Vulnerabilities and Resilience among Extreme Poor People: the South West Coastal Region of Bangladesh

shiree working paper 5

Save the Children
UK

Extreme Poverty Research Group (EPRG)

shiree

House 5, Road 10, Baridhara, Dhaka-1212, Bangladesh
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The Extreme Poverty Research Group (EPRG) develops and disseminates knowledge about the nature of extreme poverty and the effectiveness of measures to address it. It initiates and oversees research, acts as a learning and sharing mechanism, and assists in the translation of learning into advocacy. It is an evolving forum for the shiree family to both design and share research findings.

The data used in this publication comes from the Economic Empowerment of the Poorest Programme (www.shiree.org), an initiative established by the Department for International Development (DFID) and the Government of Bangladesh (GoB) to help 1 million people lift themselves out of extreme poverty. The views expressed here are entirely those of the author(s).

The paper has been peer reviewed by colleagues in either the Chars Livelihood Programme (CLP), the UNDP Urban Partnerships for Poverty Reduction (UPPR) and BRAC's Challenging the Frontiers of Poverty Reduction – Targeting the Ultra Poor (CFPR-TUP) programmes – all part of the DFID/UKaid extreme poverty portfolio in Bangladesh. It was also peer reviewed by Nidhi Mittal, Climate Change Adaptation Advisor, Save the Children UK.

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Prokriti Nokrek Prokriti@savethechildren-bd.org
Arafat Alam arafat@savethechildren-bd.org

shiree
House 5, Road 10, Baridhara, Dhaka-1212, Bangladesh
Web: www.shiree.org

EXECUTIVE SUMMARY

The South-West coastal region of Bangladesh is unique for its environmental characteristics. It is extremely vulnerable to natural and climate change-related disasters such as floods, cyclones, tornadoes, tidal surges, storm surges, river bank and coastal erosion. Cyclone Sidr, struck the coastline of Bangladesh in 2007, and cyclone Aila hit the region on 25 May 2009 with 13 ft high waters, breaking river embankments and dykes in several places, washing away the lives and livelihoods of people. People in this area are vulnerable to cyclones, tidal surge and river erosion along with salinized water and soil. Extreme poor people are suffering the most because of their exposure to, and dependence on, natural resources for their lives and livelihoods. This climatically challenged and ecologically fragile region is rendered more so by the rapid growth of shrimp farming in the region which exacerbates its vulnerabilities.

Since 2009 (after the devastating cyclone Aila), Save the Children UK (SCUK) has been implementing its Household Economic and Food Security (HEFS) project in six *upazilas* (sub-districts) of two coastal districts Khulna and Bagerhat. The project aims to graduate 70% of its 15000 extreme poor beneficiaries' households from extreme poverty by strengthening their income sources and diversifying their employment opportunities through a variety of interventions. These interventions include, for example: asset transfers; capacity building and cash stipends; skills development; business counselling; strengthening market linkages; together with awareness training in health, nutrition and disaster risk reduction. This package of interventions was thus designed to not only increase incomes but also increase resilience to future climate-related disasters and environmental stresses.

Another storm resulted in a huge tidal surge in October 2010. The water level rose by 1 foot after the tidal surge and destroyed the embankments and other structures in 14 Upazilas. Koyra and Morrelganj were the most tidal surge affected Upazilas of the SCUK project area. In Koyra, 624 beneficiary households were damaged, and the corresponding figure was 228 in Morrelganj.

A key underpinning issue is that SCUK livelihood interventions, undertaken in April 2010 to protect extreme poor beneficiaries, comprising of asset protection or transfer, diverse livelihoods and awareness raising to build resilience to floods, were not enough to prevent assets lost or damage to the beneficiaries by the tidal surge which came in October 2010. Such ex-ante resilience measures were inadequate in the face of a severe covariant shock, such as flooding, which is becoming less predictable and more severe in recent times. Ex-post resilience measures, such as links to existing services cash for work, relief, and additional financial support were arranged only after the intervention, several weeks later, after the damage was done. Given the increasing threat of climate change and man-made risks, it would seem that ex-ante approaches should be given a higher priority at all levels – from the household level (indigenous methods) to the community level (social protection) and the level of political economy (to challenge the dominance of shrimp farmers, to build more secure embankments, and challenge the state to address the extreme siltation build up in the rivers).

This study aims to explore why the HEFS model - based on assets, diversified livelihoods plus awareness training - was insufficient to prevent the damage done to assets and livelihoods. How can we build on successful examples of resilience in order to prevent damage to the livelihoods of SCUK beneficiaries in the future and enable long-term adaptation to climate change? Such a study will enable us to identify the role that distributed assets play in enabling poverty reduction and enhancing adaptive capacities for the beneficiary households (BHHs) during the proposed plan. It will also shed insight on possible modifications to programmatic approaches necessary to ensure the sustainability of SCUK asset interventions and inform advocacy on key issues.

In this study we use the concepts vulnerability and resilience to frame our analysis and draw on the work by Kessy and Tarmo (2010) to guide our analysis. This study mostly relied upon qualitative data, including Life histories (LHs), Focus Group Discussions (FGDs), and Key Informant Interviews (KII).

Our findings reveal that tidal surges made the extreme poor more vulnerable by destroying or damaging the few assets they owned. The most immediate and visible impact of the tidal surge was the damage to community infrastructure, household equipment (housing, poultry shed etc.) sanitary and water bodies/tube-wells, production assets, poultry and livestock, natural assets (water bodies). People's human assets (health, skill and children education) were also severely affected with short and long-term implications. We also found that the climate-related disasters affected social relations within the community, for instance, some women were forced out to work, despite social norms which prohibit women's work outside the home.

The majority of our beneficiaries tried to apply their own ex-ante resilience strategies but these were inadequate in the face of increasing severity or scale of climate-related disaster events. For instance, many made attempts to raise their pond/hatchery dyke or raise the platform inside the house, nevertheless, the unexpected tidal surge (which happened at midnight) washed away and destroyed their assets. Very few could protect their assets during the tidal surge by leaving these with relatives and neighbours and by applying some indigenous strategies (for instance, valuable items hung on the top roof covered by polythene).

It was also found that vulnerabilities vary among individuals and households according to their capacity to prevent, mitigate or resilience with disasters or other long-term climate risks. Therefore retaining assets and protecting damage depends on the household's ability to manage their vulnerable situation. At the household level it was found that these asset retaining strategies enabled households to maximize their available human capital. In addition to this institutional support, the HEFS project, government safety nets and other support initiatives from NGOs provided opportunities towards building the resilience of the extreme poor and improving their asset base. However, most of the links with government safety nets and with local NGO schemes (e.g. cash for work scheme, children's education stipend and relief) were implemented only after the tidal surge, which limited the effectiveness of the project. This is an important lesson for future asset based strategies: links to safety nets and NGOs should be made early and in an expedient way along with asset interventions in order to build ex-ante resilience.

PROGRAMME IMPLICATIONS

During the period of the study, one of the issues which emerged was the need to promote climate-resilient and sustainable livelihoods of extreme poor households from the project, this included:

- Strong housing structure for small business shops (grocery, betel leaf, vegetable business);
- Fresh water;
- Cyclone resistant houses and secure boxes with locks (cloth business);
- Wooden shed for ducks, poultry birds and goats;
- Net, bamboo fence and raise ponds/hatchery dikes (crab and fish culture);
- More diversified and stable livelihood options for BHHs;
- Livelihood diversification for round the year to cope with disaster vulnerability (seasonal livelihoods e.g. crab);
- Need more diversified and female focused livelihood options for female-headed BHHs, which have immediate cash flow/returns;
- Ownership of the asset to women – who are so often abandoned or divorced in this region marked by very high post-disaster male migration for work outside the region.

WIDER POLICY ISSUES

Some policy issues also emerged from this study. These are:

- Construction of the adequate number of cyclone shelters and *killa* (raised platform) for the protection of lives and properties from cyclone and tidal surge;
- Stop the shrimp farmers from the practice of making holes within the embankment which severely weakens it;
- Safe drinking water for coastal people in the face of increasing salinization of water resources which renders them undrinkable (installing water treatment and desalination plant);
- Human capital is key to successful livelihood diversification, so education is needed for children in extreme poor households.
- Establish social protection programmes for the extreme poor for long-term climate adaptation.

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CONTENTS

1. INTRODUCTION

1.1 VULNERABILITY AND FLOODING

Bangladesh is a tropical country and extremely vulnerable to various natural disasters such as floods, cyclones, tornadoes, tidal surges, storm surges, river bank and coastal erosion, and droughts. It is currently ranked as the most climatically vulnerable country in the world (EC, 2008, IPCC, 2007). There are approximately 711 km of coastal area in Bangladesh (*CDP, 2006*). Over a period of 100 years, 508 cyclones have affected the Bay of Bengal region, of which 17 per cent caused serious land erosion (GOB, 2008). Though the majority of the population have experienced disasters in varying degrees and forms, the coastal populations are the most vulnerable. During the 'cyclone season' in the months of April-May and September-November, these natural and climate-related disasters have a profound and lasting impact on their lives and livelihoods of the extreme poor, particularly in 12 districts, including Khulna and Bagerhat.

Cyclone Sidr, struck the coastline of Bangladesh in 2007, and took a toll of 3,500 lives with huge loss of property and livestock (The Daily Star, June 2009). Cyclone Aila, a tidal surge, struck the South-West coast on the 25th of May 2009 with 13 ft high water, breaking river embankments and dykes in several places, washing away the lives and livelihoods of people. Khulna and Sathkhira, in the South-Western coastal belt were among the worst affected districts.

Therefore, people in this area are vulnerable to cyclones, tidal surges and river erosion, along with salinized water and soil. Among all, the extreme poor people are suffering the most because of their deep dependence on nature for their lives and livelihoods. They live in physically fragile huts that offer little protection from floods, storms and cyclones. They do not have their own homestead land and are often forced to live on marginal and flood-prone land. Very often they lose their homes due to river erosion but are often too poor to buy land elsewhere as a coping mechanism (TEARFUND, 2005).

This climatically challenged and ecologically fragile region is rendered more so by the political economy of shrimp farming. The new economic and political dominance of 'white gold' shrimp farmers is replacing paddy farming all along the coast. According to Mondol and Baqi "*Shrimp production in the coastal areas (Khulna, Satkhira, and Bagerhat) has led to the change of the total landscape.*" It is mainly agricultural lands which are being converted into shrimp farms. Shrimp is now the second highest earner of foreign currency for the country. Though shrimp cultivation is helping the country by earning foreign currency, it is also having a severe and negative impact on the environment and undermining the resilience of local populations. Only a few receive the benefits of shrimp farming, whilst the remaining suffer

from its ecological damage. If at least 85 percent of the landowners agree to lease out their lands for shrimp farming, the owners of the remaining 15 percent are obliged to lease out their lands for the same purpose or (else) "allow to inundate the entire area with saline water for farming" (Bhattacharya et al, 2005; Tutu, 2004).
These shrimp farmers need saline water to flood their shrimp farms, and as a result, holes are made in the embankments rather than properly sluice gates. This leads to low and deteriorating embankments, salinized soils which can no longer grow anything, and the destruction of the livelihoods of farmers and employment for labourers.

