

Non-farm Livelihood Adaptation Approaches and Technologies IN THE CONTEXT OF CLIMATE CHANGE VULNERABILITY

June 2013

STUDY REPORT

Comprehensive Disaster Management Programme (CDMP II)
Ministry of Disaster Management and Relief

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Conducted By

Center for Natural Resource Studies (CNRS)

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Non-farm Livelihood Adaptation Approaches and Technologies

IN THE CONTEXT OF CLIMATE CHANGE VULNERABILITY

FOREWORD

Bangladesh is a hotspot for geophysical and climatic hazards. The country is relatively ranked very high in terms of vulnerability to natural calamities. Geographical location and geophysical configuration combined with its topography and dense population made the country prone to various disasters including climate change which often resulting in high loss of life and economic damage. The economic impact of disasters usually consists of direct damage e.g. infrastructure, crops, housing, loss of lives and livelihoods, and indirect damage e.g. loss of revenues, unemployment and enduring poverty. It is therefore increasingly becoming a major concern for the government, development partners, researchers and communities as well.

The country frequently experiences multiple natural hazards including floods, cyclones, droughts, salinity, water-logging, river and coastal erosion, hailstorms, tornados, tidal surge and landslides etc. Impact of climate change is increasing the treat of natural disaster and effecting the lives and livelihood of millions. In this scenario, the underpinning needs for detail technical research study in relations to disaster risk reduction and various options for climate change adaptation issues have been long due. I am very happy that the Comprehensive Disaster Management Programme (CDMP II), Ministry of Disaster Management and Relief has taken initiatives for conducting some technical research on various critically concerning areas of DRR and CCA from the country perspectives.

I hope the research study report on 'Non-farm Livelihood Adaptation Approaches and Technologies: In the Context of Climate Change Vulnerability' will serve as a resource for understanding, analyzing and addressing the risks and vulnerability associated with disaster and climate change for the relevant stakeholders.

I encourage not only relevant researchers or development professionals but all concerned citizens to make use of the study, utilize the recommendations part and take pro-active effort to pursue the research benefits to bring positive impacts in the life of the vulnerable communities. I congratulate and convey my sincere thanks to the study team and fellow colleagues who were involved in thorough editing and publishing of the document.

Mohammad Abdul Qayyum
National Project Director
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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF CASE STUDIES

ACRONYMS

ADB	Asian Development Bank
AIT	Asian Institute of Technology
APEN	Affluence Poverty Environment Nexus
BBS	Bangladesh Bureau of Statistics
BCAS	Bangladesh Centre for Advanced Studies
BCCSAP	Bangladesh Climate Change Strategy and Action Plan
BIDS	Bangladesh Institute of Development Studies
CBN	Cost of Basic Need
CC	Climate Change
CDMP	Comprehensive Disaster Management Programme
CNRS	Center for Natural Resource Studies
CPD	Centre for Policy Dialogue
DPA	Disaster Prone Areas
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
GCM	Global Circulation Model
GDP	Gross Domestic Product
GOB	Government of Bangladesh
HIES	Household Income and Expenditure Survey
HSC	Higher Secondary Certificate
HYV	High Yielding variety
ICZMP	Integrated Coastal Zone Management Project
IFPRI	International Food Policy Research Institute
IPCC	Intergovernmental Panel on Climate Change
ITCZ	Inter-Tropical Convergence Zone
KII	Key Informants Interview
MDG	Millennium Development Goal
MFI	Micro-financing Institution
MSL	Mean Sea Level
NAPA	National Adaptation Programme of Action
NGO	Non-Government Organization
NW	North-West
PEN	Poverty-Environment Nexus
PIP	Policy, Institution and Process
PRA	Participatory Rural Appraisal
PRAN	Program for Rural Advancement Nationally
PRDI	Participatory Research and Development Initiative
PRS	Poverty Reduction Strategy
RMG	Ready Made Garments
RNF	Rural Non-Farm
SLR	Sea Level Rise
SME	Small and Medium Enterprise
SSC	Secondary School Certificate
STATA	Stata is a general-purpose statistical software package created in 1985 by StataCorp. The name Stata is a portmanteau of the words statistics and data;
STW	Shallow Tube well
UNDP	United Nations Development Programme
UZ	Upazila
VGD	Vulnerable Group Development
VGF	Vulnerable Group Feeding
WFP	World Food Program

LIST OF LOCAL TERMS

Aftab	An agro-processing enterprise
Agricultural	In Bangladesh, agricultural includes the sub-sectors of crops, horticulture, aquaculture, poultry, livestock, etc relating to farm households.
Aila	Cyclone that hit the south-west coastal zone of Bangladesh in 2009
Aman	Rain-fed rice that is cultivated during mid-June to mid-November
Arong	An agro-processing enterprise
Aus	Summer rice that is cultivated during mid-April to July
Ban	Storm surge
Baor	Ox-bow lake
Bepari	Middleman (intermediary) in local market system tortoyas; mostly known as trader
Bigha	A primitive measuring system for land; a bigha is about 33 decimal
Boro	Winter rice that is cultivated during mid-November to mid-May
Char	River island
Chira	Flaked rice
Faria	Middleman (intermediary) in local market system; mostly known as commission agent
Ghat	Boat/launch/steemer terminal
Gher	Coastal aquaculture farm
Haor	A bowl-shaped large tectonic depression. It receives surface runoff water by rivers and canals, and consequentl.
Jhoom	Agriculture practices in steeps of hills in the south-east of Bangladesh
Kal Boishaki	The north-westerly wind in April-May creates the *Kal Boishaki Jhor* (storm) with thunder, lightning and sometimes hail
Kancha	Provisional structure
Kharif-I	Crops that grows during mid-February to June
Kharif-II	Crops that grows during July to October
Maund	A primitive weighing scale in Bangladesh that is equal to about 40kg
Milk Vita	A milk-processing enterprise
Monga	Seasonal famine in northern Bangladesh
Muri	Puffed rice
Nosimon	A mechanized three-wheeler powered by sub-standard machine/engine
Pacca	Permanent structure
Pran	An agro-processing enterprise
Rabi	Crops that grows during mid-October to February
Sahus	Absentee landlords
Sidr	Cyclone that hit the south-west coastal zone of Bangladesh in 2007
T. aman	Transplanted aman

EXECUTIVE SUMMARY

Background and Objectives

The Comprehensive Disaster Management Programme (CDMP II) of the Ministry of Disaster Management and Relief initiated the study on 'Non-farm livelihood adaptation approaches and technologies' In the context of Climate change Vulnerability through Center for Natural Resource Studies (CNRS) to identify disaster vulnerability and poverty aspects in 20 districts of the country. Eventually it is expected that the study findings and recommendations can accelerate some crucial risk reduction policy measures those need to be taken at decision making level towards reducing vulnerability of poverty-stricken people in the face of disaster and changing climate.

The specific objectives of the study are to:

a) Identify climate change (CC) induced risks on farm activities and outcomes;
b) Identify non-farm livelihood adaptation options for CC and disaster vulnerable poor people;
c) Approaches and strategies in adopting non-farm livelihood options and measures, and mainstream in to national development process;
d) Identify the technologies and viability of the technologies for the non-farm options, adaptation measures and strategies to put technologies in place; and
e) Identify policy gaps and measures to fill gaps.

Methodology

In order to assess and identify disaster and climate change induced risks and the non-farm livelihood options and technologies, the study relied on both quantitative and qualitative methods. The key tools used in this study includes a household survey with structured questionnaire in 20 districts for wet and dry seasons, 20 FGDs with different stakeholders in the study area, 11 case studies of purposively selected households, collection of information on community through informal group discussions, key Informants Interview (KII) with different stakeholders including community professionals, local leaders, members of local government, NGOs and so on. The household surveys were carried out in two seasons, dry and wet, with the same set of households.

Area Coverage, Survey Design, and Sample Size

Based on experience and literature review, the study team identified around 40 districts which can be characterized as vulnerable for the four broad types of disasters viz. salinity, flood, drought and Flash flood. From the 40 districts of the working area of CDMP-II, 18 districts were selected as the study area. Two districts (Sherpur and Naogaon) were added later based on discussion with CDMP-II management considering their vulnerability and geographical coverage in the country. In total 20 districts were covered under the study. A total of 2,558 households were selected from 80 villages drawn from 40 upazilas.

Livelihood Strategies and Poverty

Three poverty levels are determined: extreme, moderate and non-poor. In the sample it was found that about 39% of the households are poor, including both extreme (25%) and moderate (14%). Among the households below the poverty line, a bit less than two-thirds are extreme poor. The incidence of poverty hardly changed with the seasons, dry and wet.
Livelihoods were classified into five categories: self-employment in agriculture, self-employment in non-agricultural, wage labour in agricultural, wage labour in non-agricultural, and services.

Most of the household members are self-employed, either in the agricultural sector or in the non-agricultural sector. Self-employment in agriculture ranks first, this indicates the dominance of farming in rural livelihoods. Involvement of the households in the non-agricultural sector as a labour is very low but high in the agricultural sector. Involvement of the households in the service sector is very low.

More households are involved in the non-agricultural sector in the dry season as compared to the wet. In the dry season, the extreme poor households are involved more in agricultural labouring than in other livelihoods. This happens because of increased demand for labour from boro cultivation.

Dependence of the poor households on agriculture is at least as high as the dependence of the non-poor households. It is the moderate poor households who are most dependent on agriculture. The non-poor households are more involved in self-employment in the non-agricultural sector in the dry season and less in the agricultural sector. They are least involved in agricultural labouring and more involved in the service sector. The participation of the poor and the non-poor are of similar magnitude in the self-employment in the non-agricultural sector enterprises but they do different things. While the poor are involved with basic transport vehicles such as rickshaws, the non-poor are involved in trading in agricultural commodities and other profitable businesses. Thus to provide support on the basis of type of livelihoods pursued could be misleading. The crucial question here is who is pursuing any chosen livelihoods, poor or non-poor?

The dry season is characterized by more involvement of the households in the non-agricultural sector. The households were also found to be more food secure in the dry season as compared to the wet.

The moderate poor households are involved in tailoring and for the extreme and non-poor, the second position is taken up by trading in agricultural commodities such as fish or milk. The non-poor are also owners of grocery shops. Some extreme-poor households own tea stalls.

The highest incidence of poverty in the salinity prone area is found amongst the agricultural labour households. As high as 61% of the households pursuing agricultural labouring is either poor or extreme poor. More than half of those involved as wage labourer in the non-agricultural sector are also poor. About 41% of the households who own non-agricultural enterprises are also poor. Irrespective of poverty status, all households are involved mostly in earthwork. The second most important source of employment is in the construction sector.

Similar to the salinity prone area, most of the households are involved in the rural transport sector in the flood prone area. The second position is taken up by trading in agricultural commodities such as fish, milk etc. About 11% of the non-poor households have tailoring business. The pattern of involvement in the non-farm enterprises remains more or less the same in the two seasons.

In any poverty category, most of the households are involved as construction sector workers in both seasons. The second largest occupation is transport sector worker in all poverty groups except for the extreme poor. The extreme poor households in the flood prone area are involved more in earthwork. About 8% of the non-poor households are workers in the mills and workshops.

