies to counter violence against women have to be embedded in women's experience of subordination and empowerment. Drawing linkages between violence and women's empowerment (through collective effort) is seen as critical to any endeavor to counter violence.

The Theory of collective action

In economics, collective action refers to the provision of public goods (and other collective consumption) through the collaboration of two or more individuals. Since Olson's (1965) seminal work on the matter, much of the mainstream economics literature has focused on the challenges of undertaking effective collective action because of the tendency of individuals to want the benefits but none of the costs of participating—the problem known as free-riding.

The implication, from Olson and others, is that goods tend to be underprovided when they depend on collective action and that this is particularly the case in poor societies where the costs of participation are often high. Ostrom (1986) and colleagues countered this by arguing that effective collective action does often take place in poor rural societies and can be an effective response to both state and market dysfunction, in particular, internalizing negative externalities and/or generating positive externalities in the use and management of natural resources. Significantly, Ostrom and colleagues were able to provide evidence of the factors contributing to successful collective action, identifying the critical importance of rules and norms—the "cooperative infrastructure'"—in supporting group-based agency.

Ostrom's work has gone on to become some of the most influential in the field of development and has spawned considerable interest by researchers and development actors in the potential role for local group action in solving longstanding development problems.

Source: Mansuri and Rao, 2013; Olson, 1965; Ostrom, 1998, 2004; and Booth, 2012

The formation of CBOs can be helpful to create a space for community members to regularly interact and raise collective voices on issues that matter. Female CBOs can hold regular monthly meetings, to discuss issues, and explore collective solutions. Training for the men on showing respect to women, sharing household work load, restraining themselves from violence against women, seem to have effective impact on the social behavior.

Domestic violence, in Bangladeshi society, is considered a “private issue”, not as a crime. Control of women’s sexuality and physical integrity is regarded as a matter of family and community “honor” rather than personal autonomy and individual right. While the families cocoon the silence, it is quite common that the village elites (mostly men) continue to protect the perpetrators.

Integrated CBO-based flexible structures, that include clear spaces for allowing different aspects of resilience to come through i.e. social, gender, and economic empowerment issues with CBO providing governance links may effectively work to address these issues.

5. 2 Going beyond the domestic periphery

Working inside the home, like working for family, is usually seen as a barrier to empowerment because it means that women remain under the control of male guardians and lack autonomy and mobility. It is widely acknowledged in the global literature on women empowerment and gender that norms of female seclusion limit women's mobility in the public sphere, constraining their economic opportunities by limiting their choices of work location and their ability to interact in markets. “Women only” development initiatives since 1970s have tried to empower women through engaging them in market-related productive activities within the household sphere without affecting their roles in the domestic spheres. The inherent assumption is that if the women come out of the household and work outside, household work might get affected. However it is broadly observed that without addressing the power inequality within the families and challenging the very system of patriarchy, no connection between mobility and economic success can be achieved. Mobility associated with work outside the home is important to economic outcomes and to women’s empowerment.

Empowering adaptation projects can initiate women’s engagement in productive sectors that connects women to different productive activities, beyond the domestic sphere. Dairy, maize, chili, and floating gardens, production groups can be formed at the community level. However, the approach will vary because of the hydro-geo-physical realities in different areas. Adaptation projects can develop CBOs consisting of all women members and can try to build their capacity in on context-specific, innovative, production systems. Women in the CBOs should take collective decisions in the process of production and should be involved in financial planning and saving.

5.3 Women’s “adda”: Connectivity among women

Connectivity among women is a critical arena in which information exchange, collective effort, motivation and mutual help can be promoted. Meetings (locally called adda) can be set where women in a given community can meet regularly. CBO activities may be useful to initiate and sustain such a format.

CBOs women's adda can make community women aware of a range of issues and social awareness programmes like stopping early marriage, instigating anti-dowry campaigns understanding of the rights of women, whilst training women technical and creative skills and expertise for income.

In addition, adolescent female and male separate groups can be formed to conduct regular monthly meetings. These groups can take a slightly different tack, in educating youngsters about health care, sanitation and hygiene, and other important information. Programmes of this type have the potential to influence both boys and girls in terms of their mental and psychological development. Commitment to creating new social rules and accountability should be seen as major areas of attention.

Meetings with young boys and girls from neighboring schools and colleges in the community may be held quite regularly. The main objective for these meetings could to raise awareness and the voice of youth in their families and society for ending gender-based violence. Other issues worth exploring are issues like dowry, early marriage, polygamy, and divorce.