Few extreme poor labourers benefit from this change – they only have a few days' work on shrimp farms – compared to two seasons of work on paddy and other crops. Moreover it is not healthy work: there are many reports of children working in the shrimp industry where health and hygiene conditions in shrimp processing depots are extremely poor. There are many reports that laborers in the shrimp sector are victims of labor rights violations (Mondol & Baqi, 2010).

This combination of natural and man-made hazards adversely affects the people in the coastal area, damaging their livelihoods through loss of lives and assets.

1.2 THE RESPONSE OF SAVE THE CHILDREN

From 2009, (after the devastating cyclone Aila) Save the Children UK (SCUK) started to work with a total target of 15,000 vulnerable extreme poor households to strengthen their income sources and to diversify their employment opportunities through a variety of interventions, such as asset transfers, capacity building and cash stipends, business counselling, and strengthening market linkages. The project also conducted some awareness training for communities on how to prepare for flooding through regular courtyard sessions. Therefore, asset transfers, investments in human capital through skills development, awareness training on health, nutrition and disaster risk reduction and linking with educational stipends are the major existing ex-ante resilience strategies integral to this project. The major livelihoods of poor people in these working areas (Khulna and Bagerhat districts) are day labour in agriculture, fishing and rickshaw pulling. The extreme poor households are the most vulnerable because they are generally smaller households[1] with less available labour; have limited access to land and livestock; have lower incomes and fewer savings. In this region, there are also some people who are exclusively dependent on Sundarbans like bawali (*golpata*- Nypa leaf collectors) and mowals (honey collectors).

Another storm made huge tidal surges in October 2010. The water level rose by 1 foot after the tidal surge and destroyed the embankments and other structures of 14 Upazilas. The local media sources confirmed that about 10 million people were marooned by the tidal surge.

[1] The number of female-headed households (3.4 million in total coastal areas) is higher in coastal areas than the national average 2.37 million (BBS 2003). There is also a large number of widows in the coastal region, particularly areas near to the Sundarbans, as their husbands were victims of tiger attacks (cited in a report on the in-depth recovery needs assessment of Cyclone Aila affected areas, October 2009)

Koyra and Morrelganj were the most tidal surge affected Upazilas of the SCUK project area. In Koyra, 624 beneficiary households were damaged, whereas the corresponding figure was 228 in Morrelganj. Poultry, fisheries, goat, sheep, livestock and small trade sectors were the most affected during the tidal surge.

As part of the emergency response, SCUK provided some immediate relief e.g. water jars, water purification tablets and ORS to affected BHHs. Partial replacement of those assets lost in the tidal surge was also provided.

1.3 PROBLEMATIC AND RESEARCH QUESTIONS

A key problem is that SCUK livelihood interventions undertaken in May 2010 within the study area to protect extreme poor beneficiaries – comprising of assets, diverse livelihoods and awareness building about resilience to floods – was not enough to prevent asset lost or damage to the beneficiaries by the tidal surge which came in October 2010. Such ex-ante resilience measures were not enough in the face of severe covariant shocks, such as flooding, which are becoming less predictable and more severe due to the myriad of factors, as discussed above. Ex-post resilience measures, such as links to cash for work, relief and education stipends, were arranged only after the intervention, several weeks later, after the damage was done. A key reason for this is that SCUK interventions relied more on ex-post disaster mitigation (SCUK, 2008:14) than on ex-ante resilience or prevention (SCUK, 2008: 4). Given the increasing threat of climate change and man-made risks, it would seem ex-ante approaches should be given higher priority at all levels – from the household level (indigenous methods), community level (social protection) and level of political economy (to challenge the dominance of crab/shrimp farmers to build better embankments, and challenge the state to address the siltation problems in the rivers).

This study documents the effects of the SCUK interventions on the livelihoods of the extreme poor after May 2010, then documents the effects of the tidal surge in 2010 on these assets and livelihoods. We then ask the question: why was the HEFS model based on assets, plus diversified livelihoods, plus awareness training, insufficient to prevent the damage done to assets and livelihoods? How can we build on successful examples of climate resilience in order to prevent damage and have a transformative impact on the livelihoods of SCUK beneficiaries in the future?

1.4 RESEARCH APPROACH

In order to understand the effects of floods on household assets, institutions and resilience, this study examines the micro level dynamics which precede and follow a flood through a life history approach. Such dynamics which can help us understand how to build long-term resilience and climate change adaptation for extreme poor individuals, households and communities.

Such a study will enable us to identify the role that distributed assets play in enabling poverty reduction for the beneficiary households (BHHs) during the proposed plan and shed insight on possible modifications to programmatic approaches, necessary to ensure the sustainability of SCUK asset interventions and to inform advocacy on key issues.

Specifically, the study aims to examine:

- Vulnerability and the impact of climate-related disasters on the extreme poor (henceforth EP) livelihoods;
- Strategies adopted by the extreme poor in order to reduce their vulnerability to disasters within a broader relational context;
- Strategies adopted to make livelihoods more resilient and hence sustainable in the face of future disasters or long-term climate change by focusing on both ex-ante and ex-post strategies at the household, meso and political economy levels.

1.5 STRUCTURE OF THE REPORT

This report is divided into five parts. Chapter one describes the Household Economic Food Security (HEFS) for the sustainable development of extreme poor households. Chapter 2 follows with a review of relevant literature. The third chapter discusses the methodology of the study and a snapshot of sample respondents and the study region. Chapter four examines extreme poor people's vulnerability by examining the impact of floods/tidal surges on extreme poor households. Chapter five focuses on extreme poor people's/households climate resilience through ex-ante resilience and ex-post recovery strategies. Finally this paper concludes with programme and policy recommendations.

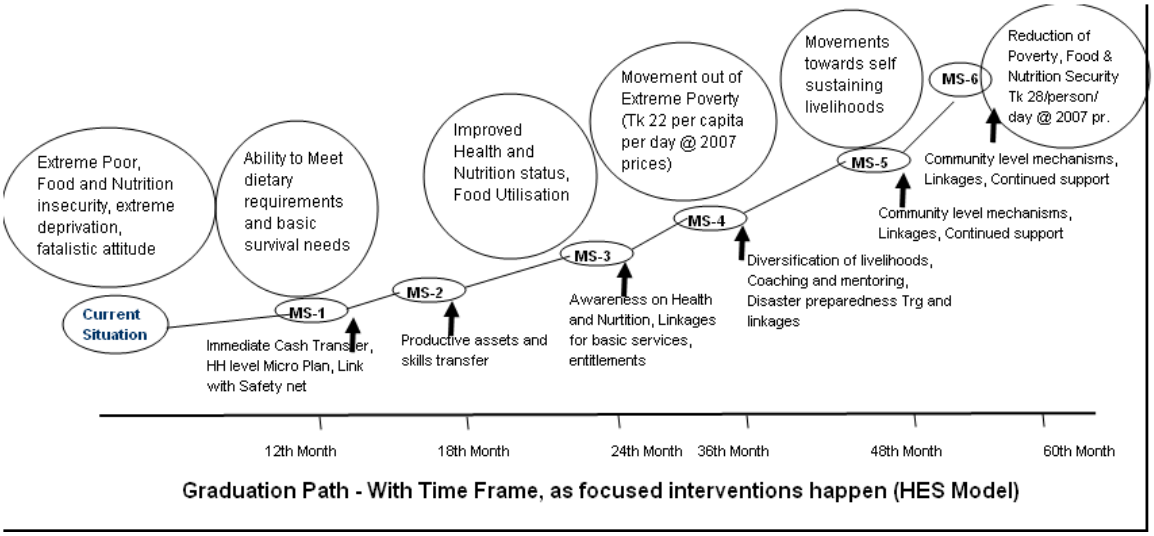
1.6 HOUSEHOLD ECONOMIC FOOD SECURITY (HEFS) MODEL TO SUSTAINABLE DEVELOPMENT OF EXTREME POOR HOUSEHOLDS

SCUK is implementing the HEFS project[2] in southern Bangladesh in the Khulna and Bagerhat districts. The goal of the project is to ensure that the government of Bangladesh's Millennium Development Goal targets 1 and 2 on income poverty reduction and hunger are achieved by 2015. The project envisages the scale-up of a tested model of graduating beneficiaries out of extreme poverty. The model specifies and suggests a set of process, tools, methodologies and principles necessary to attain graduation out of extreme poverty.

Figure 1 illustrates the graduation model of the HEFS project. The project also uses a livelihoods based framework (see annex figure1) for analysing the way extreme poor households survive and graduate out of poverty. This model focuses on the household (as an economic unit) and addresses the multiple factors that contribute to the poverty situation of the unit. This model aims to create opportunities for meeting basic needs and livelihoods of the extreme poor by encouraging beneficiaries to take three livelihoods based on their choice, context, capabilities and needs, offering alternatives if the first options fail.

[2] The project areas are Dacope, Koyra and Paikgacha Upazila's from Khulna District and Mongla, Morrelganj and Rampal upazila's from Bagerhat district.

FIGURE 1: HEFS GRADUATION MODEL



This diversification aims to help extreme poor households to withstand external shocks and stresses. It will also provide alternative avenues for income generation and reduce the overall risk of households to livelihood related shocks.

The HEFS project also seeks to enhance social capital of the extreme poor, which includes formal and informal community structures. The project strengthens private sector engagement, catalyses employment opportunities and emphasizes enterprise based livelihoods.

1.7 EX-ANTE AWARENESS TRAINING

This project is implemented in the coastal area which is characterized by frequent natural disasters. Thus, building awareness and practicing adaptation measures are also key components to prevent extreme poor households from falling back into extreme poverty. Through courtyard sessions, community mentors discuss the information related to disaster risk reduction, integral to building their adaptive capacities to climate change. These measures include plinth raising, changing housing material such as bamboo instead of mud, and storing dried food in plastic bags or on higher platforms in the hut, planting trees around the house, hiding valuable items under earth, letting domestic animals free and keeping food and other productive assets in higher place (source: Disaster Risk Reduction Guidelines, SCUK).

2: REVIEW OF LITERATURE ON VULNERABILITY AND RESILIENCE

In this study we use the concepts of vulnerability and resilience to frame our analysis. A key feature of the vulnerability of the extreme poor to floods in particular is that the latter is a highly damaging covariant risk which affects the whole community and especially the poorest that are the most vulnerable. Covariant risks not only damage physical assets and bodies, but coupled with other risks related to markets which turn against the extreme poor in almost every way: assets sold lose their value as everyone sells, credit becomes dear as everyone needs to borrow, food costs skyrocket as demand for food rises and food stocks become damaged, employment dries up in the short term as farms fail and wages for what little employment is available falls, health and working capacity get worse as pneumonia and other diseases hit, relations of support dry up as friends and relatives become poor and vulnerable too. Indeed the astute businessmen are able to profit at the expense of the poor at such times. For states and NGOs, it means insurance provision is costly and complex as a result. Moreover, the constant and idiosyncratic risks which extremely poor people are exposed to don't stop during floods: shocks and hazards such as accidents and illness continue to plague the poor, exacerbating their vulnerabilities.