Self-employment in the agriculture sector is the most widely pursued livelihoods in the flash flood prone area. However, this falls sharply for the non-poor and moderate poor households in the dry season. The second largest involvement of the extreme and moderate poor households is wage labouring in agriculture in the wet season. A third of the non-poor households are either involved as self-employed or as wage labourer in the non-agricultural sector in the wet season. This involvement increases to 48% in the dry season. The participation of the non-poor households in service sector jobs is relatively low compared to other areas, but it is highest amongst the three poverty groups. The extent of involvement in the non-agricultural sector in the dry season is higher when compared to the wet season.

All categories of households perform trading in agricultural commodities most, followed by self-employment in the transport sector. For the non-poor and moderate poor households, grocery shop business ranks third.

Most of the workers here are involved in the coal/sand/stone industry. This type of work is available in this part of Bangladesh. The households are also involved in rickshaw pulling. Interestingly, the non-poor households are also involved as workers in mills and factories.

In the dry area, while most of the non-poor households are involved in farming, most of the extreme poor households are involved in agricultural labouring in the wet season. The moderate poor households are mostly and almost equally involved in farming and wage labouring. The non-poor households are least involved in agricultural labouring and the extreme and moderate poor households barely have jobs in the service sector. Service sector jobs are mostly taken up by the non-poor.

It was noticed that the involvement of the households in farming drastically falls in the dry season. This is expected because it is generally a mono-crop area depending almost exclusively in rain-fed irrigation. As a consequence involvement of the households in the non-agricultural sector increases in the dry season because less agricultural work is pursued.

Most of the households are self-employed in the transport sector. The non-poor households also have grocery shops and they are also involved in trading in agricultural commodities. Participation in the non-agricultural sector as workers is low in this area. Those who are involved in this activity are mainly construction workers.

Migration is an important livelihood strategy, particularly in disaster and poverty prone areas. A quarter of the households have one or more migrant member. The pattern of occupations taken up in the destination of migration is very different from those taken up by the households at the origin of migration. While non-agricultural involvement of the households in the origin of migration is not only low but is also limited to self employment, most employment in the destination of migration is in the wage-based non-agricultural activities. Migration also generates more jobs in the service sector. Promotion of migration not only increases the extent of involvement in the non-agricultural sector, it also changes the structure of non-agricultural employment and makes the shift more rewarding because fewer households take employment in the low return self-employment non-agricultural sector.

Which Livelihoods should be Promoted?

Livelihood options in the Salinity prone area are very diverse. The transport sector plays a big role in this region. This basically represents those who are either owners or drivers of transport vehicles such as a rickshaws or rickshaw vans. In the drought prone area the transport sector possibly represent almost the only source of livelihoods diversification to non-agricultural activity. Here livelihood options are relatively limited. The second position is taken up by trading in agricultural commodities. This again is based heavily on the situation in the agricultural sector. The non-poor also own grocery stores. Some tailoring business is pursued by the moderate poor households. This activity can also be promoted either through training or through supplying capital equipment required for establishing and running this enterprise. Otherwise, there is a whole range of activities that are tangentially pursued by the households. Effort can be made to promote some of these based on the analysis of local conditions.

The flood prone region has some work available in the quarrying industry and it is available to all poverty groups. In Salinity prone areas it is earthwork that dominates the sector. In the drought prone areas it is the construction sector that provides bulk of the employment. The construction sector also provides the most employment in the flood prone area. Thus the construction and transport sector plays a big role in generating non-agricultural livelihoods in Bangladesh. It is important to take into account the fact that the route to promote non-agricultural activities should first follow the poverty route (identify the poor from the non-poor) and then the line of activity. This is so because certain activities are pursued by both poor and non-poor households. The activity and the actors should have to be jointly selected.

The Nature of the Non-Agricultural Sector in the Study Sites

The non-agricultural sector is characterized by low skill activities. More capital is used in the non-agricultural sector as compared to the agricultural sector. The non-agricultural enterprises are run mainly by family labour. Net income from non-agricultural enterprises is higher than agricultural enterprises but low. Labour productivity in the non-agricultural enterprises is higher than the agricultural enterprises but, again, also low at the absolute level. Involvement of family labour in non-farm enterprises owned by the non-poor households is the highest. These are therefore family based enterprises. More hired labour is employed by the non-farm enterprises run by non-poor households. More capital is employed by the non-farm enterprises owned by the non-poor households. The non-poor households use more capital-intensive techniques as compared to the poor households. There is a clear pattern of shift of labour from the farming to the non-farming sector.

Household Income and Poverty

Per capita yearly income of the sample households was estimated at Tk. 21,494. The sample households are found to be more agriculture-dependent than the national average. This indicates that poor regions are more agricultural, more natural resource dependent and at the same time it is more exposed to climate factors. More studies are needed to establish this.

The non-poor households earn more from the agricultural sector, mainly from crop production. Their second source of income is remittances. The moderate poor households earn most from non-farm enterprises. This is followed by the extreme poor. Thus, though the poor and non-poor households are almost equally involved in the agricultural sector, the non-poor households earn most from this sector.

Household heads who are service holders earn most among all broad occupational categories. Self-employed households earn more than that of wage labourers. There is not much difference in yearly household incomes between self-employed agricultural and non-agricultural. Among the wage labourers, labourers in non-agricultural sector earn more than that of labourers in the agricultural sector. The workers who work in mills, workshops, mining, quarries, and transport earn more than those who work in brickfields, construction, rice mills and do earth work.

Leather/hide traders, utensils store owners, hardware shop owners, and pharmacy owners are among the top earners. However, very few people are involved in this trade. "*Muri/chira*" producers, cottage industry owners, "*sharee/lungi*" hawkers are the lowest earners among the self-employed in non-agricultural.

A typical household whose household head is involved in the non-agricultural sector belongs to the lower end of incomes from non-agricultural enterprises. A typical household involved in trading in agricultural commodities has income higher than a household involved in the transport sector. Grocery businesses earn the most.

Earthwork households earn a pittance. Construction sector workers earn a bit more. Work in the quarrying industry is exclusively available for households from the flash flood prone area. This is a relatively high income activity. Income from mills and factories is the highest.

Some activities are participated by both, the poor and non-poor households; however, they do not earn the same. The non-poor earn more than the moderate poor and the moderate poor earn more than the extreme poor from the same activity. This is also the case with construction sector work.
The upshot of these findings is that the promotion of non-farm livelihoods may not involve crossing the poverty barriers by the supported households. The technology is poor, the market is limited and hence these activities may not generate enough income. This will improve the current situation of the poor but they may continue to hover around the poverty income.

Climate Change Induced Risks on Farm Activities and Outcomes

There has not been any major change in broad cropping patterns in the last ten years. Most of the regions continue to produce the main rice crops: *aus, aman and boro*. There has been change in crops for about 5% of the households. Land preparation time has changed for a fourth of the households. In all the areas, untimely/unpredictable rainfall has been the main cause for this change. The adverse impact of climate change on agriculture is therefore quite clear. The extent of the impact should be best understood with longitudinal data and the processes involved with more qualitative studies.

Given that the poor are as much involved in agriculture as the non-poor, climate change factors affect both social groups. Given also that the non-poor are more able to withstand these shocks and changes because of their better wealth positions, it is the poor who suffer most from climate change impact on agriculture. This unequal incidence of climate change can be ameliorated by helping the households which are primarily involved in the agricultural sector to diversify.

Non-Farm Livelihood Options for Climate Change and Disaster Vulnerable Poor People

One major finding of this study is that the poor are not only identified by their participation in the agricultural labour market but also in self-employment in the non-agricultural sector. Promotion of the non-agricultural sector therefore also benefits the poor.

It was found that the transport sector here plays a big role. This basically represents those who are owners and drivers of transport vehicles such as a rickshaw or rickshaw vans. The second position is taken up by trading in agricultural commodities. It was also found that tailoring business is pursued by some moderate poor households. There is a whole range of activities that are tangentially pursued by the households.

Participation of the households in the non-agricultural sector as wage labour is lower than their participation in the self-employed non-agricultural activities. The construction sector generates most wage-based non-agricultural livelihoods in Bangladesh. The non-poor also participate as workers in mills and workshops in salinity and flood prone areas. This activity is hardly done by the poor.

The non-farm self-employed livelihoods are relatively less affected by climate change. Even when they are affected, the effect is mostly described by the affected households as “moderate”. The transport sector (rickshaw, rickshaw-van, *nosimons*) are most affected. Those related to agro-processing are also affected. While the former is pursued more by the poor, the latter is pursued more by non-poor households. Most of them are affected by flood, Flash flood, its level and predictability.

In all the disaster prone areas (DPAs), the households dropped farming and agricultural labouring. In most of the areas the households have taken up non-agricultural livelihoods. Existing evidence shows that non-agricultural activities have been increasing in Bangladesh at a rapid rate. This is happening mainly due to economic factors. Thus, there is a built-in process that contributes to climate change adaptation abilities. A conscious policy for the government should be to enhance this change.

It was also found that disaster affected households had to rely on their own savings and borrowings for coping against disasters. Only a few households received support from public and private sources, otherwise they had to depend on themselves and on the community.

Mainstreaming Non-Farm Livelihood Options into National Development Process

The national development process should attack on two fronts: it should try to lessen the shock and stresses of climate change factors either through awareness raising programmes or through adaptation activities or, when possible, mitigation activities as well as foster the growth of the non-farm economy through appropriate policies.

Strategies taken in NAPA and BCCSAP are already contributing towards reducing vulnerabilities of the rural households to CC. Both agricultural and non-agricultural livelihoods are exposed to CC factors. They are also functionally linked. Livelihoods should also be seen in a larger perspective and beyond employment to include health, education, water supply, etc. Therefore, the key factors that affect the livelihoods of the rural households have to be first approached along with the specific factors which have been identified in this study. For example, in Sirajganj, the households suffered from a breach in the embankment which has seriously affected all forms of livelihoods. The participants in the focus group discussion (FGD) mentioned about the needs for repairing the embankment first, not of promotion of any specific livelihoods. These all-affecting public goods (embankment, safe water, a region free from water logging, etc.) must be first supplied. Government should first prioritize the known problems in each disaster prone area and try to address them.

The rural non-farm sector has not yet received enough explicit strategic position in overall development strategy of Bangladesh, although some information is available in public statistics such as labour force and household expenditure surveys. Development of growth centres, linking them with better road infrastructure, spending on health, education etc. is contributing towards the growth of this sector. This rural development strategy should be continued but with an added focus on climate change factors. Government projects should identify CC risks in development projects at the project design stage. The government can start to think of creating a directorate under the Ministry of Industry or Ministry of Agriculture to promote non-farm livelihoods.

Technology for Non-Farm Options

A list of livelihoods that can be promoted by the policy makers is concretely and clearly identified in this study. This is based on the incidence of non-agricultural livelihoods pursued by the households. The incomes associated with these livelihoods along with the poverty status of the households are now known. In the self-employment category, transport sector comes first, followed by trading in agricultural commodities. Trading in agricultural commodities involves trading agricultural inputs or outputs. Some moderate poor households are also involved in tailoring. Promotion of these activities is proposed because they are already pursued by the poor households in large numbers. In the wage employment sector construction work comes first.