This initiative has the ability to mobilize and motivate members of the community to act as change makers. Useful tools for bringing about this change can be videos and documentaries with easily understandable messages.

5.4 Inclusion of marginalized women representatives

The project partners along with CBO members should be engaged in meetings and discussions with the local Union Parishad to make the governance process participatory. Project activities must focus on the inclusion of women in different task forces and institutions like Union Parishad standing committees which is strongly supported by local men, Union Disaster Management Committees, school management committees, market management committees, ward committees and Union women forum committees.

The inclusion of more poor women members in various committees set up by the Union Parishads is expected to result in increasing functional linkages between CBOs and the Union Parishads.

5.5 Engagement of women in addressing food security

As a suggestion, women in the CBOs can maintain a "food bank", to store rice just after harvest and collectively decide how to use that in times of food crisis. The concept of food bank is not new in Bangladesh. However, though a cooperative initiative it can be rejuvenated.

5.6 Decision making

Decision-making power is an important indicator of women's empowerment that connects to a variety of sectors of family, social and political life. In many cases in Bangladesh, mobility of women is controlled by their male counterparts. For example, decisions are easily made regarding visiting a neighbour, compared to going to a relatively faraway place, irrespective of a woman's age. Empowerment is a process and it will take time to get the leverage on what an adaptation project can do to also demonstrate its efficiency in terms of bringing awareness to women's rights.

5.7 Solving public goods problems

Initiatives towards providing access to common property resources seem to attract little attention in NGO-led activities in Bangladesh. The CBO members need to be aware about their rights, especially the availability of support services and social safety net provisions by the government. There is a huge gap in advocacy with local administration as well as in influencing policymakers toward an equitable distribution of resources, especially in locations where people are largely dependent on eco-system.

5.8 Challenging social norms and practices

All the links and initiatives discussed earlier are not mutually exclusive, they are all essentially instrumental—collective action helps women advance specific value goals or objectives. But a further vital link between collective action and agency is between the act of associating and women's psycho-social wellbeing. This is what Naila Kabeer calls the intrinsic value (or "power from within") of collective action. In this sense, whether it provides measurable developmental benefits or not, group action can be vital in supporting women's self-esteem and self-confidence as well as providing access to spaces and networks that go beyond family and kin.

Through developing the power within, women can go on to challenge gender norms in the wider community, whether together or as individuals (Contrearas-Arias et al., 2013). Adaptation activities should try to address the very essence of gender inequality through an approach which can change the system of patriarchy. However, without linking with greater policy regime at national level, it might not be very effective. As "empowerment" is seen as a collective process at local level, it often ignores the wider part of the collective, the national level where the legislation and approaches towards women's empowerment comes in.

5.9 Connecting institutional adaptation and other related initiatives

The Government of Bangladesh has been taking initiatives to address climate change and extreme weather events through its development work. In this work, it has been critical to explore a holistic approach and embrace synchronization among actors and activities. Within this work, advocacy for different issues can also be pursued. Specific examples in the SWR might include:

- Advocacy for drinking water
- Advocacy for embankment protection, maintenance
- Advocacy for adequate gender sensitive shelter building and maintenance
- Advocacy for regional water sharing
- Advocacy for effective use of Social Safety Net programs
- Advocacy with local administration on different issues (with agriculture, livestock, fisheries Departments, Department of Women Affairs, Department of Social Welfare, etc.)
- Advocacy for women's effective participation in climate change related activities, policy formulation, finance tracking

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It has been observed from the field that often livelihood options generated out of different adaptation activities at local level can be destroyed by a single embankment breach or cyclonic hit. The limitations of adaptation are well known. It is important to address the causes of climate change and other stressors. Addressing those can be a useful modality to build resilience. Women can play a major role in this, if they are trained properly.

5.10 Taking a holistic approach

A holistic approach is required to achieve women's empowerment through adaptation activities. Adaptation must be seen as a development activity that should be connected to development work. Activities around women's empowerment coupled with the engagement of women in income-generating activities in the context of the SWR needs to be integrated.

Individual household level project assistance often fails to help poor men and women to graduate from poverty. Small-scale industrial production, and if possible, large-scale production is recommended where women can be engaged. Formal employment is an important modality to address empowerment that functions beyond domestic periphery. At the end, adaptation project must incorporate/ connect to different development activities in a given context.

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