A household affected by a flood or a successive environmental shock is likely to be more vulnerable in the future. The vulnerability of the extreme poor according to Chambers (1989) is defined as "a lack of means to cope without a damaging loss." For instance, during floods people resort to distress strategies such as being compelled to sell assets needed for the future, pull children out of school to work or cut consumption which means damaging future health. According to Kessy and Tarmo (2010) "vulnerability is the increased probability of the lower income strata of the community to fall below the poverty line and for those already under the poverty line to remain in or fall further into poverty."

Mukherjee, N (2009) reflects on the seasonal gender-specific vulnerabilities to show how the problems compound for poor women in Bangladesh during the deficit season, who have limited mobility and increase in workload and ill-health. This is true for women suffering the effects of floods as well in coastal Bangladesh who are often left with their children and other dependents whilst men migrate; during this period they may not receive remittances and may be forced onto a labour market with few opportunities and low wages, and may even be abandoned at such times with limited means of survival, as men who migrate may not return.

In this paper we draw on two concepts of resilience from Kessy and Tarmo (2010) to guide our analysis. The first is that people's resilience to floods and their ability to adapt to climate change in the long-term depends to a large extent "on their capabilities to mobilize, combine and transform livelihood assets", as presented in the Sustainable Livelihood Approach (SLA) (see DFID, 2000; Ellis, 1999; Scoones, 1998). The SLA suggests that building resilience is important in preventing livelihood insecurity. Five livelihood assets in the SL approach are:

- Human capital (knowledge, education, physical condition for labour);
- Social capital (membership in family, social networks, associations);
- Natural capital (land, agricultural products, livestock);

- Physical capital (building, equipment, transport); and
- Financial capital (savings, cash, credit).

A number of experts also recognise the significance of the SLA to reduce disaster and climate vulnerability (Scoones, 1998; Ellis, F 1999), and to promote sustainable livelihoods. In the context of South-West coastal region in Bangladesh, experts also emphasise the significance of SLA to reduce poor people's vulnerabilities and to make a sustainable project/programme in the coastal region of Bangladesh (Sdaat. M.A and Islam. S, AKM, (2011), Basher, M.A (2009), Solaiman, M., and Rabbanee, F.K, Bangladesh Centre for Advance Studies (BCAS) 2010).

According to Kessy and Tarmo (2010) "Resilience building means mobilizing and transforming these assets and *fostering policies, institutions and organizations to enable this*" (our emphasis given). Assets and institutions create layers of resilience to disasters and environmental stresses (Kessy and Tarmo, 2010; Glavovic *et al.,* 2003; Obrist et al., 2010).

Resilience is seen to have two sides:

- One occurring *ex-ante* as a process: effective *ex-ante* interventions reduce the chances of a hazard occurring and the need for subsequent *ex-post* interventions (Wuyts, 2006).
- The other one *ex-post* as either a process or a curative measure.

NGO programming and state policy has a role in both *ex-ante* and *ex-post* processes for adaptation and resilience. Much can be learned from indigenous coping mechanisms for building resilience, for instance, Hasem, M.T., and Baten, M. A. (2009) focus on indigenous perceptions, predictions and survival strategies among the Rakhains (indigenous ethnic) community of Bangladesh. The researcher explored some adaptation practices such as changing types of housing patterns, weather prediction, measuring the variation of sea-levels, wind direction and weather etc. within this ethnic community and made some recommendations for effective disaster management planning and programming input at local and national level.

3: METHODOLOGY OF THE STUDY

3.1 SELECTION OF THE STUDY AREA

As noted earlier, Koyra and Morrelganj were the most affected areas within HEFS project locations by the 2010 tidal surge. Therefore, in this study two Unions: (i) Koyra Sadar and (ii) Nishanbaria union were selected for further study: areas which have the highest concentration of affected people during 2010 tidal surge.

3.2 KOYRA SADAR UNION

A Union with approximately 9500 households and situated about 100 km from the district town of Khulna. The majority of the population is Muslim although there is also a significant Hindu population. The Upazila has 13 primary schools, 3 high schools, 3 colleges, 7 madrasas and one market place. Most of the roads are unpaved (katcha). There are seven cyclone centres including a school-cum shelter that have been built by the government in that area. On average, every cyclone centre is situated about two kilometres away from a village. During cyclone AILA and tidal surge the whole union was under water. Therefore the area became uncultivable because of water logging and high salinity. The major occupation of the extreme people of this Union is day labour. Moreover there are some occupations which are common like van pulling, domestic work and small trading. Cash for work is one of the main safety nets for people provided by the Government and NGOs.

3.3 NISHANBARIA UNION

This Union is located 50 km from the district town of Bagerhat and has approximately 8000 households. It is a SIDR affected area with only 3 cyclone centres, which are 4-6 km away from the study villages. The Union has 6 primary schools, one high school, and 4 madrasas (religious education centres). There is no electricity. In the aftermath of SIDR, some national and international NGOs are workings there. The primary source of employment is agriculture. In addition to this, people in this area are dependent on the Sudarban forest.

3.4 SAMPLE SELECTION

In order to strengthen the position of extreme poor households, the HEFS project transferred a number of productive assets (about 32 categories) to beneficiary households. In the 2 study regions, 8 categories of assets have been chosen, including: poultry, duck and goat rearing, crab fattening, sewing machine, ring slab making and various small businesses (fish business, grocery, vegetable, and clothes). Our aim was to examine the dynamics of different livelihood options under coastal conditions.

Individuals interviewed: Individuals in a total of 16 beneficiary households were chosen (two households for each type of asset intervention) who had suffered from damage during the tidal surge. Moreover, different household compositions such as female headed, male

headed, and female managed, larger family and religious minorities were also kept in mind when selecting the sample.

Focus group discussions (FGDs): We had 2 focus group discussions comprised of SCUK Community Support Group (CSG) members.[3] These groups were comprised of men and women.

Key informants: Five Upazila Technical Committee (UTC[4]) members e.g. one livestock officer, two fisheries officer and two youth development officers who are in the HEFS project were selected to conduct key informant interviews.

TABLE 1: DATA COLLECTION METHODS

Data Collection Tools	
Qualitative	**Quantitative**
Life History	Household Profile (CMS1)
Focus Group Discussion	
Key Informant Interviews	

This study mostly relied upon qualitative data. Life histories, FGDs, and Key Informant Interviews (KIIs) were used as qualitative data collection methods. We used life history methods because it helps to provide the necessary context and periodization for the analysis of livelihoods before and after successive disasters. So whilst we used life history methods, we focused on the last 5 years. We chose this method because it captures inter-temporal and social dynamics necessary to understand the effects of repeated disasters on vulnerabilities and resilience of poor communities. It was also an ideal way to explore indigenous coping methods of the region (see Scoones, 1998). It was also an effective tool to express respondents' feelings and views comfortably since the researcher gets the time needed to develop a relationship of trust with respondents (Davis, 2006).

FGDs have been conducted with two community support groups. This method was very effective to verify the opinion and experiences of individuals' life histories and that of key informants. It also provided useful information in a short period of time. In addition to this, key informant interviews with local level technical groups were also useful to get technical responses from experienced people.

[3] HEFS project has one CSG in each project village with a number of ranges 7 to 11 members. The function of CSG's are to assist in selecting EPHHs, ensure the locally available services by establishing linkages, assist in mobilizing locally available resources, assist in the protection of the assets of EPHHs which are provided etc.

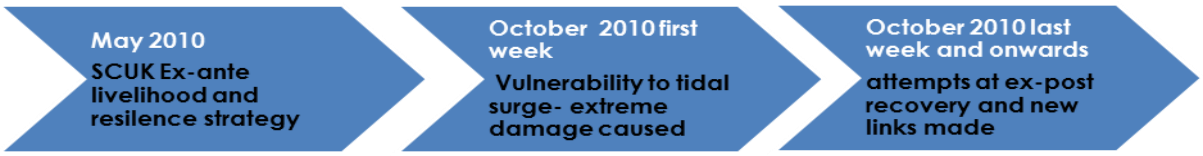
[4] The HEFS project has one technical committee in each project Upazila who are providing support to beneficiary households in respect of capacity development and access to markets.

Informants consent has been taken orally before starting the life history interviews. The objectives of the study were explained so that they could be aware of the purpose of the study. In terms of dealing with privacy and confidentiality issues a mutual trust had to be established within the respondents and community people. At the same time it was explained that the source will be anonymous in the document by changing the name of the respondents/participants.

In order to get socio-demographic information on 16 households we have used household profile data, known as Change Monitoring System 1 (CMS1[5]). In this study we only focused on 16 households that were purposively selected for the life history. The 16 households were not representative of a larger sample, but they were cases which illustrated different contexts. Similarly during our qualitative field work the study team has also collected detailed information on their socio-demographic status after the intervention. This information helped to compare change over time.

FIGURE 2: ANALYTICAL TIMELINE

The following analytical timeline has been used in this study.



3.5 CHARACTERISTICS OF SAMPLE RESPONDENTS BEFORE THE INTERVENTION

A total of 16 respondents were interviewed from the two study sites. The mean age of male respondents was 38 years and 34 among females. Baseline data also shows that the majority of respondents (62.5%) did not go to school while 31.25% studied at primary level and only 6.3% completed schooling at junior secondary level (up to class seven). The average level of respondents' education were class one among male respondents and class two for female respondents. The majority (87.5%) of respondents were Muslim and the remaining was Hindu.

[5] The purpose of the shiree change monitoring system (CMS 1) is to provide a detailed assessment of the status of all shiree households before project interventions. This is a detailed profile of every beneficiary household that is undertaken at or soon after the involvement with shiree project. The household profile is also considered as a baseline for evaluation of project impact.

TABLE 2: TYPE OF FEMALE MANAGED HOUSEHOLDS

Type of female managed households	Percentage (n=8)
Abandoned woman	25
Divorced woman	25
Widowed woman	25
Female managed because of her husband's illness	12.5
Husband was elderly (he had abandoned her 10 years ago and returned in his older years when he found out she received assets from scuk)	12.5

Out of 16 households, there were 8 female managed households. The remaining 8 were male managed households with wife and children.

3.6 OCCUPATIONS BEFORE INTERVENTION

TABLE 3: OCCUPATIONAL STATUS BEFORE HEFS PROJECT INTERVENTION

Men		Women	
Occupation	**Percentage of Households (n=8)**	**Occupation**	**Percentage of Households (n=8)**
Day labour	62.5 (5)	Domestic Maid (paid in food)	62.5 (5)
Fishing	12.5 (1)	Fuel wood collector and sold for cash	12.5 (1)
Ring slab maker	12.5 (1)	Domestic maid in school	12.5 (1)
Betel leaf business	12.5 (1)	Tailoring (had sewing machine but no money for fabric)	12.5 (1)

Data reveals that prior to the involvement with this project, the majority of male sample respondents (62.5%) worked as day labourers e.g. earth digging, agriculture labour, worked in a shrimp enclosure or brick kiln. It was also found that a significant number of women (5 out of 8) were engaged as domestic maids for payment in kind (rice and other food), and an additional one was employed as a domestic maid in school, paid a salary. Only one was a wood collector and seller and another was a tailor but without fabric.