The technology used in these activities is obviously very simple. In most cases it involves one main capital good such as a rickshaw or a rickshaw-van. In trading agricultural commodities, it often involves a physical space for a shop or a platform on which the goods can be transported. The viability of these technologies depends more on other supporting factors such as road infrastructures, availability of electricity and so on. Thus the crucial question is how infrastructure project is developed so that it can take the shocks and stresses of climate change effects.

Adaptation measures therefore relate not only to these technologies as such but to the technologies involved in supporting activities such as rural road infrastructure or more resilient agriculture. These technologies are simple, rudimentary and there is a strong supporting industry. The issue of new technology does not require any particular focus. A large part of these activities is already supported by micro-credit providers. Credit is a major constraint to development of these activities along with skills. These activities are less skill constrained. This strategy should be complemented with those that promote the supporting factors that have been mentioned here.

Policies to Promote Non-Farm Livelihoods

The policy space to promote non-farm livelihoods should focus on the strong relationship between the agricultural sector and the non-agricultural sector. Agricultural growth translates into non-farm growth and is still the key driver for the non-farm sector.

The literature on non-farm economy of Bangladesh has already adequately pointed out the policy implications for fostering the non-farm sector. These include development of rural infrastructure, education, growth centres, promoting migration, developing small and medium industries, finance, etc. Some gaps were identified on the basis of the findings of this study.

First, existing policy does not deal adequately with poverty reduction. One of the major findings of this study is that the poor are involved in low-return non-farm activities. Should a non-farm activity promoting policy support this kind of enterprise which may not help the poor come out of the poverty trap? Should policies intervene at the enterprise level or at developing skills that will help the poor get work in non-farm enterprises? It was found that the migrants find more skill intensive work at the destination of migration. These basic skills are therefore not difficult to develop. The policy should identify these skills and promote them. If poverty reduction is the main thrust of non farm policy, the agent pursuing an activity should also be first identified. Non-farm enterprises are supported more by the micro-financing institutions (MFIs). The government should focus more on promoting small and medium rural industries that can hire the poor households.

Second, the matter is even worse for the extreme poor. Some of them are possibly excluded from this sector. They should not be included in this strategy in any major way at the initial stage of any programme intervention. They are not the right microcredit client. They should rather be supported by direct asset transfer so that they can gradually build up physical and financial capital to start a non-farm activity. Thus the moderate poor households should be the main focus of any policy for promoting non-farm livelihoods particularly in a policy that aims at reducing poverty as well. Helping the poorest of the poor may not reduce poverty; it can only make the poor less poor.

Third, existing policies do not take into account the influence of environment and climate change. Though strengthening the linkages between the agricultural and non-agricultural sectors is focused, what becomes important here is the role of adaptation in the farming sector. Otherwise, vulnerability will be exported from the farm to the non-farm sector.

Limitations of the Study

The study covered two seasons but the gap between the two periods was short. Since the process of climate change is slow, a longer time horizon could have better captured the impact of climate change on livelihoods in general and non-farm livelihoods in particular. The study also focused more on representativeness and hence generated a large sample size. More in depth approach could be taken. For example, only a limited number of districts could have been included in salinity or flood prone area. The focus of the study could have been more qualitative. The study could have included enterprise level data outside the village level, particularly those located in peri-urban areas. The study also did not focus on the implications of non-farm livelihoods on women in the context of climate change. Future research could be guided by addressing these limitations.

CHAPTER 1

Introduction

Bangladesh Climate Change Strategy and Action Plan (BCCSAP, 2009) recognizes that Bangladesh is one of the most climate vulnerable countries in the world and will become even more so as a result of climate change. Floods, tropical cyclones, storm and tidal surges, salinity intrusion, droughts, etc. are likely to become more frequent and severe in the coming years. These changes will threaten the livelihoods of the citizens of Bangladesh and it is envisaged that the poorer section of the rural community, particularly those dependant heavily on natural resources, will suffer the most. These changes will threaten significant achievements Bangladesh has made over the last 20 years in increasing incomes and reducing poverty, and will make it more difficult to achieve the MDGs.

Bangladesh is prone to hazards, and 75% of all disasters are originated by weather-climate extremes. The climate (and variability) change are increasing the weather extremes. All these stresses are impacting agriculture and farm activities. Climate Change and variability shall impact all spheres of life and livelihoods of millions in Bangladesh by increasing weather extremes leading to more disasters and will have gradual impacts on livelihood.

The CDMP (Phase II) has commissioned this study on "Non-farm Livelihood Adaptation Approaches and Technologies: In the Context of Climate Change Vulnerability" in 20 districts for identifying non-farm adaptation options in the context of rural Bangladesh. The study is conducted over the period from December 2010 to April 2012. The output from the study is expected to generate non-farm livelihood adaptation options to facilitate livelihoods of the rural community in a changing climate regime in Bangladesh.

1.1 Objectives of the Study

Existing evidence from Bangladesh suggests that the livelihoods of the marginalized and poor people who are dependent directly or indirectly on the agricultural sector, either as small farmers, or as farm labourers, fishers or day labourers, are under serious threat. CDMP II intended to study non-farm livelihood adaptation approaches and technologies with references to vulnerability and poverty in 20 districts and advocate the introduction of risk reduction policy measures. Identified non-farm adaptation approaches and technologies are expected to be either not sensitive or limited sensitive to CC and variability.

In a bid to develop new as well as to re-establish adaptation measures as mentioned in the NAPA (2005), the process is expected to accommodate the study findings on adaptation approaches and technologies for reduction of vulnerability and poverty by promoting non-farm options at the rural setting to combat the CC induced risks.

The specific objectives of the study are to:

a. Identify CC induced risks on farm activities and outcomes,
b. Identify non-farm livelihood options for CC and disaster vulnerable poor people,

c. Approaches and strategies in adopting non-farm livelihood options and measures and mainstream in to national development process,
d. Identify the technologies and viability of the technologies for the non-farm options, adaptation measures and strategies to put technologies in place, and
e. Identify policy gaps and measures to fill gaps.

1.2 Scope of the Study

According to the terms of reference of the study, the scope of the study is to 'conduct seasonal survey on the panel respondents in the 20 selected districts to identify non-farm adaptation options and technologies and approaches for adoption'. Households living below poverty line in the rural areas are the targeted population for the study. An appropriate and statistically representative sample was drawn from these 20 districts for the seasonal survey. A panel of respondents were identified to conduct the survey both in dry and wet season (repeat survey). Based on the repeat survey, a comparative statement of the results with seasonal variation was drawn. In addition to the empirical survey, findings were triangulated with the information collected by following qualitative and participatory methods viz. FGD and case studies.

A detailed list of non-farm options and strategies of adoption of these options were depicted in the report. A thorough statistical analysis of collected data and information encompassing comparative analysis of socio-economic and physiological setting were done. A comparative analysis of historical evolution and existing trend and scope between farm and non-farm livelihoods options were illustrated in the study. The study reviewed the literature on the conceptual and empirical underpinnings of this from more recent perspective, focusing on the experience of Bangladesh and other developing countries. The study documented the size and heterogeneity of the sector, pointing to evidence that in many countries the sector is expanding rather than declining. The issues associated with measuring the sector's economic contribution were discussed, followed by empirical assessments. The distributional impact of non-farm earnings were examined and pro-poor impact of non-farm activities were described. The sector's path over time, in different settings, were reviewed, and the scope for and experience of various policy interventions are to be discussed.

CHAPTER 2

Climate Change and Bangladesh Country Context

BCCSAP (2009) declares - adaptation is the priority for Bangladesh in the short to medium term. The country is already a world leader in the research, design and implementation of adaptation strategies, and this work will continue. In the long-term, however, climate resilience will require deep cuts in greenhouse gas emissions.

To develop new adaptation measures it is necessary to understand the country setting including natural setting (land elevation, proximity to the sea, hilly terrain, wetlands, floodplain, mangroves, etc), physical infrastructure, socio-economic condition of the area, human resources including health, institutional converge and services. The impacts of CC and variability will depend on these factors.

The geographic location and geo-morphological conditions of Bangladesh have made the country one of the most vulnerable ones to CC, particularly to sea level rise (SLR). Bangladesh is situated at the interface of two different environments, with the Bay of Bengal to the south and the Himalayas to the north. This peculiar geography of Bangladesh causes not only life-giving monsoons but also catastrophic ravages of natural disasters, to which now are added CC and SLR. The country has a very low and flat topography, except the northeast and southeast regions. About 10% of the country is hardly 1 meter above the mean sea level (MSL), and one-third is under tidal excursions.

Bangladesh is a very densely populated country. The per capita income in Bangladesh is US$ 470. About one-quarter of the country's GDP comes from agriculture, which makes the country's economy relatively sensitive to climate variability and change. Access to income and employment is limited, with a large service sector, a climate sensitive agricultural sector and industry.

Access to drinking water is also insecure in some parts all year round due to salinity intrusion (both at surface and underground water) in the coastal area, while in a large part of the country undergroundwater is contaminated with arsenic. The country also has to ensure health and education service to its nationals.

The 4th Assessment Report of IPCC (2007) predicts that monsoon rainfall will increase, resulting in higher flows during the monsoon season in the rivers, which flow into Bangladesh from India, Nepal, Bhutan and China. These flows are likely to further increase in the medium term due to the melting of the Himalayan glaciers. The IPCC also forecasts that global warming will result in sea level rises of between 0.18 and 0.79 meters, which could increase coastal flooding and salinity intrusion into aquifers and rivers across a wide belt in the south of the country, although some of the areas are protected by polders. Rainfall is predicted to become both higher and more erratic, and the frequency and intensity of droughts are likely to increase, especially in the relatively drier northern and western parts of the country.

Bangladesh is widely recognized to be one of the most climate vulnerable countries in the world. It experiences frequent natural disasters, which cause loss of lives, damage to infrastructure and economic assets, and adversely impacts on lives and livelihoods, especially those of poor people.

UNDP has identified Bangladesh to be the most vulnerable country in the world to tropical cyclones and the sixth most vulnerable country to floods (source: UNDP, 2004), A Global Report: Reducing Disaster Risk: A Challenge for Development (http://www.undp.org/bcpr).

It is unlikely to find a year in which the country has not faced any type of natural calamity. In fact, it may be more appropriate to say that before even recovering from any previous natural disaster, a new disaster comes. This has been happening for decades.

2.1 Common Disasters in Bangladesh

a. Floods

Flooding is a recurring phenomenon in Bangladesh. Some 30 to 35% of the total land surface is flooded every year during the wet monsoon season. Flood causes multiple problems - loss of human lives and biodiversity, disruption of communication, agricultural production and livelihood system, damage and destruction of infrastructure, disruption to essential services, national economic loss, displacement and sufferings of a large number of population, spread or outbreak of diseases like diarrhoea, malaria and severe malnutrition.