3.7 LAND AND HOUSING STRUCTURE

Among 16 households, 87.5 per cent have their own homestead land, 6.3 per cent households live in parents' home, while the rest live on forest land (average land in decimal).

The average land size of sample respondent from Morrelganj was 4.54 decimal and in Koyra is 2.375 decimal.

TABLE 4: HOUSING MATERIAL

Wall Material	**Percent (n=16)**	**Roof Material**	**Percent (n=16)**
straw or *goal* leaf	60	Corrugated sheet/tin	60
Bamboo	60	Straw or *goal pata*	40
Wood	20		

Baseline data reveals that 60% households used straw or *goal* leaf as wall material while 20 % found bamboo and another 20% wood. In terms of roof material 60% of households had corrugated tin and 40% used straw or nypa leaf (*goal pata*). FGD and life history data indicate that before SIDR and AILA 90% of the houses of extreme poor were made of mud wall and roof material was straw and *goal* leaf.

It is important to note here that after these two devastating cyclones (SIDR and AILA), some international and national NGOs came forward to help and provided some cyclone tolerant (bamboo made wall and corrugated sheet for roof) houses to the victims. In this study 31% sample respondents from two study sites received a house from CCDB and Uttaran (both are national NGOs). Moreover, two households received 18 corrugated sheets from World Vision for roofs for their houses.

3.8 WATER AND SANITATION

Baseline data shows that in Koyra the primary sources of drinking water were shallow or deep tube wells (5 households) and hand tube wells (for 3 households) and the source of water was safe drinking water. All these water sources were privately owned by others. On the other hand all sample respondents (8 BHHs) from Nishanbaria used drinking water from ponds/rivers/canals and it was unsafe drinking water. These water sources particularly ponds were privately owned by others (5 households) and three were a public resource.

It should be noted that people in this coastal region usually use rain water during monsoon. In terms of sanitation 56% (9 BHHs) had own latrine, 12.5% (2 BHHs) sample respondent used others latrine (shared ownership) and 19% (3 BHHs) practiced open defecation.

3.9 FOOD SCARCITY

Baseline data shows that 13 respondents (81%) had 12 months of food scarcity and the remaining (3 BHHs) households had 7 to 10 months of food scarcity. It was also found that 37% of the sample household members had two meals per day for five months before the project intervention. Whereas three households (about 19%) had one meal per day for two months and two more households (12%) found they had to have one meal per day for three and six months respectively. About 30% households had three meals with difficulties for seven months.)

3.10 AFTER THE INTERVENTION

The HEFS project transformed the lives of these 16 beneficiaries by improving their livelihoods through assets, businesses, training and also links to government benefits and other local NGO safety nets (such as cash for work).

TABLE 5: OCCUPATIONAL STATUS AFTER HEFS PROJECT INTERVENTION

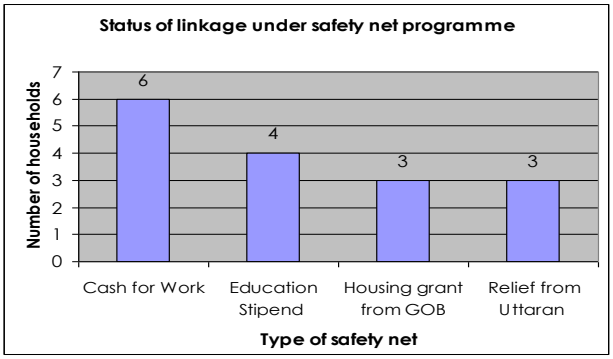
Men		Women	
Occupation	**Percentage of Households (n=8)**	**Occupation**	**Percentage. of Households (n=8)**
Crab fattening	25 (2)	Grocery Shop	12.5 (1)
Vegetable business	12.5 (1)	Cloth business	12.5 (1)
Rickshaw Van	12.5 (1)	Poultry, duck and goat rearing	25 (2)
Grocery Shop	12.5 (1)	Fish culture	12.5 (1)
Fish business	12.5 (1)	Poultry &cloth business	12.5 (1)
Ring slab maker	12.5 (1)	Vegetable business	12.5 (1)
Betel leaf business	12.5 (1)	Tailoring with cloth business	12.5 (1)

After involvement with HEFS project most of the male sample respondents who worked as day labourers, moved into petty entrepreneurial livelihoods such as crab fattening, vegetable business, pulling rickshaw van and starting grocery shops. The remaining interventions were based on their existing occupations. On the other hand, most of the women were engaged in poultry and animal raising/rearing and small businesses e.g. grocery shops and clothes businesses.

3.11 MORE LINKS WITH GOVERNMENT BENEFITS ESTABLISHED AFTER INVOLVEMENT WITH THIS PROJECT

Baseline data shows that only two female headed households were receiving widow allowances while more links to benefits were established with cash for work (6 households), education stipends (4 households) and some relief from other NGOs (3 households) after involvement with HEFS project. Recently three households also received a housing grant (20,000 taka) from the GoB.

FIGURE 3: STATUS OF LINKAGE UNDER SAFETY NET PROGRAMME



4. VULNERABILITY - IMPACT OF FLOODING ON EXTREME POOR PEOPLE'S LIVELIHOODS

4.1 IMPACTS ON LIVELIHOODS ASSETS

This chapter displays the findings based on the empirical data of life histories, FGDs and Key Informant Interviews. The findings revealed that the most immediate and visible impact of tidal surge/storm on the beneficiary households was the damage to those assets necessary for their five livelihood assets.

TABLE 6: DAMAGE TO LIVELIHOOD ASSET AFTER THE TIDAL SURGE AMONG BENEFICIARY HOUSEHOLDS

Capital	Impact of the tidal surge
Physical	• Death of poultry, duck and goat • Destroyed poultry sheds • Partial damage to housing structures • Crab hatchery and ponds washed away • Community infrastructure damaged / destroyed
Human	• Illness of the main income earner • Dependence on one earning member • School closed for a week
Social	• Reliance on local connection and relations • Women forced to work outside the house (against social norms) • Family breakdown
Natural	• Salinity in the water and soil • Contamination of water resources
Financial	• Loss in business/investment • Price increased for purchasing/collecting safe drinking water • Transport cost increased • Rise in expenditure on medical treatment

The above figure illustrates the impact of tidal surge on extreme poor people's livelihood assets. Following are some details of the damage to livelihood assets.

4.2 COMMUNITY INFRASTRUCTURE

As noted earlier heavy and incessant rainfall caused tidal surges in this study area. FGD participants from Koyra shared that during *Aila and its* aftermath, 75% of Koyra union was inundated, while tidal surge (2010), inundated the whole union and lasted for several months. During tidal surge the water level rose by 1 foot than Aila in Koyra and became worse during high tide. In terms of infrastructure, embankments and roads were

broken at several points. Therefore road communications with the other parts of village and upazila (sub administrative area) has been damaged and it became very difficult to communicate between one place and another. In addition to this, water logging creates communities and households surrounded by water, isolating them further from local markets. The situation of Nishanbaria (another study sites) was different from Koyra. The tidal surge led to the direct damage and destruction of water bodies and sanitation. This reveals that tidal surge/flood had a covariant nature with wide-ranging impacts not only on individual households but also affected wider part of the community.

4.3 HOUSEHOLD ASSETS, SANITARY FACILITIES AND WATER BODIES/TUBE WELLS

Samirun's house

As mentioned earlier (chapter three), there were two types of housing pattern among our sample respondents (tin roof and wood /bamboo wall for those who had received housing grant) and straw or *goal pata* (nypa leaf) for both roof and wall for remaining households. Most of them received house and sanitary latrine from different NGOs after these two devastated cyclone in the study area. The majority of the respondents in the life history shared that they did not have proper house for kitchen (no wall or made of mud wall), only a shed for cooking. The tidal surge destroyed even the limited housing and sanitary facilities that the households had such as partial housing structure, kitchen and latrine. Tidal surge caused significant damage of water source too. Before SIDR and AILA, surface water (mainly ponds) and rain water were the primary sources for drinking water in two studies. Nishanbaria is not a tube well success area, therefore there are no tube wells in this village while after AILA some NGOs provided some tube wells and ring slab latrine at Koyra Sadar. During tidal surge all tube wells and water bodies submerged at Koyra. Similarly, trees, leaves and salinity contaminated all water bodies especially pond water at Nishanbaria. According to FGD participants, the colour of the water changed and became unhygienic due to rotten leaves, but they were forced to drink this unsafe water due to no other viable alternatives.
Ratifa was one of them who suffered due to damage of their kitchen.

Ratifa, wife of Humayun Biswas shared that "*Flood waters caused damage to our kitchen which was made of straw and mud wall. As the basement of the kitchen was damaged, we suffered by not being able to cook food for three days*".

Sumoti also shared that she had a *katcha* (unpaved) latrine. It was damaged during that time and rendered dysfunctional for use by her family members.

4.4 POULTRY AND LIVESTOCK

- Ratifa wife of Humayun Biswas received taka 2000 from this project on 23 June 2010 and bought 10 hens. From that 10 it was increased 19 hens. The flood water inundated the poultry shed and 10 hens died.
- The wife of Hasem Chowkder also shared that they had seven hens that they had received from HEFS project. During tidal surge the poultry shed collapsed which built of straw and mud wall and all hens died.
- Bani Begum shared that during tidal surge one goat died. She provided regular vaccine to her animals. But this could not protect her goat from tidal surge.

The HEFS project focuses on diversified livelihood options for each household of which at least one is disaster and climate resilience and one female focused livelihood option. The findings reveal that a number of women in Nishanbaria were engaged in poultry and goat rearing. Therefore women were mostly responsible for nurturing activities and played an active role on feeding, watering and caring. A total of five sample respondents who were engaged in poultry, duck and goat rearing were interviewed in this study.

Poultry, duck, goat and cows (livestock) are the key assets for the extreme poor people. They can meet nutrition deficiency by eating eggs and sometimes they can entertain their guests. Sometimes they can also sell their livestock assets during distress periods as a coping mechanism. Poultry and livestock have the potential to support the adaptation effects of the poor during disaster, because poultry and livestock are more resistant to climate change than crops because of its mobility and access to food (IFAD). Therefore poor people have the tendency to buy some poultry or livestock's whenever they have some money in hand. However, a number of poultry birds from eight beneficiary households and one goat were killed during tidal surge. It also destroyed poultry sheds because the majority of poultry sheds were made of earthen wall and weak straw or *goal pata* (Nypa leaf) as roofing material, which immediately collapsed in the tidal surge.

After Aila very few people were involved with poultry and livestock rearing in Koyra. According to a livestock officer from Koyra, prior to Aila, poor people were used to having poultry, duck and goats at household level. People in this area were also used to growing single crops, so there was a good scope for grazing land during the dry season. However, due to salinity, soil fertility has decreased and there were no crops over the last two years. Therefore it is difficult to rear poultry and livestock in this locality. Saline water also affected the feed preparation of poultry and livestock. Considering this context, in this study area HEFS project provided poultry and livestock only to 25 beneficiary households. Interviews with one female headed household who was involved in duck rearing showed that it was getting very less and irregular cash/profit from duck rearing due to lack of adequate food and fresh water.

4.5 OCCUPATION AND INCOME

Different occupations had different risk and vulnerability during and post tidal surges. The following are some details on how tidal surges affect extreme poor people's occupation and income. Data shows that the majority sample respondents (more than 60%) in the study areas were involved with off-farm activities such as small business and technical work. Six respondents (37%) were engaged with crab fattening, fish culture and poultry, duck and goat rearing.

Crab farming: Crabs grow very fast and people can start earning income two months after initiating crab culture. Therefore, crab farming has been an important activity in the coastal area. In this study two sample respondents were engaged with crab fattening in small ponds within their homestead. Mobin Mondol (32) was one of them engaged with crab fattening. Before tidal surge he made 8000 taka profit within five months and invested this profit to purchase 4 poultry and 2 ducks. Just before tidal surge he also bought 50 kg of rice with his profit.

Crab fattening in the pond

Mobin Mondol expressed his sorrow, "*I had a plan to sell all crabs a week later but tidal surge washed away all of my crab and it was huge financial loss around 10,000 taka. I tried to protect my crab hatchery by putting net and bamboo fence, but water level crossed the protection.*" After the tidal surge he was forced to work as day labourer and had to wait for the next crab fattening season to restart his business.

There are about sixteen species of crabs in Bangladesh (cited in the National Encyclopedia of Bangladesh). Most of these species are economically important but the serrated mud crab, also known as mangrove crab, or *Scylla serrata* is now the most commercially important species. The commercially important species *Scylla serrata* usually spawns in the sea and its larvae are carried to the coast by tide (Source: SAARC Agricultural Centre, 2008 and web address: http://www.banglapedia.org/httpdocs/HT/C_0366.HTM, Accessed on 25.09.2011).

Crab fry is usually available all year round but the peak seasons are summer (May-August) and winter (December-February). According to Mobin, after cyclone Aila crab fry was available in the locality, because river water can enter easily. After repairing the embankment at Koyra, river water cannot enter the locality and there is no high tide. But to carry out crab fattening in small pond it needs the facilities of water change, cleaning and liming for water quality management and continuous water flow or tide. So in the tidal surge aftermath he had to get crab seed in the locality. Besides this he had no experience to

collect crab seed from the tidal river and sea coast, so he was contemplating switching from crab fattening to fish business.

White Fish Culture: Three beneficiaries from Nishanbaria were engaged with Fish culture in a small pond within their homestead. Three of them live beside the river. During tidal surge, floodwater overflowed leading to the submergence of the bank of ponds.


Meherun's pond

Meherun (30), a female managed household, lives beside the Sundarban forest and her house is nearby the Bhola River. She expressed that "*we have received 2500 taka from HEFS project to culture fish in our small pond. During tidal surge, we tried a lot to protect our assets. When the water level started to rise we put nets and raised our pond dykes. We also made a hole in our pond to get saline water. At that time we tried to put some mud to close the hole too, but tidal surge washed away all our fish.*"

Vegetable and betel leaf business: Before Aila, the people of Koyra used to grow vegetables and other crops. After Aila, people in this area could not grow vegetables and other crops because of salinized soil. Two of our sample respondents were involved with vegetable businesses at Koyra sadar. During the tidal surge both of them had financial losses due to damage their vegetables. As noted earlier, tidal surge happened at midnight so they did not have any preparation for facing the flood, so both of them left their vegetable in the local market by covering polythene, what they usually do. The distance of the local market was 2-3 kilometers away from their residence. As flood water came at night it was not possible to move their vegetables from that place and the saline water destroyed all their vegetables.

Tarina expressed her misery. She said, "*I tried to make the best use of the SCUK intervention by combining my own cash from the widow allowance*". Tarina received 5800.00 taka from HEFS project and added 1000 taka from her allowance to run vegetable business. She engaged her elder son in this business. Flood water damaged 80 Kgs of sweet pumpkins, onions, dry and green chili and some other vegetable. The value of the loss was about 8000.00 taka. *She expressed that "our all investment was washed away by flood water. We are now cashless and unable to restart our business. To survive I have to send my elder son in the forest for fishing.*"

Betel leaf business is another profitable business in this locality said Selim Biswas, one sample respondent who was engaged with betel leaf business. He has received 6000 taka from the HEFS project to run his business and before the tidal surge he earned 100 taka per day as profit. During tidal surge he had some betel leaf worth of 1200 taka that he kept in the local market. Saline water entered in the betel leaf basket and rotted all leaves. To him salinity is one of the major threats in his business, because to keep betel leaf fresh, he needs to put fresh sweet (i.e. unsalted) water.

Cloth business: In this study we talked to two female headed respondents who were engaged in the clothes business. They usually hawk clothes within their locality and outside their village. Tahmina shared her sufferings due to tidal surge. Though flood water did not enter her house, heavy rain spoiled her clothing goods. She expressed that she is the only earning member in this family, but over the period of floods she could not go for hawking clothes and could not earn.

Tahmina lives in a dilapidated hut; the structure of the house is straw made roof and wall by coconut leaf. During heavy rain water entered in her house and spoiled her clothing goods as she kept them in the cotton made bags. There were some spots in the clothes after wetting by rain water so people refused to buy it for actual price. So she had to sell it off at a very low price and some clothes she could not sell at all.

Tailoring with cloth business: It is important to mention here that very few women were involved with tailoring in extreme poor households in this study area. Mariam was one of them and only completed primary level education in this study. During Halima's marriage, her parents gave her a sewing machine. Due to insufficient dowry her husband divorced her. At that time she was carrying a baby for three months and she came back to her parent's house. Her husband tried to take her sewing machine but she took the machine with her. According to her, she has received 5000 taka from HFES project to buy some unstitched clothes. After getting this support she has earned on average 500 taka per day (200-300 taka by selling clothes and 150-200 taka for tailoring). She made around 5000-6000 taka profit before tidal surge and invested 4000 taka in delta life insurance. During tidal surge rainwater entered in her house and spoiled her clothes. After Aila Uttaran (an NGO) provided a house to her. Within a year the bamboo made wall weaken and rain water easily entered by wall. She hung all clothes in the *alna (*cheap steel made shelf/rack*)* and they became wet with rain water. At that time there were also few customers in her house and reduced her income. Finding indicates that weak housing structure also added to vulnerability during disaster.

Mariam's house provided by Uttaran after Aila

Grocery shops: Two sample respondents were engaged with grocery shops in two areas. Both of them reported that the tidal surge caused damage to their grocery items. Fatima is one of them who explained her situation during the tidal surge.

Fatima lives in Koyra; she got 8200 taka from HEFS project in June 2010 in order to open a grocery shop. She didn't have her own place for the shop so she had to use her neighbors, Karim Box Dhali's place, with whom she had good relationship. That place was actually a cow shed on the road. So in the daytime Fatima used this place as grocery shop and at night she had to put all her grocery items in the jute bag and bamboo basket. During the tidal surge, she put all her grocery items in the higher place inside her house. She also had around 80 kg of rice stock for the grocery shop. Flood water entered at night and washed away the basement. So the higher platform collapsed and spoiled all her rice stock. Some grocery items she also hung on the roof top and she was only able to save those items.

She also added that during this period she did not stop her business, she continued it from the next day. However, fewer customers came at that time which eroded her income. At that time she had to borrow rice from her brother-in-law who was living in the same homestead. In contrary it was found that male headed household tended to purchase grocery items on credit from retailer in the market whereas female headed household could not avail this facilities because they do not want to take risk.

Ring slab business: In the study area we found only one sample respondent who was engaged in ring slab making business. Miraj Molla received 9000 taka from HEFS project to strengthen his business. Usually he makes the ring slab in the open place which is beside the canal. Just before the tidal surge he made some ring slab and left some sand and bricks in that place. Tidal surge caused damage to his ring slab and washed away sand. The value of the loss was around 5000 taka. At that period he also had less order to make ring slabs. So it hampered his income too.

Impact on financial capital: The table shows the estimate of financial losses during tidal surge in 2010. Data demonstrates that crab and fisheries were the most affected sectors during tidal surge. They lost all the capital that they invested along with their labour. Some small businesses were also affected such as vegetable business. It was also found that in addition to damage to poor people's assets, products, market, home relations they also had to spend extra money for transport and safe drinking water. The added cost of drinking water and transport made extra burden to manage that amount money.

TABLE 7: IMPACT OF THE TIDAL SURGE ON IGAS

Occupations	Average Price for Interventions (in Tk.)	Average loss (in Tk.)
Grocery	7000/=	4000/=
Fish Business	5700/=	2000/=
Crab Fattening	8000/=	10,000/=
Fish Culture	2000/=	2000/=
Poultry, Duck and goat rearing	5000/=	1500/=
Vegetable business	6000/=	8000/=
Tailoring and Cloth business	5000/=	3000/=
Ring Slab Business	9000/=	5000/=
Betel leaf business	5000/=	2000/=

Rafiqul lives in remote area at Koyra reported that before Aila he has to spend 4-5 taka on average for purchasing water, now he has to spend 15 to 20 taka to provide safe water for his family member.

In addition to this, after the tidal surge some households had to spend money and time for reconstructing their housing, kitchen and poultry sheds. They also had to spend money to bear their family members treatment costs.

4.6 HUMAN CAPITAL

The tidal surge also had a negative impact on the extreme poor people's human capital, especially on people's health and their children's education. As noted earlier that water logging was another problem in Koyra. Therefore after tidal surge all water bodies and tube wells were highly contaminated with salinity, human excreta and other pollutants which generated unhygienic conditions and hampered people's health.

Health: 3 out of 16 sample respondents reported that they were suffering from fever at that time and could not continue their work. It is clear that poor people not only lost their assets during the disaster, but people also lost their asset after disaster by income erosion from rising medical costs due to ill health further compounding the issue of livelihoods losses.

> Halima shared her experience that during tidal surge she got a cold and fever for four days, so she could not go for hawking cloths for a week. So her income reduced due to her ill-health.

FGD participants from both study sites also shared that some children were also suffering from pneumonia due to cold. They also added that due to salinity some of their family members were also suffering from skin diseases.

Disaster, along with his wife's health problem, put Mobin Mondol greater insecurity and exposure to risk.

> Mobin Mondol's wife was suffering from a health disease. To bear his wife's treatment cost after cyclone Aila, he had to borrow about 40,000 (forty thousand) taka from his relative. Over the past two years he paid back 25000 taka. With SCUK he was engaged with crab fattening which was damaged during the tidal surge. This pushed him to stop his elder son's schooling and engage him as a day labourer. Mobin Modol himself also went back to his previous work (day labour).

Education: Educational activities were also disrupted during the tidal surge. FGD participants and 8 sample respondents shared that during the tidal surge students could not attend school. Due to water logging at Koyra the educational institutes were closed for a week.

Two female headed household shared that in the flood aftermath they had to rely on their children's income. They stopped their education and fully engaged them with income generating activities.