In the last 25 years, Bangladesh has experienced six severe floods (Table 4-1). In 2007, two successive and damaging floods inundated the country in the same season. During high floods, river bank erosion is common. It can result in the loss of thousands of hectares of agricultural land and scores of villages, and displace many thousands of people from their homes. Flash floods can also be a problem in the more hilly north-eastern and south-eastern regions of the country.

Flash flood usually happens in the haor basins of the north-eastern region and in the hilly areas of the south-east. It causes damage to the crops, life-style and properties. It causes disruptions in the economic activities, destroys crop/ property and many lives are lost.

b. Cyclone

Cyclones hit the coastal regions of Bangladesh almost every year, in pre-monsoon (April-May) or post-monsoon (October-November). Historical records indicate the probability of Bangladesh being hit by a tropical cyclone in a post-monsoon season (67%) is higher than that in a pre-monsoon season (33%). Between 1877 and 1995 Bangladesh was hit by 154 cyclones (including 43 severe cyclonic storms, 43 cyclonic storms, 68 tropical depressions). On average, a severe cyclone strikes Bangladesh every three years.

Table 2-1: Serious floods in the last 25 years

Year	Impact
1984	Inundated over 50,000 sq. km, estimated damage US$ 378 million.
1987	Inundated over 50,000 sq. km, estimated damage US$ 1 billion, 2,055 deaths.
1988	Inundated 61 % of the country estimated damage US$ 1.2 billion, more than 45 million homeless, between 2,000-6,500 deaths.
1998	Inundated nearly 100,000 sq. km., rendered 30 million people homeless, damaged 500,000 homes, heavy loss to infrastructure, estimated damage US$ 2.8 billion, 1,100 deaths.
2004	Inundation 38%, damage US$ 6.6 billion, affected nearly 3.8 million people. Estimated damage over $2 billion, 700 deaths.
2007	Inundated 32,000 sq. km, over 85,000 houses destroyed and almost 1 million damaged, approximately 1.2 million acres of crops destroyed or partially damaged, estimated damage over $1 billion, 649 deaths.

Sources: Government of Bangladesh (2005) and Government of Bangladesh (2007)

Bangladesh is on the receiving end of about 40% of the impact of total storm surges in the world. The reasons for this disproportional large impact of storm surges on the coast of Bangladesh were reported to be the following: a) The phenomenon of recurvature of tropical cyclones in the Bay of Bengal, b) Shallow continental shelf, especially in the eastern part of Bangladesh, c) High tidal range, d) Triangular shape at the head of the Bay of Bengal, e) Almost sea-level geography of the Bangladesh coastal land, f) High density of population and coastal protection system.

As a result of cyclones, storm surges and huge waves can travel up to 30 miles inland. In order to protect the crop lands and people from severe storms and tidal surges, numbers of polders more than 2,400 cyclone shelters have been built in the coastal districts. Construction of cyclone shelters is one of six key adaptation to CC measures along with embankments, afforestation, early warning systems, awareness building and communications.

c. Drought

Drought is the result of insufficient or no rainfall for an extended period, and causes a considerable hydrological (water) imbalance. If it continues for a prolonged period, a serious threat is posed to agricultural production.

Droughts in Bangladesh hugely affect the agriculture sector and water supplies. Typically, uncertainty of rainfall during Kharif-I and prevalence of dry days and lack of soil moisture during the dry season reduce potential yields of boro, aus, t. aman, and rabi crops (Erickson et.al.). Depending on the intensity of drought, estimated yield reduction of different crops varies from 10 to 70% (Karim, et. al. 1990). Drought tends to affect western districts more severely, especially when the monsoon is curtailed (Karim, et. al., 1990; Mahtab, 1989; Task Force, 1991).

d. Erosion

The river beds and adjoining areas are constant state of change. Satellite images of Ganges, Brahmaputra and Meghna middle basin show that 1,063,000 ha were lost to erosion while only 19,300 ha was accreted over 1982-1992. Most of this lost land was used for agriculture. About a million people are affected by river erosion; though cyclones and floods get far greater publicity because of their dramatic nature. Historical evidence suggests that land accretion is caused by channel migration and accreted land is offset by erosion elsewhere.

River erosion and when it is associated with widespread flood, the impact becomes devastating and enormous. During the monsoon, extensive overbank spill, bank erosion, bankline shift and char land shifts have become typical for Jamuna. The river bank erosion has impacts such as displacement of huge population and makes of the affected people unemployed and homeless.

e. Landslide

Landslide has been identified as a common hazard in Chittagong division. This is due to unauthorized hill top levelling for settlement. However, the effect of *Jhoom* cultivation and other sorts of cultivation on the steep slopes also contribute to landslide.

f. Earthquake

The north and north-eastern part of the country has significantly higher seismic active areas and usually major earthquakes originate from those areas. However, the whole country is divided into three seismic zones. Two other major earthquakes that caused severe damage in areas adjacent to the epicentres were in 1885, known as the 'Bengal Earthquake', and in Srimangal in 1918 (Government of Bangladesh, 2001).

g. Tornado and Nor'wester

Tornadoes usually occur in Bangladesh during the pre-monsoon (March-April) hot season. In Bangladesh, Nor'wester is locally known as *Kal Boishaki*. The north-westerly wind in April-May creates the *Kal Boishaki Jhor* (storm) with thunder, lightning and sometimes hail.

h. Tidal bore

In Bangla tidal bore is called ban. This type of tidal bore is observed in the estuary of Meghna and other southern coastal areas in the months of April-May.

i. Salinity

With the change in climate and sea-level rise, salinity is increasing. Another reason for salinity is the decrease of upstream flow of water. The more the sea-level will increase, the more will salinity increase at the coastal areas. It is expected that sea-level rise would accelerate the salinity impact in three fronts: surface water, groundwater and soil (PRDI, --).

Increase in salinity means decrease in agriculture production as lands affected by salinity cannot be used for further cultivation. In Bangladesh, the percentage of that salinity-affected land is quite significant and unfortunately due to sea level rise this percentage is aggravating further under this CC scenario. The trend towards salinization in the coastal zone is very clear (NAPA, 2005).

2.2 Impacts of Climate Change

CC will exacerbate many of the current problems and natural hazards the country faces. It is expected to result in:

i. Increasingly frequent and severe tropical cyclones, with higher wind speeds and storm surges leading to more damage in the coastal region;

ii. Heavier and more erratic rainfall in the Ganges-Brahmaputra-Meghna system, including Bangladesh, during the monsoon resulting in:

- higher river flows, causing over-topping and breaching of embankments and widespread flooding in rural and urban areas,
- river bank erosion resulting in loss of homes and agricultural land to the rivers,
- increased sedimentation in riverbeds leading to drainage congestion and water-logging.

iii. Melting of the Himalayan glaciers, leading to higher river flows in the warmer months of the year, followed by lower river flows and increased saline intrusion after the glaciers have shrunk or disappeared;

iv. Lower and more erratic rainfall, resulting in increasing droughts, especially in drier northern and western regions of the country;

v. Sea level rise leading to submergence of low-lying coastal areas and saline water intrusion up coastal rivers and into groundwater aquifers, reducing freshwater availability; damage to the Sundarbans mangrove forest, a world heritage site with rich biodiversity; and drainage congestion inside coastal polders, which will adversely affect agriculture;

vi. Warmer and more humid weather leading to increased prevalence of disease and disease vectors.

Each of these changes are likely to seriously affect agricultural activities (i.e. crops, livestock and fisheries). Although agriculture now accounts for only 20% of GDP, over 60% of people depend on agriculture directly or indirectly for their livelihoods. The higher temperatures and changing rainfall patterns, coupled with increased flooding, rising salinity in the coastal belt and droughts are likely to reduce crop yields and crop production. IPCC estimates that, by 2050, rice production in Bangladesh could decline by 8% and wheat by 32% (against a base year of 1990).

Shortage of safe drinking water is likely to become more pronounced, especially in the coastal belt and in drought prone areas in the north-west of the country. This will impose hardship on women and children, who are responsible for

collecting drinking water for their families. Increasingly saline drinking water may also result in health hazards, especially for pregnant women. CC is likely to adversely affect women more than men.

Increased river bank erosion and salinity intrusion in coastal areas are likely to displace hundreds of thousands of people who will be forced to migrate, often to slums in Dhaka or other big cities. If sea level rise is higher than currently expected and coastal polders are not strengthened and/or new ones built, six to eight million people could be displaced by 2050 and would have to be resettled.

All of these changes threaten the food security, livelihoods and health of the poor. People living on river islands (chars) and along the coastline (e.g. fishing families), are among the poorest people in the country. They will be seriously affected, as will others who lose their land to river erosion. Extremely poor households throughout the country, including many female-headed households, will suffer most from CC.

a. Agriculture and Food Security

Agricultural sector in Bangladesh are dealing with crop, horticulture, fisheries (contributes 3% of GDP), livestock and environment. Bangladesh economy is predominantly agrarian. The sector contributes over 20% of the country's GDP while over 60% employment is from the sector and the country's food security depends on the sector. The agricultural sector of the country is still dependent largely on the natural endowment. Rain fed agriculture depends on the precipitation regime and pattern, timely removal of monsoon water (drainage in time) determines cropping area. Untimely flood (tidal, flash, river) risks harvesting. Storms, cyclones, tidal waves risk the production. Climate (and variability) change the water regime including precipitation pattern in the country and water input from the catchments are projected to change significantly. Due to rise in temperature rice production will decrease by around 16%, wheat and potato production will be reduced significantly, biodiversity loss will be severe, land productivity will decrease in about 3.4 million ha of arable lands, climatic stresses like drought, soil-moisture storage will be decrease in major floodplain areas, sality intrusion will take place in about 2.5 million ha of arable lands in the coast, both monsoon and Flash floods frequencies will increase in about 2.8 million ha of land. CC is having direct and devastating effects on agriculture. Changes in temperature, humidity and radiation, have great effects on the incidence of insect pests, diseases and microorganisms which has direct bearing on crop yield.

b. Fisheries

Fisheries, including open water capture fisheries and aquaculture, will be impacted adversely and severely due to changes in the hydro dynamic process, and may disrupt connectivity, limiting migration; shortage of over wintering shelter and fish recruitment will decrease fisheries productivity and diversity. While the coastal fishers suffer from loss of working days due to the sea remaining rough more days when compared to previous decades.

c. Water Sector

Water related impacts of CC are likely to be the most critical concern for Bangladesh in terms of urgency, severity, and economic consequence. Bangladesh, a deltaic country drains huge catchment's water (92% of water that Bangladesh drains is from outside the country). There is likely to be more water during monsoon and less water during dry season. There is also likely to be more floods, droughts, water-logging, drainage congestion, storm surges, salinity intrusion, and river bank erosion.