Samirun was one of those who shared her experience – "there was no work after the tidal surge, but we are three members in my family (my mother who are suffering from paralysis and my son who used to go to school). I had no savings or food stock in my house. I received poultry from HEFS project, but it has no regular income. Therefore, sometimes I worked in my villager's house as domestic helper that was also not sufficient to us. Finally I engaged my son Babul (10 years) as cow boy in one farmer's house and received 500 taka per month." Similarly, Mobin Mondol stopped his elder son's schooling and engaged him as a day labourer.

Growing evidence shows that a low investment in human capital – through not sending children to school – heightens the intergenerational transfer of poverty.

4.7 SOCIO-CULTURAL NORMS

Disaster also affects traditional socio-cultural norms. In the rural societies of Bangladesh, women do not feel encouraged to work in open fields side by side with men. The majority of the FGD participant shared that before sidr and aila, women maintained *purdah* (covering the face and the practice of concealing women from men), and they did not go out to work. However, in the aftermath of disaster women were engaged with road construction work. In such situations, some of them used to work wear the *borkha*[6]. To them, "It was very difficult to work wearing the borkha during hot weather, but we had to wear it to maintain *purdah*."

Similar findings were also found in Halima's life history (one of the cases from six life histories) and in the operational context study by SCUK. Halima shared that, after cyclone SIDR she engaged with road construction work twice (15 + 30 = 45 days) receiving 100 taka per day. Despite her restriction about working outside in public place she did work twice. She added that at end of the work she and others would to someone's house to clean their borkha and then we back their houses so that villagers would not notice they had worked on the road.

4.8 SEASONAL DYNAMICS OF INCOME

From the above it is clear that all of these interventions have different investment patterns, different periods of gestation, and profitability. So in terms of risk, each of the categories also differed greatly from one another.

[6] An enveloping outer garment worn by women in some Islamic traditions to cover their bodies in public places.

FIGURE 4: SEASONAL CALENDAR OF DIFFERENT OCCUPATIONS

Occupational group	**Winter**			**Cyclone Season**		**Monsoon Season**			**Cyclone Season**		**Winter**	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Grocer	High	High	Avg	Avg	High	Low	Low	Low	Avg	Low	High	High
Tailoring and Cloth business	High	Avg	Avg	Avg	Avg	Low	Low	Low	Low	Low	Low	High
Betel leaf business	High	High	High	Low	Avg	Avg	Avg	Avg	High	High	High	High
Vegetable business	High	High	High	Avg	Avg	low	low	Low	Low	Low	High	High
Duck/poultry and goat rearing	Avg	low	low	Avg	Avg	Low	Low	Avg	Avg	Avg	Low	Low
Crab Fattening	High	High	Avg	High	High	High	High	High	Low	Low	Low	High
Fish culture and business	Low	Avg	Avg	Avg	Avg	High	High	High	Avg	Avg	Low	Low
Ring slab	High	High	High	High	High	High	Low	Low	High	High	High	High

High	Peak season, regular customer, more production (veg.)
Average	Average income
Low	Lean season, less customers, less income , less production, scarcity of feed fodder and water and suffer from diseases (duck and poultry)

The above figure demonstrates the seasonal vulnerabilities of extreme poor people. The seasonal calendar shows that seasonal vulnerability was highest during the monsoon season because of the lack of working opportunities. Therefore the monsoon season from June to August were/are the most difficult times for those businesses which rely on the income of others (a consumer base), such as small scale businesses such as grocery businesses, cloth businesses, fish businesses, ring slab business, betel leaf businesses and vegetable businesses.

The, majority sample respondents and FGD participants as well key informants reported that during the monsoon, people have less work opportunities except fishing. So they have less income. Heavy rain is also an added problem to extreme poor households who live in remote areas. They cannot easily communicate to others due to poor transportation. Extreme poor people suffer most during the rainy season because of their weak housing structures. Rain water easily enters their houses and spoils/destroys their belongings. A higher incidence of human disease and livestock disease is also found in the rainy season.

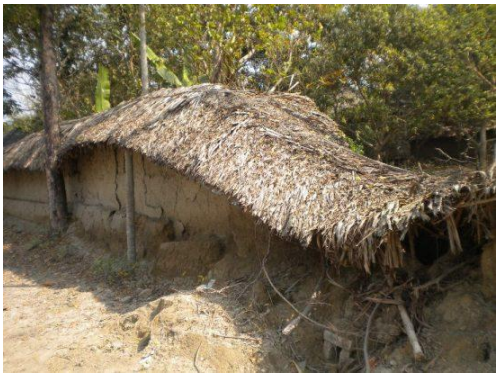
The findings indicate that the income generating activities did not generate enough income during rainy season except the betel leaf businesses. Rain water does not harm betel leaves.

Selim Biswas, who worked in the betel leaf business shared that betel leaf business is profitable. Round the year he can sell betel nut and leaf and on average his income is 3000 taka per month. Only the *Boishak* (April 14 to May 13) month is lean season for betel leaf business in this locality because most of the male members of households migrate to other districts as agricultural labourers (for harvesting) in this month.

On the other hand, it was also found that the monsoon creates opportunities for fishing. After Aila and the tidal surge, the people of Koyra have become more dependent on fishing to survive. As all the shrimp ponds have been flooded, millions of prawns have spread around in rivers and canals. They regularly go for fishing and their income ranges from Tk. 150 to 500 a day.

According to them both dry and wet season were problematic for the coastal people. Salinity increases in the dry season (during winter) which leads to an increased spread of skin diseases. The incidences of poultry/duck diseases were also high in the dry season. At that time animals suffered from diseases. There was also a shortage of fodder for animals.

A Livestock Officer from Koyra shared that February and March is the worst season as poultry suffer from chicken pox, ducks from duck plague and goats from PPR virus and goat pox. To him, water scarcity also affects feeding the ducks at this time. All these diseases are a burden to poor households, because they cannot collect preventive vaccines as they are not available in the local market.



Most cyclones occur during April-May and September-October and storm surges generate a coastal flood. According to participants, normal flooding usually has little adverse impact on crab fattening business and fish culture. But the long run has a negative impact on these sectors.

It was also found that vulnerability varies among the poor and rich. The rich also lost their asset and in terms of value the loss was higher than poor, but they had diversified assets of higher value (assets, skills and savings), strong walls and housing structures, and strong social networks to recover quickly. So, it is apparent that people's vulnerability and resilience depends on the level and diversification of their asset base.

5. RESILIENCE: EX-ANTE RESILIENCE AND EX-POST RECOVERY STRATEGIES OF EXTREME POOR PEOPLE

This section highlights the resilience and recovery strategies that were employed by extreme poor households during and in the aftermath of disaster. As noted earlier (chapter two), asset transfer and investment in human capital through skills and awareness training were major ex-ante resilience interventions from the project which were insufficient in protecting the extreme poor's assets (discussed in chapter four). Despite the inadequate preparation, it was found that extreme poor people tried to protect their lives and livelihoods. They adopted various coping strategies (resilience). The strategies and sequences of coping with disaster vulnerabilities vary by households and local conditions.

5.1 RESILIENCE AND RECOVERY STRATEGIES AT THE HOUSEHOLD LEVEL: RELYING ON HELP FROM FRIENDS, RELATIVES AND SHOPKEEPERS

The study findings show that all sample households (16) adopted various strategies to reduce their vulnerabilities which resulted from disaster. Findings demonstrate that the relationships with relatives, neighbours and the local elite served as a means of support for this group in various ways during and after the disasters.

> A UP member at Nishanbaria shared in an FGD that "During the flood my family gave shelter to about 8 affected households. Most of them were our relatives and neighbours. They stayed for one day and we provided food for them." He also added that "one of her relatives (an elderly) was trapped in the house; we rescued her from that house."

Borrowing was also one of the resilience strategies used by sample respondents in response to flooding, especially for food.

- Sumoti, a 55 year old widow, mentioned that during the tidal surge she had to borrow money from her relatives. She borrowed 2000 taka from her sister-in-law, 1000 taka from her son-in-law and 500 taka from her sister.
- Humayun Biswas and Selim Biswas had good relationship with a shopkeeper. They shared that they sometimes purchase grocery items and betel leaf on credit for their business.

At the same time reciprocal exchange relationships with relatives and neighbours were also found in this study.

Fatima shared that saline water caused damage to all of the rice from her grocery shop, so she had to borrow rice from her brother-in-law. As her brother in-law received 30 kg of rice from the Vulnerable Group Development (VGD) programme, he provided some rice to Fatima. On the other hand, when Fatima received 20 kgs of rice from the Vulnerable Group Feeding (VGF), she gave it back to her brother in-law.

This reveals that relatives and neighbours provided a range of different types of assistance by providing shelter, sharing food, lending kind and cash as well as helping to rescue and move out to safer places. It is seen that good relationships with kin, neighbours and affluent persons played an important role in coping with the crucial situation. Baumeister and Leary 1995, Deci and Ryan 1991 (cited in Deci and Ryan 2001) emphasise the importance of relatedness as a basic human need for wellbeing. They argued that having stable and satisfying relationships is a general resilience factor in people's lives. Findings showed that relatives and neighbours were the first line of defense in times of difficulties.

- During tidal surge Selim lost around 1200 taka from his betel leaf business. But he did not stop his business. With the rest of the money he continued his business. Simultaneously his wife was involved with cash for work for 40 days and got 120 taka per day. With this amount they purchased a second hand (old) rickshaw van for 2500 taka and rented to their neighbour from where they are getting 20 taka per day. They also collected some residual paddy and straw from the field.
- During tidal surge Samirun, kept her poultry in her sister's house in the higher place to protect her poultry. Similarly Miraj Molla kept his ring slab devices in his cousin's house because he had no strong house. Samirun also added that after cyclone SIDR she had no food in her house. One of her neighbour bought some rice from local market and lent her 500 grams.

Moreover, patron-client relationships were found to be fostered and provided a positive adaptive capacity in the short-term, but became a source of vulnerability in the long-term. During the tidal surge, wife of Hasem Chowkder borrowed one or two kg of rice from her neighbour with the condition that she will work as domestic helper to that household. Such relationships in this area often insure households against destitution, but retain them in long term and low paid poverty traps.

5.2 BETTER USE OF HUMAN CAPITAL

In response to disaster, a common coping strategy was for women and children to become more involved in labour. Four sample respondents reported that after the tidal surge, both husband and wife were engaged with income generating work which helped them to recover from the damage and suffering experienced at the time.

After the devastating tidal surge (where the household's crab hatchery was washed away), the wife of Prabir Badya initiated a grocery shop with 500 taka. His wife also sometimes worked as a day labourer in the shrimp enclosure. At this time their children also helped them to sell the grocery items during their free time. In addition to this, Prabir Badya himself engaged with some outside work. This way all family members worked jointly together.

Another case Halima, wife Selim engaged with the cash for work programme for 40 days and earned 4800 taka. From this, they reconstructed their house and invested in a productive asset (purchased an old van). During their children's free time they also involved their children to collect some residual paddy from the field within the village.

Similarly after tidal surge, Tarina could not start her vegetable business. So she had to depend on only 20 kg of rice that she received as VGF. Finally she sent her elder son to the forest for fishing and received 3000 taka per month for four (November to February) months. She also received some relief items (blanket, bucket, nail cutter, mug, bed sheet, soap and sleeper) from Uttaran (through linkage by HEFS project).

5.3 CHILD LABOUR

These studies reveal that it was not merely women engaging in paid works outside the home. The tidal surge affected households also engaged their children (during their free time who were school going) with income generating work to recover from the shock.

The above three cases indicate that women and children played a significant role during the recovery period. This overburdened the women. For example, Halima had to do all the household chores and take care of her children. Simultaneously she had to work outside the home, under the cash for work programme which is labour intensive.

5.4 DIVERSIFYING SOURCES OF INCOME

Diversification also contributed to reducing the adverse impacts of the disaster by utilizing human capital and generating alternative sources of income. Selim and his wife are a good example. Findings also indicate that the more diverse and improved the livelihoods, the more diverse the income.

Tahmina (50 years) was the only income earner in her family and lived with her elderly mother. She has received training as a birth attended (midwife). She never charges any fees

when she works as a birth attendant, while in return people give her saris, soap and money that have ability. From poor to rich, everybody has asked her for help. As such, she has a good relationship with her neighbours and villagers. During the tidal surge she could not go out hawking clothes, and instead the neighbours and villagers helped to get her food.

5.5 ADOPTED ALTERNATIVE LIVELIHOODS

It was found that alternative income generation from different sources was also another coping and recovery strategies among the extreme poor households.

> Zahir Hoque Morol explained how he survived during the tidal surge. The tidal surge caused damage to his vegetable business. His wife was also suffering from skin diseases. He had to borrow money from his brother-in-law to bear his wife's treatment cost. Due to a lack of capital and water logging he could not restart his vegetable business. He had only 1000 taka profit from his vegetable business. He borrowed 500 taka from his brother – in-law. Combining with his profit money he hired a boat from his relative and was engaged with boating for two months. He used to earn 250-300 taka per day. When the water receded he worked in a shrimp enclosure (*gher*) as a day labourer and used to get 120 taka per day.

The ability to create alternative opportunities for income generation by boating and day labour made it possible to overcome his vulnerabilities. It was not only Zahir Hoque who had to rely on alternative livelihoods to survive. For example, since Aila the people of this area have become more dependent on fishing to survive.

5.6 REINVESTMENT OF THE PROFIT IN BUSINESS AND PRODUCTIVE ASSETS

Data shows that before the tidal surge, most of the sample respondents made some profit which they reinvested to strengthen their activities or buy productive assets.

> Before the tidal surge Rafiqul Islam made some profit from his fish business. With this profit he purchased 4 containers for 2000 taka to keep fish. After the tidal surge he continued his business and also made some profit by which he built a shed for buying fish from fisherman and spent 2000 taka. After received further support from HEFS project he extends his business. He made some profit and invested 10,000.00 taka as *dadon* (advance) to 5 fishermen with the condition that he will buy fish from that fisherman (to whom he provided advance money) with 10 taka less from per kg. To him, last month he made 8000.00 taka profit from his business. Now his relatives give honour to him and he can have three meals a day regularly.

- Fatima bought two hens (220 taka), two goats (1200 taka) and two pots for 380 taka from her profit from grocery shop. She also invested some money to her grocery shops.
- Halima from her cloth business purchased two hens for 250 taka.
- Selim Biswas from his profit from betel leaf business purchased two geese and from his wife's income (cash for work) purchased an old rickshaws van and some money also invested in his betel leaf business.
- Mobin Mondol also bought 4 hens and 2 ducks.

From the above findings it is clear that the majority of people have a tendency to buy poultry and livestock with their profit, as these are held as key assets to them.

5.7 SEASONAL MIGRATION STRATEGIES

The seasonal calendar (in chapter four) shows that the poor people living in the remote rural area are used to facing seasonal unemployment almost on a regular basis during a specific time of the year e.g. in the cyclone and monsoon season. Therefore, seasonal migration is an important strategy to extreme poor households in the study area to find employment opportunities. It also helps to reduce livelihood insecurity and associated risks. Most of the male members (3 from Koyra and 1 from Nishanbaria) from two study sites mentioned that during harvesting period they migrate to nearby districts or localities as agricultural day labour.

Prabir Badya was one of them: he shared that people in this area migrate two times in a year (December in winter and April in dry season) in Gopalganj and Botiaghata (other district or area). They usually go in a group of 6-10 and stay for a month. Food was provided by the farmers. From their work on average they used to get 10/15 mound paddy which they sent in a truck collectively. According to Prabir, this amount paddy served at least 4-6 months food security to them, through providing him with opportunities of additional working days. He also added that he developed a good network with better-off farmers outside his locality which will later provide him work for short duration.

On the other hand both Mobin Mondol and Zahir Hoque shared that income from seasonal migration helped to meet their wife's treatment costs.

From the above findings, it is apparent that people know this seasonal problem earlier and they take the initiative to reorganize their resources and activities according to their capacity to develop alternative strategies that help to their complement incomes. This becomes a part of the normal cycle of the household existence. To face such anticipated shocks, the households income depends on such seasonal migration strategies. They migrate during the lean season and earn for maintaining their household welfare stability. It provided opportunities for additional days of employment during the lean season. It also helped the extreme poor households to meet their subsistence needs and health expenses and helped them to overcome the adverse impact of seasonality and other vulnerabilities.

5.8 COMMON PROPERTY RESOURCE MANAGEMENT

Common property resources such as forest and common water bodies helped the extreme poor people to cope during the difficult season in the study area. During the tidal surge most of the water bodies were inundated and fishes were washed away. At that time, 3 sample respondents and their family members were engaged with fishing for a couple of months in Koyra. On the other hand it was found in Nishanbaria that two of our sample respondents collected free fuel wood from the Sunderban forest. FGD participants also added that most of the extreme poor people also engaged with shrimp fry collection from the local river in the both the study areas. This is additional support for them as they have opportunity to extract resources. The Ministry of Water Resources formulated the Coastal Zone Policy in early 2005. The policy aims to reduce coastal vulnerabilities, improve the livelihood of the coastal people, ensure the optimum use of coastal resources and create an enabling institutional environment. However, there are still some barriers: (i) over influence of the powerful local elite, (ii) less effective institutional harmonization between government agencies and among NGOs to the development of pro-poor policies (Ministry of Water Resources, GOB, 2005).

5.9 INCREASED AWARENESS ABOUT DISASTER RISK REDUCTION (DRR)

In the aftermath of the both cyclone (Sidr and Aila and tidal surge), the extreme poor people enriched their awareness in the light of their experiences. Before Sidr and Aila, about 90% of the houses among extreme poor households were built of mud wall and straw or goal leaf (Nypa leaf). As mentioned earlier, the HEFS project has some ex-ante resilience interventions for extreme poor households in this study area. The majority of the sample respondents tried to protect their assets in various ways based on their awareness training (raised pond/ crab hatchery dyke, used net, building a high platform inside the house). After the tidal surge while constructing new houses, they also raised the plinth area higher than the flood water level that they experienced in the past.

5.10 WOMEN'S MOBILITY OUTSIDE HOME FOR WORK INCREASED

FGD participants and life history respondents have reported that women's involvement with income generating work increased after these two devastating cyclones (Cyclone SIDR in 2007 and AILA in 2009). Before these two disasters they did not go outside to work. In the aftermath of disaster most of them became involved with fishing, cash for work, or selling saris, for example. Therefore, women's involvement in income generating work outside the home reduced their households' vulnerability. Young girls started migrating to the town to work in the readymade garments factories (FGD participants).

- **Restricting adult consumption in favour of small children:** Fatima had three young children. During tidal surge they had less income so she sometimes had to eat less.
- **Savings:** After the involvement with the HEFS project, 3 sample respondents started savings in the piggy bank. Fatima shared that every day she saved 5 to 10 taka. During the tidal surge she spent this money.
- **Rice stocks before tidal surge:** Some households had some rice stock before the tidal surge that they used during and after tidal surge to maintain consumption.
- **Deferring medical treatment**: Both Firoz Molla and Mobin Mondol had to defer their own and family members treatment during the tidal surge.

5.11 REDUCING INSECURITY: ROLE OF FORMAL AND INFORMAL INSTITUTIONS

The above findings demonstrate that although the tidal surge disrupted extreme poor people's overall livelihoods, survival mechanisms have been developed at the household level. In addition to this, institutions and organizations also enhanced and diversified their resilience by providing a range of support.

TABLE 8: REPLACEMENT STATUS

Intervention	Koyra	Nishanbaria
Grocery Shop	2500.00	4500
Fish Business	4500.00	
Crab Fattening	3500.00	
Tailoring (Cloth)	2000.00	
Betel leaf business		5000.00
Ring Slab Business		6000.00
Cloth business		7800.00
Goat + poultry rearing		4500.00
Rickshaw van		9044.00

The above table shows that SCUK provided partial replacement to the tidal surge affected beneficiary households In order to buffer the impacts. A total of 12 sample respondents received support ranging from 2000 taka to 9044 taka.

- **Samirun** received 3000 taka from shiree for poultry rearing. She bought 10 hens with that money. During the tidal surge, her 4 hens died. After the tidal surge she received 7800 taka to run a cloth business. During the period of field work (in this study) it was found that she made a profit of around 3200 taka within three months.
- **Hasem Chowkder** (25 years) received poultry and 1500 taka for fish culture. During the tidal surge his ponds went under water and all the fish were washed away. Their poultry shed also collapsed and killed 4 hens. After the tidal surge the HEFS project provided a rickshaw van to him. Currently he is earning 100 taka per day by pulling van.
- **Fatima's** (45 years) husband has been physically disabled from 2006. From this time Fatima has worked as a domestic helper. Sometimes she has also engaged with fishing in the open water. Support from the HEFS project made it possible to continue her grocery business and have three meals a day for five persons.

The findings demonstrate that in the disaster aftermath the HEFS project provided alterative and appropriate support to cope with future disasters and climate shocks.

5.12 RECOVERY EFFORTS BY SCUK: LINKS WITH GOVERNMENT BENEFITS

As noted earlier in the background section (chapter three), more linkages with government social protection were established after the involvement with HEFS project. Data reveals that six women from both study sites were engaged with cash for work and received a good wage rate (150 taka per day) which enabled them to access subsidies and create some productive assets at the household level which enabled a regular return (Case: Halima). Some were also spent to meet their daily necessities and one paid back her loan to her relatives.

5.13 BENEFITING FROM GOVERNMENT AND NON-GOVERNMENT SERVICES

Eight sample households from Koyra were receiving 20 kgs of rice under VGF programme until December 2010. This support helped them to cope with food shortages just after the tidal surge. Three beneficiary households also benefited from government housing grant (mentioned in chapter three) and received 20,000 taka.

One respondent shared that he invested 20,000 taka in his fish business. After getting a profit from fish business he will build a house. Another respondent spent money (that he received as a housing grant) to bear his wife's treatment costs.

At the same time another three households received some non-food items (blanket, bucket, nail cutter, soap and a bed sheet,) from Uttaran. The HEFS project also provided pitcher, oral saline and water purification tablets to these households. This subsidy helped them to recover from the disaster.