Fresh water availability is currently highly seasonal. Lower winter precipitation in combination with higher evaporation rates will lead to reduced availability of fresh water (for drinking, agriculture, industrial uses) in the drier months. Moreover, reduced winter flows, may make surface water systems more vulnerable to increased saline water intrusion, and also exacerbate contamination from industrial and municipal effluents.

d. Infrastructure

More cyclone, floods of increasing intensity and magnitudes shall reduce durability or damage fully or partially existing infrastructures including roads, highways, ports, railways, growth centres, embankments, polders, godowns, silos, cyclone shelters, etc.

e. Vulnerable groups

Women, children, elderly people, people with disabilities, ethnic and marginalized people will be impacted most during any disaster events. These people are already vulnerable and suffer most and CC will compound their vulnerability. Women are primary caregivers, combining the care for the children and elderly with their domestic and income earning activities. In a traditional society like Bangladesh women are even more vulnerable to the impacts of CC because they are often not allowed to participate in the public share, and are therefore less likely to receive critical information for emergency preparedness.

f. Biodiversity

Bio-geographically, Bangladesh lies in the junction of Indian and Malayan sub-regions of the Indo-Malayan realm that is considered by IUCN as "Regions of High Species Density". The unique environment of Bangladesh provides a variety of better ecological niche for both flora and fauna of both terrestrial and aquatic species. The physical setting of the land supports a wide range of species biodiversity; some of them are described as follows in brief:

- **Flora:** A very large number of native flora including terrestrial and aquatic species has been recorded from Bangladesh that serves as an effective and efficient primary producer of the diverse ecosystems of the land. Among them 3-4 thousand species of woody flora are available here. Several hundreds of species/varieties/lines of different types of crops are native to Bangladesh that contribute to support our daily intake.
- **Birds:** A total of 660 species of birds are supported by the land that represents about 50% of bird species recorded from Indian sub-continent. It should be noted that Bangladesh lies under two international flyways of shorebirds.
- **Fisheries (inland):** A total of 260 finfish species are recorded so far from inland waterbodies that placing Bangladesh third in the world in terms of fish species per land area. The river systems that are crisscrossed by a complex network of rivers, tributaries, flood-plane, haor, baor and beels facilitates the recruitment, abundance and distribution of aquatic fauna species, efficiently.
- **Fisheries (marine and coastal):** A total of 475 species of fish (including 53 cartilaginous species) and 19 species of shrimp and prawn are found in the marine and brackish water of Bangladesh.
- **Other marine flora and fauna:** The coastal ecosystems of Bangladesh represent a transitional ground for the fauna of the Indo-Himalyan and Indo-Malayan ecological sub-regions. Some part of the coastal zone (i.e. St. Martine, Teknaf peninsula) provides breeding areas for four globally threatended species of marine turtles, and as well as serving as a staging site for several globally threatened migratory waders. St. Martin Island is one of the few areas in the world where coral-algal communities dominate rocky reefs. In addition to many of the mangrove species, the coastal zone supports large numbers of waterbirds, rich community of mollusks and echinoderms.
- **Wildlife:** Huge number of wildlife species are recorded in different parts of Bangladesh. Among them the Royal Bengal tiger is famous in the world. The country has about 113 species of mammals, 125 species of reptiles and 22 species of amphibians. As far available information, other faunal species include 327 mollusks and 66 corals. Status of insect species is not available but it is reported to be highly diverse.

The biodiversity (including both in the forested areas as well as elsewhere) is already under threat due to human interventions and the fragmenting of habitats. CC impacts will add an extra dimension to these ongoing stresses. The Sundarbans mangrove forest is likely to be severely affected by CC. High evapo-transpiration and low-flow in the winter are likely to increase soil salinity. As a result, the growth of freshwater species would be severely affected. Over time, the species offering dense canopy cover would be replaced by non-woody shrubs and bushes, and the overall forest

productivity will decline significantly. The degradation of forest quality might cause a gradual depletion of rich diversity of the forest flora and fauna of the Sundarbans ecosystem.

However, the impacts of CC are very high and widespread across all sectors and levels of the population. The poorer section and marginalized community will be most affected. CC and variability threats achieving the goals of Bangladesh Poverty Reduction Strategy Papers (PRSPs).

BCCSAP (2009) emphasizes the adaptation for building resilience of community. Adaptation is a process with multiple components, such as impact and vulnerability assessments, awareness-raising, capacity building, stakeholder participation and mainstreaming. The role of adaptation assessments is to come up with priorities for adaptation. In this context, adaptation to current impacts of climate variability and/or change is a priority, but attention also needs to focus on future impacts, in particular with regards to infrastructure, which has a long lifetime. The adaptation measures thus shall be a blend of the local knowledge and scientific knowledge. The measures could be for household level, community level, institutional level and systematic level.

CHAPTER 3

Climate Change and Farm and Non-Farm Livelihoods

The study deals with several broad themes and in the literature they are normally studied independently and not eclectically or in an inter-connected way. For example, either the interaction of CC and natural resource degradation is studied without much focus to livelihoods change or to be more specific, livelihoods diversification. Are households dependent more on farming more affected by CC factors? Or, do CC factors affect both farm and non-farm livelihoods? What is the basis of this link? Often the focus is the environment but not poverty and vulnerability of the poor living in the rural areas as such. This study, therefore, takes an eclectic approach to understand the complex link between CC and farm and non-farm livelihoods options in the context of poverty and vulnerability in rural Bangladesh under different disaster prone conditions.

3.1 The Problem of Definition

In this study non-farm economy will also be referred by other names such as non-agricultural sector or off-farm sector etc. In the literature there exists no standard definition of non-farm activities. Some researchers include livestock and fisheries into the non-farm sector, others not. In this study livestock and fisheries sectors are included in the agricultural sector. In this study all sectors, agricultural and non-agricultural, have been defined in terms of livelihoods. There remains no confusion in this study about what is meant by non-farm employment (see Annexure B: Classification of Livelihoods).

3.2 The Approach

From the methodological perspective, there should ideally be at least three guiding blocks for conducting the study:

a. Affluence Poverty-Environment Nexus
b. Livelihoods Approach
c. Linkage Theory

These building blocks have been combined to form an eclectic hole that has guided the entire study. They are described here and also combined to form a holistic framework for studying non-farm livelihoods adaptations and technologies.

3.2.1 Affluence Poverty Environment Nexus (Apen)

The central debate around the nexus between poverty and environment is about whether poverty leads to reduction in the quality of the environment. Overfishing of fishing grounds and deforestation of the forests are frequently cited as classic examples of jeopardizing the environment. Overuse is the outcome of demographic factors as more people have to depend on the dwindling natural resource base. On the other hand, widespread poverty drives people to exploit

more natural resource which then gets more degraded. Increasingly this Malthusian view on degrading environment is challenged. The major drawback of this approach is the emphasis on the local at the cost of the global. This approach is not able to handle global environmental issues such as CC.

CC is caused by affluence in the industrialized countries, rather than by poverty in the poor countries brought about by rapid population growth. When the other side of the causation is considered, i.e. degraded environment causes poverty, then there is a strong relationship between poverty and environment. The degradation is transmitted from the activities of the industrialized countries as well as from some rapidly growing economies such as China and India. Note that local resources here are not only degraded due to local factors. While this is also the case, in the case of CC this happens for an altogether different reason: the local environment is degraded by the industrially affluent countries operating at the global level. Here the affluence-environment-poverty link works at the global level and affects poverty at the local level in countries badly affected by CC. With CC factors, the PEN cannot be studied at a local level alone and should be understood as an outcome of the global environment process. This process will therefore be referred to as the Affluence-Poverty-Environment Nexus or APEN.

In fisheries, resource degradation is affected both by the poor (many people chasing less fish) as well as by the rich (use of destructive fishing methods/gears in a large scale). It is also affected by other environmental factors such as those caused by the construction of flood control projects or excessive use of chemical factors. This is also affected by CC factors such as drought. The interaction of the local and the global is the norm not an exception in APEN. The main argument of APEN is diagrammatically presented as follows:

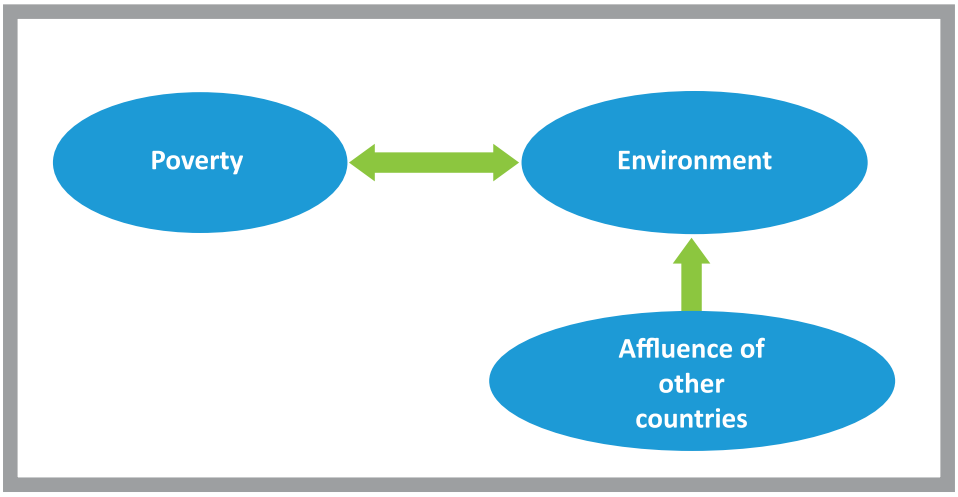


Figure 3-1: Affluence, Poverty, Environment Nexus

3.2.2 Sustainable Livelihoods Approach

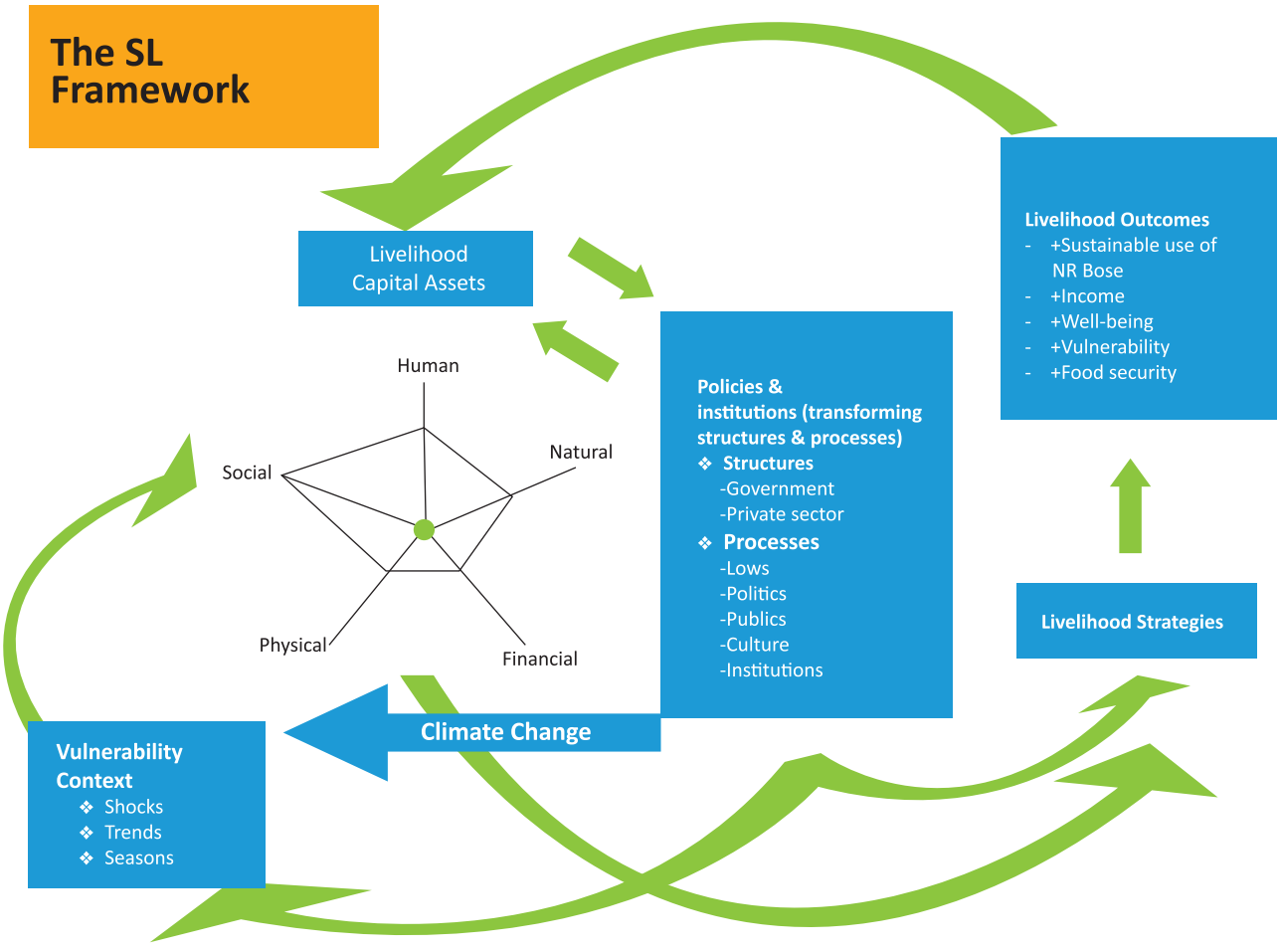
The sustainable livelihoods approach improves understanding of the livelihoods of the poor. It organizes the factors that constrain or enhance livelihood opportunities, and shows how they relate. It can help plan development activities and assess the contribution that existing activities have made to sustaining livelihoods (Serrat, 2008).

Sustainable livelihoods can be interpreted in many ways (there are many approaches) and at many levels (household, village, region and so on). A household is assumed here. A livelihood comprises the capabilities, assets, and activities required for a means of living. It is deemed sustainable when it can cope with and recover from stresses and shocks and maintain or enhance its capabilities, assets, and activities both now and in the future, while not undermining the natural resource base (Serrat, 2008). A household has several capitals such as human, financial, material, natural and social.

These are called livelihood capital assets. The asset mix describes what households have at their disposal to contribute to a better livelihood and assets can complement or substitute each other to some extent. A household combines the asset mix to generate income (improve well-being). The process of this combination is called a livelihoods strategy. Doing farming is a livelihood strategy. So is agricultural labouring. These are livelihood outcomes. This transformation (from assets to livelihoods outcome) is done through the mediation of policy, institutions and processes (PIPs). The whole process is affected by shocks, trends, seasonality. These affect livelihoods as parameters in livelihoods approach.

A livelihood is more than just income. A livelihood encompasses income, both cash and in kind, as well as the social institutions (kin, family, compound, village and so on), gender relations, and property rights required to support and to sustain a given standard living.

A livelihood also includes access to, and benefit derived from, social and public services provided by the state such as education, health services, roads (infrastructure), water supply and so on. Therefore, livelihood diversification is not synonymous with income diversification.



Sources: DFID sustainable livelihoods presentation

Figure 3-2: The sustainable livelihoods approach

This approach is helpful if CC is considered as the source of shock. Then it can be seen how livelihood strategies are altered in response to these shocks. The link between CC and the livelihoods approach is therefore introduced through the blue

arrow in Figure 5-2. Interpreted in this way, the main subject matter of the study can be understood in the right context. Rural non-farm (RNF) strategy will be taken by households more endowed with human, physical and financial capitals. On the other hand, agricultural strategy would be taken by those who are more endowed with natural capital (access to fisheries or cultivable land). This process of livelihoods transformation is constrained or facilitated by policies and institutions. For example, if markets are not well developed or proper incentives are missing, livelihoods diversification can be constrained. One of the objectives of this study is the identification and promotion of policies that promotes livelihoods diversification.

Put in this way, do people actually take livelihoods strategies in response to CC? To a certain extent this is the case. For example, livelihood changes brought about by CC impacts can not only affect livelihood capitals and entitlements but also prices/relative returns. The relationship between livelihoods and CC has to be understood, given the fact that a complex set of factors determine livelihoods strategy. Some CC impacts are slow and some fast and livelihoods change can also therefore be slow or fast. Ideally, these changes have to be studied in a historical context, particularly those related to slow changes that take place over a large span of time.

The outcome of these strategies would be reflected in at least two ratios: (i) the ratio of non-agricultural income to total income of the households and (ii) the ratio of RNF employment to total employment. These are two possible basic indicators of livelihoods diversification. The latter is possibly more reliable because it does not involve prices (wages). The estimation of the former could also be problematic if there is growth in low productivity high employment RNF activities (what are they in practical terms?). Thus one approach of the study could be to look at these ratios at the household level and then look at the activities that are associated with these values. There are surely other ways of doing this and they are attempted in this study. These and other similar indicators could be constructed at the village/upazila/district/disaster-affected area levels. The characteristics of the household who diversifies may be later found out. Implicit in this study is the axiom that more diversified livelihoods portfolio would result in less vulnerability to CC shocks (Hahn et. al., 2009).

Here the difficult aspect of the study comes from the study of policies, institutions and processes. One of the specific objectives of the study is to "identify policy gaps and measures to fill gaps". Rural livelihood diversification cuts across a number of typically self bounded arenas of policy discussion in development studies including rural poverty, household risk strategies, household coping strategies, intra-household relations, rural growth linkages, rural non-farm activity and rural-urban migration. While overlap occur between these arenas, they each tend to bring rather partial insights to bear on the causes, opportunities, effects and policy implications of diversification. Policy areas influence livelihoods of the poor or for diversifying the income earning options of individuals and households in rural areas of Bangladesh. Following are the major policy areas the study has to be considered for identifying the appropriate non-farm livelihood options of the poor:

a. Targeting (safety net support, locational and seasonal incidence of food security),
b. Risk reduction (market failure, transaction cost, political and social instability, lack of rule of laws, poor information, poor infrastructure and so on),
c. Micro-credit, rural services (input supply, machinery repair, etc.),
d. Rural non-farm enterprise (rural small-scale industry, micro-enterprise),
e. Rural towns, infrastructures, rural electrification, education, health, processes (governance, justice, etc.).

It is important to mention that social status and individual decision-making capabilities of women are affected by changing situation of their access to work and income outside home. Gender relations often constrain the patterns of income diversification pursued by the households. Gender aspects thus affect livelihood options, in terms of which income earning opportunities are taken up and which are discarded. It also affects diversification patterns, as manifested in unequal male and female participation rates in different branches of non-farm activities. Considering its importance and extent of vulnerability caused by changed climate, this study will look after these issues.

The livelihoods approach clearly shows that there are a number of ways livelihoods options can be affected and CC is just one of them. Rural households are moving away from natural resource-based livelihoods for many reasons and in many developing countries. This will be discussed in detail in this study.

3.2.3 Linkage Theory

Literature on linkage theory/framework would emphasize the organic link between the agriculture (A) and the rural non-farm sectors (RNF). This should be considered as an important approach for understanding the major issues related to livelihoods options. This approach highlights the interdependence between the agricultural and the RNF sectors and show exactly how these sectors are linked. Haggblade et. al. (2007) mentions four types of linkages. They are:

a. Production linkages: Forward linkages from A to RNF (paddy to rice mill or milk to *Milk Vita/Arong*) and backward linkages (STW repair services, farm equipment)
b. Consumption linkages: Rural farm income spent on RNF output and services.
c. Factor market linkages: Movement of labour and capital between the two sectors
d. Productivity linkages: These are macro linkages transmitted from agriculture to the RNF. For example, lower food prices leading to better nutrition of the labour force employed in RNF.

It is not possible to understand productivity linkages much in the context of this study as it takes an altogether different route. Factor market linkages can be extended to include migration and this will be studied in the context of livelihood options. Other factor market linkages are hard to study. Unfortunately there is hardly any study on Bangladesh that explicitly deals with these linkages. Those available are either outdated or address the issues indirectly.

The general impression is that the main force behind these linkages mainly stems from the agricultural sector. The literature highlights consumption linkage generated in agriculture. In Bangladesh, and perhaps in many other developing

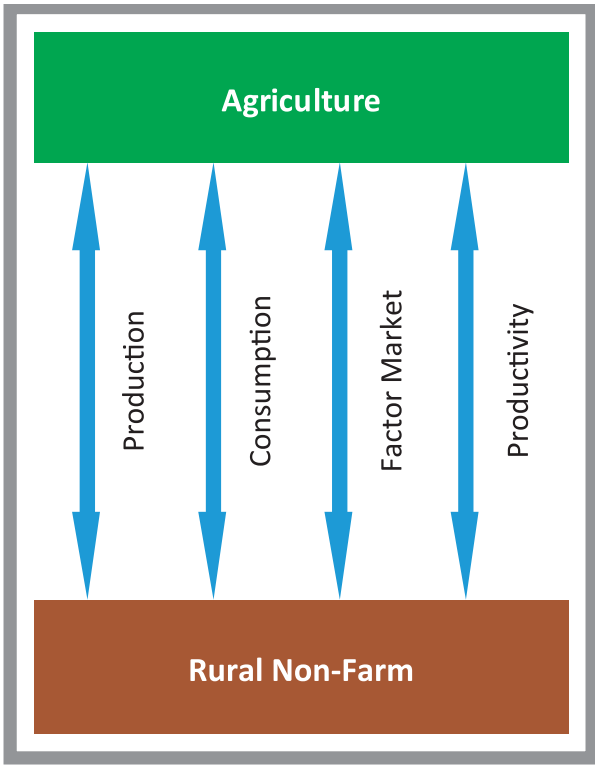


Figure 3-3: The linkage approach

countries, consumption expenditure often partly bypasses the RNF and positively affects the formal/urban sector (Myone TV, mobile phones). In some cases this dominance can be weak or even reverse. In this study it has to be understood where does Bangladesh stand and in which direction it is moving. Toufique and Turton (2002) emphasized that in Bangladesh the agricultural sector is dominant but becoming weak due to developing infrastructure, increase in migration and other factors. Given mechanization of Bangladesh agriculture and use of modern technology, growth of microcredit and development of infrastructure, it is likely that the relationship is becoming weaker and will continue to do so. Toufique and Turton (2002) argued that it would be a mistake to talk in terms of the rural and the urban because the rural is fast changing and there is a continuation instead of a break.