6. CONCLUSION

From the above discussion it is revealed that the tidal surge caused damage to extreme poor households and their productive assets, and pushed them into a more vulnerable situation for the next disaster or climate change impact. It also had negative impacts on health which put them in a difficult situation to meet the basic needs of the family members. Seasonality (monsoon, dry season, cyclone season) also increased the vulnerability of extreme poor people by destroying their assets reducing their work opportunities, customer base and income.

The majority of respondents tried to apply their ex-ante resilience strategies such as trying to raise pond/hatchery dyke, raising the platform inside the house, but unexpected tidal surge which happened at midnight washed away and destroyed their assets. Very few could protect their assets during the tidal surge leaving their assets in the houses of relatives and neighbours or hanging these on top of their roofs (applying indigenous strategies). Findings also indicate that weak housing structure added to the vulnerability during the disaster for poultry, duck and cloth businesses.

It was also found that vulnerability varies among the poor and rich. The rich group also lost their assets and in terms of value the loss was higher than for the poor, but they had diversified assets of higher value (assets, skills and savings), strong walls and housing structures, and strong social networks to recover quickly. So, it is apparent that people's vulnerability depends on the level and diversification of their assets base.

Similarly it was found that despite their vulnerability, the extreme poor did not remain passive but employed several strategies to reduce their vulnerability. It was found that a significant number of wage labourers and domestic helpers shifted from manual labour to different income generating activities after the involvement with the HEFS project. It was also positive to note that women headed households also had the ability to manage grocery shops and cloth businesses.

A significant number of sample respondents were also found to be more successful 'shock absorbers' through adaptive strategies during and after tidal surges. They were engaged in diversified income generating activities and increased the investment and generated additional employment opportunities, for instance by purchasing a van. It was also found that livelihood diversification minimizes disaster risks and helped extreme poor households to overcome vulnerabilities. Alternative income generation from different sources (boating, fishing, and seasonal migration) was also another coping and recovery strategies among the extreme poor households. These strategies helped to reduce livelihood insecurity and the associated risk.

Institutional support (through the HEFS project, Government safety nets and other NGO support) provided opportunities towards asset building. The findings indicate that retaining

assets and protecting damage depends on the household's ability to manage the vulnerable situation. It was found in the present study that (75%) of sample respondents were able to recover their asset that they lost, only because they had institutional support from HEFS projects and they benefited from links made by the latter to access other social safety net programs.

At the household level it was found that these retaining strategies worked because the household could maximize their available human capital. The cases of Selim, Prabir, Humayun, Samirun and Tarina are good examples. On the other hand data indicates that those households who did not have sufficient human capital, especially single female headed households, for engaging in income generating work, had to accept the asset loss and their unstable household economic situation (e.g. cases of Halima and Meherun). It is clear that households with low working capacity and poor health could not recover completely, and lost their assets.

Data also revealed that most of the links with government safety nets and with local NGO schemes (e.g. the cash for work scheme, children's education stipend and relief) were implemented only after the tidal surge. This is an important lesson for future asset based strategies – links to safety nets and NGOs should be made at the same time as asset interventions in an attempt to build ex-ante resilience. It was also clear that assets and diversification of livelihoods on their own are not sufficient as a method of insurance against livelihood deterioration. Therefore, social protection is essential and links made by NGOs to government and other local NGOs social safety nets is one step in the right direction.

From the above discussion it is apparent that in order to increase the resilience of the extreme poor, there's a need to raise more ex-ante intervention (capacity to adapt and respond to disaster). Therefore ex-ante resilience intervention should be prioritized to protect the extreme poor people's asset base and livelihoods and to build long term adaptation to climate change.

6.1 RECOMMENDATIONS

During the period of the study, a range of issues have emerged which need to be addressed to promote sustainable livelihoods for the extreme poor. Crucially, the ex-ante resilience interventions of the project can be improved.

6.2 PROGRAMME IMPLICATIONS

- Strong housing structure for small business shops (Grocery, betel leaf, vegetable business);
- Fresh water and safe place for betel leaf business;
- Cyclone resistant house and secure box with locker (cloth business);
- Wooden shed for ducks, poultry birds and goats;
- Net, bamboo fence and raise ponds/hatchery dikes (crab and fish culture);
- Need more diversified and stable livelihood options for BHHs;

- Livelihood diversification for round the year to cope with disaster vulnerability (seasonal livelihoods e.g. crab);
- Need more diversified and women focused livelihood options for female-headed BHHs, which have immediate cash flow/returns;
- Ownership of the asset to women (who are widowed, divorced or abandoned or affected by post-disaster male migration for work outside the region).

6.3 WIDER POLICY ISSUES

Some policy issues were also emerged from this study. These are:

- Although the coastal belt of Khulna and Bagerhat is a disaster (to cyclone and tidal surges) prone area, the number of shelters is inadequate to accommodate the affected people. Therefore, it is necessary to construct an adequate number of cyclone shelter and *killa* (raised platform for poultry and livestock) for the protection of lives and properties from cyclones and tidal surges. The Ministry of Disaster Management and Relief and national and international agencies who are involved with disaster response programme should take the initiative here.
- The embankment is an integral part of the lives and livelihoods of coastal people in Bangladesh which protects them from the saline and coastal river. However, shrimp farmers create holes in the river embankment to pipe saline water from the coastal rivers into their hatcheries, weakening the structure. This combination of environmental degradation and manmade disaster adversely affects the people in this area. Therefore, the Ministry of Water Resources, through its implementing arm – the Bangladesh Water Development Board (BWDB) - should enforce laws to stop shrimp farming and saline water intrusion into unauthorized areas which destroys the embankments and fresh water bodies.
- Scarcity of safe drinking water is an acute problem in the South-West coastal region, where people usually use surface water (mainly ponds) and rain water as their primary sources for drinking. This scarcity is particularly intense during the dry season (November to February) when the salinity of water increases, and also during cyclone and tidal surges (May to July and October to November), when water sources are damaged and contaminated with saline water. In this situation people are forced to drink un-safe water or spend their limited financial resources on collecting from other water sources or purchasing water. The National Water Policy (1999) does not address the water problem of the coastal zone and did not give special focus to the extreme poor, though the policy gave importance on Haor water management. The National Water Policy should be reformed emphasizing coastal areas, the extreme poor people and the vulnerable position of women. It should have clear guidelines of the roles and responsibilities of specific authorities and a process of management which is not found in the current policies. Water laws should be approved immediately, recognizing the rights to access and control of water sources by the extreme poor.
- The illiteracy of the extreme poor is an obstacle to their long-term graduation. Education is an important ladder for transformation and betterment of society, and for halting the intergenerational transfer of poverty. The provision of education needs to widen for the greater inclusion of children of extreme poor households.

- Repeated disaster, tidal surges and river erosion demand the attention of policy makers to design and prepare social protection programmes, livestock insurance and health packages to protect disaster affected vulnerable households.

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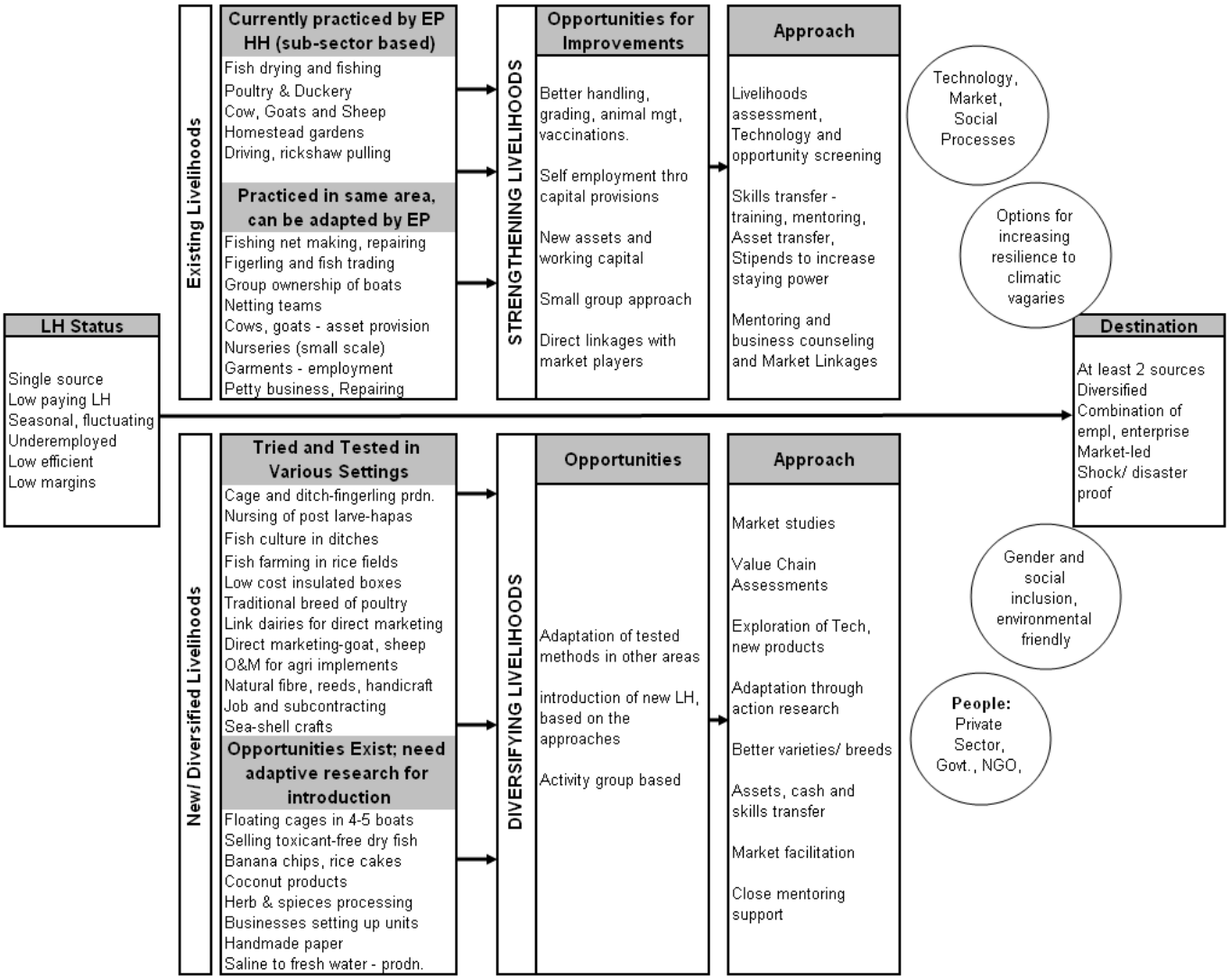
ANNEX 1: LIVELIHOOD ENHANCEMENT AND DIVERSIFICATION-ENTERPRISE AND EMPLOYMENT (LED-2E) FRAMEWORK FOR EXTREME POOR HOUSEHOLDS IN THE COASTAL AREAS

Livelihood Enhancement and Diversfication - Enterprise and Employment (LED-2E) Framework
Coastal Areas and Extrme Poor Households



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