The shrimp sector in the south is a good example. A large number of shrimp farms (a component of the agricultural sector) and a large number of processors/exporters form the production link. The processors are located in urban and semi-urban spheres. A large trading sector is involved in the value chain (from shrimp farm to the packers/exporters). There are 8 districts in the Salinity prone area for this study. Any negative CC impact (i.e. cyclones, tidal bore, storm surge) on the shrimp sector will seriously affect the shrimp exporters. This is a case of production linkages.

Has CC weakened this link between the agricultural and RNF sector? For example, a fisher may take up work in the RNF sector if the waterbody dries up or not enough fish is available because of CC? Or through climate induced migration?

The main benefit of adopting this approach lies in giving credence to the axiomatic belief that a section of the RNF activities is relatively less affected by CC and hence should be promoted. It also shows the dependence of the RNF sector on natural resources. It has to be identified where the link is getting weaker or stronger and why, this would be definitely region/area specific. How these weak links can be identified in a dynamic way?

But this gives rise to other type of problems when livelihoods adaptation of the poor is analyzed. Existing evidence gives a phenomenon of what may be termed as double duality. First, the rich and the poor both diversify their livelihoods. Second, there are low-end (basic rural transport, cheap icecreams) and high end parts of the RNF (SME, nosimon producers). The former is possibly promoted by a combination of poverty reduction strategies of the state and by supply of micro-credit. The households and livelihoods can be thought of being related to in the following way:

Of course, the extreme poor would find it difficult to diversify. Actually, what kinds of poverty are referred to here? Are these extreme poor households who have to be taken care of by social safety nets? If this is the case (evidence on this is required), this study may have to focus on promoting low end RNF where the dominance of the poor can be observed either as wage labourers or as self-employed persons. A focus on the first relationship (rich and high-end RNF) needs poverty justification (trickle down argument). This may add nuance to this study.

This study should also point out policy choices to make RNF growth pro-poor. The participation of the poor in the RNF sector has to be increased. This will involve promotion of health and education on one hand and development of infrastructure on the other.

Viewed from these perspectives, one can ponder where the agricultural and RNF links are already weak or are becoming very weak. Is it weak in the high-end part of the RNF or is it weak in the low-end part. The low end part (particularly the consumption link) may be very much dependent on the agricultural sector, in particular through the consumption link.

One big problem is the location of the link. The link can be conspicuous in urban and peri-urban centres, not in the villages to be studied. In fact, the forces of globalization are changing the scene very fast. There are regions that are increasingly getting rur-urbanized (Reardon et. al. 2007). Rur-urbanized regions are characterized by a tradable growth-motor induced RNF sector with clusters of small/medium enterprises for manufactures, and a preponderance of services.

CHAPTER 4

Methodology and Fieldwork Design

The study used both quantitative and qualitative techniques. Sources of information are also primary as well as secondary.

4.1 Mixture of Quantitative and Qualitative Approaches

In order to assess to identify CC induced risks and the non-farm livelihood options and technologies, the study has relied on both quantitative and qualitative methods. While quantitative approach is representative and helps draw causal inferences, there are some aspects of the projects which the numbers and techniques alone cannot address. The key tools used in this study are:

a. Household survey with structured questionnaire in 18 districts of the working areas of CDMP phase–II. Two districts (Sherpur and Naogaon) outside the CDMP have been selected,
b. Construction of two-period panel data of the same households, with first survey in monsoon and the follow up in the dry season,
c. 20 FGDs with different stakeholders in the study area,
d. 11 case studies of purposively selected households,
e. Collection of information on community through informal group discussions,
f. Key Informants Interview (KII) with different stakeholders including community professionals, local leaders, members of local government, NGOs, etc.,
g. Use of PRA tools to capture the perception the community on the behaviour of CC, potential risks and adaptation measures,
h. Collection of secondary data to compare and triangulate the results from primary data.

A baseline report was prepared on the basis of the results from the questionnaire survey for the wet season alone. This is the final report and is based on all the tools mentioned above. The findings from the dry season survey are incorporated.

4.2 Area Coverage

Bangladesh is prone to many hazards. It is envisaged that the whole of Bangladesh is highly vulnerable to climate change induced risks. Based on experience and literature review, there are about 40 districts which can be characterized as vulnerable for the broad four types of disasters viz. salinity, flood, drought, and Flash flood. Note that these districts are also vulnerable to other climate induced risks and hazards like tidal surges, cyclones, erratic rainfall, fog, heat wave, hail storming, land slide, erosion, sand carpeting, etc.

From the 40 districts of the working area of CDMP-II, 20 districts (Table 6-1) are selected as the study area based on the following criteria:

a. Proportionate number of districts under each of the broad four risk areas – Salinity prone area, flood prone area, Flash flood prone area and drought prone area.
b. Extent of poverty
c. Distribution of districts based on geographical representation

Two districts (Sherpur and Naogaon) were added by the CDMP-II management staff. It has to be mentioned that the list of the districts has been endorsed by CDMP-II.

The districts are selected on the basis of secondary information and literature review (Poverty map of WFP, ICZMP reports, reports of land zoning project, reports on various agro-ecological zones, BCCSAP, BBS), covering all major types of hazards, poverty prone areas, representative distribution, etc.

Poverty mapping data are disaggregated by upazilas. For example, for Munshiganj, Sirajdikhan and Gazaria upazilas are worst (status 3) when compared to the other 4 upazilas of the same district (status 2). That is why 2 numbers (2 and 3) are put. Chronology of the numbers is also important. Number mentioned in the first means more upazilas are under that number (that status). In case of Munshiganj, 4 upazilas are under 2 and 2 upazilas are under 3 poverty status therefore chronology stands at 2, 3.

Table 4-1: The 20 study districts by 4 disaster-prone areas

Salinity-prone area (South)		**Flood prone area (Central-Jamuna)**		**Flash-flood-prone area (North east)**		**Drought-prone area (North-west)**	
Districts	PS*	Districts	PS*	Districts	PS*	Districts	PS*
Satkhira**	5,4	Gaibandha	4	Sunamganj**	3	Naogaon****	3
Khulna	5,4	Sirajganj**	4	Moulvi bazar		Nilphamari	4,5
Bagerhat	5,4	Faridpur**	4,3	Sherpur****	3		
Barguna	5,4	Kurigram	5	Sylhet	1		
Patuakhali	5,4	Jamalpur	5,4				
Noakhali	1,2	Munshiganj	2,3				
Cox's Bazar**	4,5						
Jessore***	5,4						

* *Poverty Status (as per poverty mapping of WFP), % of population below poverty line: 1=10% or less, 2=11%-22%, 3=23%-32%, 4=33%-43% and 5=44% and above*

** *Districts were part of CDMP Phase I.*

*** *Hazards like water logging, siltation may be taken into consideration*

**** *Non CDMP II districts*

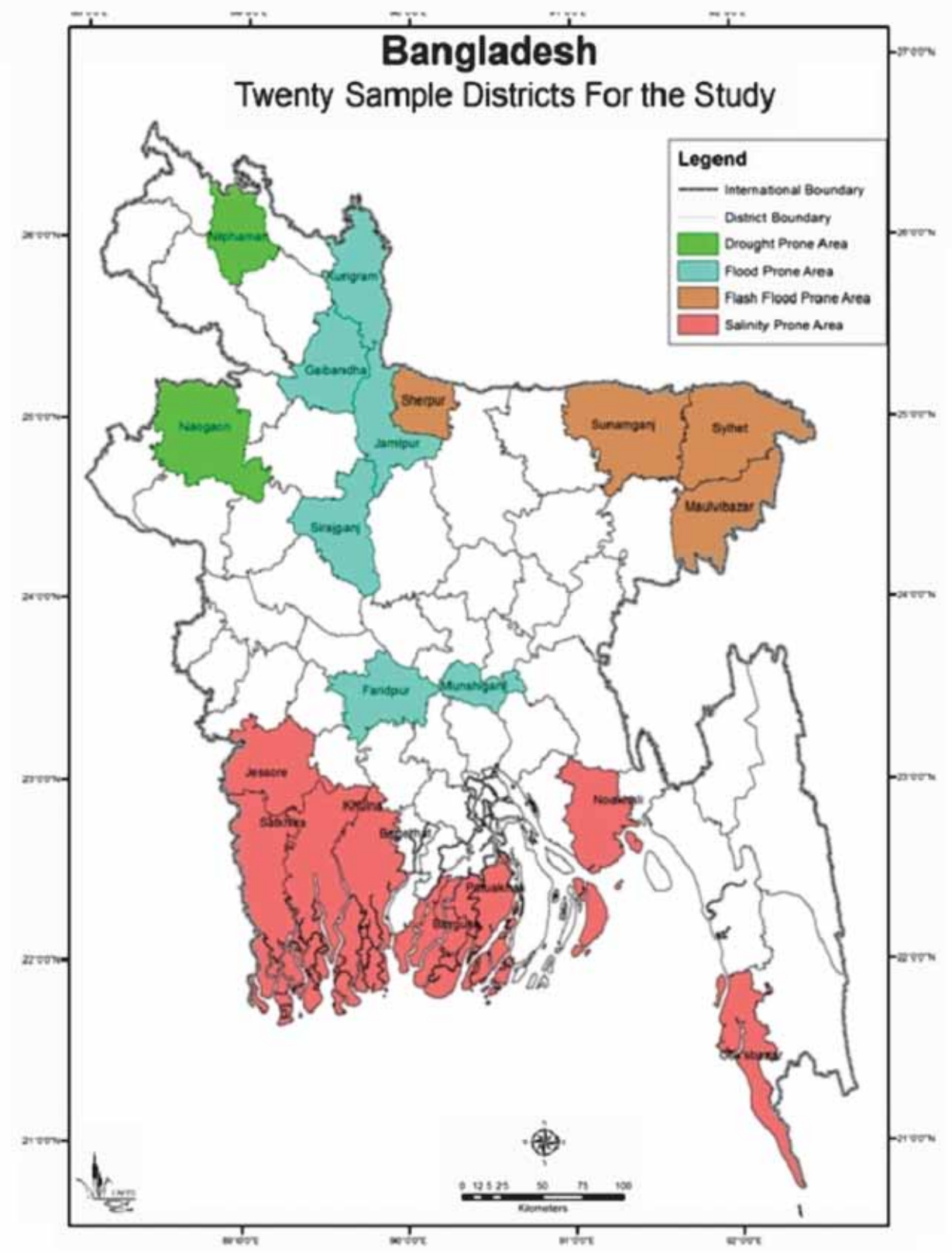


Figure 4-1: The 20 study districts by 4 disaster prone areas

4.3 Survey Design and Sample Size

Multistage probability cluster sampling is considered as an appropriate sampling technique to conduct the seasonal surveys, i.e., dry and wet season of the panel respondents of 20 districts. The purpose of the survey is to identify non-farm adaptation options, technologies and approaches for adaptation.

Using multistage probability cluster sample techniques, the following number of upazilas and households are selected for the study.

Table 4-2: The sample coverage (districts, upazillas and households)

	Sample Size	Remarks
Number of district	20	There are 40 districts of CDMP-II
Number of upazilla	40	There are 160 upazilas in 40 districts. 2 upazilas in each sample districts are selected.
Number of sample village	80	2 villages per upazilla
Number of sample household in each village	27 or 28 [31-33]*	
Number of sample household in each district	111 [127-128]*	
Total Number of sample households	2,220 [2,558]*	

** Figures in brackets are actual numbers. An excess number of households were selected on the assumption that it may not be possible to interview all the households during the repeat survey because of many factors such as migration, death, absence and the like.*

** Figures in brackets are actual numbers. An excess number of households were selected on the assumption that it may not be possible to interview all the households during the repeat survey because of many factors such as migration, death, absence and the like.*

It was initially planned to sample households living below the poverty line because they are the targeted population for the study. This plan was later dropped for the following reasons. It was thought that it could address the main objectives of the study by not limiting ourselves to studying only the poor households. CDMP intended to study non-farm livelihood adaptation approaches and technologies with references to vulnerability and poverty in up to 20 districts and advocate the introduction of risk reduction policy measures. But livelihood options that are available to all households must be known as much as possible. If only the poor households are focused, only a limited number of livelihoods can be then analyzed. That is, the livelihoods that are mainly undertaken by the poor. Studying livelihoods of the non-poor will help to identify the constraints faced by the poor to pursue them. Removing the constraints to those climate-proof livelihoods that are perhaps pursued by the non-poor households can be an important aim of public policy. Besides, whether the non-poor households participate more in climate-proof livelihoods or if they do, what are these livelihoods? What prevents the poor from taking up these livelihoods? Are the poor constrained by lack of human capital or financial capital or both? That the poor and non-poor households pursue different sets of livelihoods is well known, but whether the non-

poor pursue more climate-proof livelihoods, has to be established. How the impact of climate change and coping strategies vary by income groups must also be known.

These considerations led to the suggestion of including both poor and non-poor households for this study to CDMP and this was duly approved.

The original proposal also suggested stratification of the households by occupations. This was proposed to capture all the occupations taken by the poor households. This was also in effect ignored because of the decision to include households irrespective of their poverty status. Since both poor and non-poor households are studied, most of the livelihoods pursued by the households are likely to be covered.

It would not be cost effective and feasible to cover all villages under the sample upazilas. It is necessary to determine the number of villages because the ultimate sampling unit, the households, are located at the lower administrative boundary i.e., the villages. The sample households will be distributed equally in each sample village.

The approach for determining the sample size is now discussed. First, the socio-economic and physiological study covered 20 districts from diverse disaster prone areas. Second, the local administration at the next tier, upazila, in the study areas is also considered. In the multistage sampling methodology two types of formula are used for determining the sample size; number of villages and households (which is the ultimate sampling unit). Before village selection, the number of upazilas selected purposively. Two upazilas from a district were selected. The following rules were used for selecting the upazilas from each district:

a. The upazilas are first ranked in terms of exposure to natural shocks and extent of poverty. Most affected upazilas are selected. Natural shocks ranking was done in consultation with people well informed about the district while poverty ranking was done by using WFP data. The ranking of the upazilas was provided by Center for Natural Resource Studies (CNRS) and the selection of the upazilas was done by authors of the report and the latter did not provide any clue on upazila selection criteria to CNRS,
b. In case of more than two upazilas with similar exposures, the one with higher poverty rates is picked,
c. In case of similar poverty rates, the first odd numbered ones were picked. When even numbered upazilas were only left for selection, the first upazila was picked.

From each upazila, two villages were randomly selected. This resulted in the selection of 80 villages (Table 6-2).

4.4 Sample Frame and Selection of the Households

The normal approach to meeting the probability sampling requirement is to select sample members from a sample frame, that is, a complete list of the relevant population members. For the survey, this will require an up-to-date list of selected settlements of all the sample upazilas and villages included in the study area from which to draw the ultimate sampling unit, households. An up-to-date household profile was not available from any secondary source. A complete census of all the households from the randomly selected villages was conducted. From each village 32 households were randomly selected. The random number was generated from a uniform distribution with the aid of the statistical software STATA.

Detail of the actual administration of the fieldwork is provided in Annexure E (Background detail of the field survey).

4.5 Challenges

The approach and the task were extremely complex and challenging. Households were classified in various dimensions. First of all, they were classified into four disaster prone areas. Within each area they were classified into thee categories, extreme poor, moderate poor and non-poor. Finally, livelihoods were classified into five major groups: a) self-employment in agriculture, b) self-employment in non-agricultural, c) wage labouring in agricultural, d) wage labouring in non-agricultural, and e) service. The issue of migration is also considered. This is therefore an ambitious study. The findings are not always fitting with each other although enough care has been taken to solve the jigsaw puzzle opened up by the data. The approach and methodology used in this study has helped to undertake the study and develop deeper insights.

Some problems that may arise from conducting a repeat survey were anticipated:

a. The temporary/permanent absence of sample household members (panel respondent) during repeat survey.
b. Broken or newly formed households from panel respondent households.
c. Availability of the key respondent in the sample households during repeat survey and selection of alternate respondents with similar characteristics.
d. Availability of relevant information/data at the national level for comparison of historical evolution, trend and scope (availability, reliability, timeliness).

Some additional households (4-5) were selected to resolve the problems associated with these issues.

4.6 Field Work

The process leading to the preparation of a list of sampled households was a significant part of the total fieldwork. It was necessary for enabling the enumerators carry out the interviews. The survey team ensured the quality of the survey through cross checking and triangulation.

Before that a structured questionnaire was developed and the enumerators were given two-day training. Pre-tests were done and the questionnaire was revised to address some problems detected during these tests. This was done for both the wet and dry season surveys.

4.6.1 Briefing the Study

A series of discussions/personal contacts in all the selected study villages were held. The purpose of this exercise was to inform the communities about the objectives of the assignment and the role of the researchers involved in the project. Through these meetings, the queries of the communities/employee could be addressed, the misunderstandings and misconceptions could be resolved and finally the households could be motivated to join the survey.

4.6.2 Analysis Plan

All collected data were entered into a database using Microsoft Access and the data was analysed using STATA.

4.6.3 Qualitative Study

The main information came from the 20 FGDs and 11 case studies conducted during the course of the study (Table 6-3). These FGDs were done towards the end of the study when most of the results from the household surveys were already available. However, some FGDs were done towards the beginning of the study in the flood and saline prone areas. These FGDs were not done in the same villages where the household survey was conducted but they were done in the same upazila and in most cases in the same union. The FGDs were done with an open mind to understand rural livelihoods in a broad sense.

No.	Village	Upazilla	District	Salinity -prone	Flood - prone	Flash-flood-prone	Drought-prone
1	Joykolos	Sunamganj Sadar	Sunamganj			1	
2	Bhabanipur	Tahirpur	Sunamganj			1	
3	Joy Shree Purbo	Dharmopasha	Sunamganj			1	
4	Thongpara	Amtoli	Bargana	1			
5	Gab baria	Amtoli	Bargana	1			
6	Naeber Kachari	Golachipa	Patuakhali	1			
7	Char Biswas	Golachipa	Patuakhali	1			
8	Berpara	Islampur	Jamalpur		1		
9	Uzanpara	Jamalpur Sadar	Jamalpur		1		
10	DariKali Nagar	Jhenaigati	Sherpur		1		
11	Uttar Kanduli	Jhenaigati	Sherpur		1		
12	Southpur	Shoronkhola	Bagerhat	1			
13	Dumuria	Shyamnagar	Satkhira	1			
14	Manikura Utttar Para	Sapahar	Naogaon				1
15	Gunargati	Sirajganj Sadar	Sirajganj		1		
16	South Sundarkhata	Dimla	Nilphamari				1
17	Nij Sundarkhata	Dimla	Nilphamari				1
18	Madhyam Sundarkhata	Dimla	Nilphamari				1
19	Boalmari	Saghata	Gaibanda		1		
20	Sarkarpara	Saghata	Gaibanda		1		
	Total			**6**	**7**	**3**	**4**

Table 4-3: List of FGDs undertaken

Along with the FGDs, 11 case studies were conducted. Several key informant interviews were made. These include local NGO workers, teachers, political leaders, and so on.

CHAPTER 5

Livelihood Strategies and Poverty

5.1 Socio-Economic

5.1.1 Demographic Information

Average age of the household heads is around 44 years, and it does not vary much across the disaster prone areas. About 7% households are female headed, with drought prone area being the lowest and Flash flood prone area being the highest among the areas. It may indicate that incidence of migration is higher for Flash flood prone area than the drought prone area. Average family size and dependency ratio are found to be much higher in Flash flood prone area (5.49) than other areas. While according to household income and expenditure survey (HIES)-2010, the national average family size is 4.5 (BBS, 2010), in Flash flood prone area it is higher by about 1 person in this survey. Dependency ratio of Flash flood prone area (84.23) is also higher than the national average, which is 69.33 (BBS, 2010).

Table 5-1: Demographic information by disaster prone areas (DPAs)

Characteristics	Salinity-prone	Flood-prone	Flash-flood-prone	Drought-prone
Age of Household Head (Average)	44	45	44	43
Female Headed Household	75 (.07)*	50 (.07)	39 (.08)	13 (.05)
Family Size (Average)	4.95	4.75	5.49	4.39
Dependency Ratio	61.56	62.11	84.23	55.12

** Figures in () represent % of female headed households in each area.*

5.1.2 Education

Household heads in drought prone area are more literate than other areas. About 62% of the household heads in drought prone are has some formal schooling (class I and above). This figure is as low as 29% in Flash flood prone area and 41% in flood prone area. This figure is 47% for Salinity prone area. Note that literacy rate of the country is about 58% (BBS, 2010). The four areas can be presented according to the size of each education group in the following way:

Salinity	Sign/read/write > Class I-V > Illiterate > Class IX-SSC> Class VI-VIII > HSC > Degree/Honors > Masters
Flood	Sign/read/write > Illiterate > Class I-V > Class IX-SSC> Class VI-VIII > HSC > Degree/Honors > Masters
Flash-flood	Sign/read/write > Illiterate > Class I-V > > Class VI-VIII >Class IX-SSC > HSC > Degree/Honors > Masters
Drought	Class I-V > Sign/read/write > Illiterate > Class VI-VIII >Class IX-SSC > Degree/Honors >HSC >Masters
Full sample	Sign/read/write > Class I-V > Illiterate > Class IX-SSC> Class VI-VIII > HSC > Degree/Honors > Masters

Interestingly, the order of the education group of the Salinity prone area matches the order of the full sample and in drought prone area group of class I-V is larger than all other groups.

Table 5-2: Levels of education of the household heads by DPAs

Level of education	Salinity-prone	Flood-prone	Flash-flood -prone	Drought-prone
Illiterate	134 (25.09) [13.1]	190 (35.58) [24.77]	169 (31.65) [33.01]	41 (7.68) [16.02]
Can sign/read/write	347 (40.4) [33.92]	261 (30.38) [34.03]	195 (22.7) [38.09]	56 (6.52) [21.88]
Class I-V	261 (44.54) [25.51]	164 (27.99) [21.38]	85 (14.51) [16.6]	76 (12.97) [29.69]
Class VI-VIII	101 (43.91) [9.87]	54 (23.48) [7.04]	36 (15.65) [7.03]	39 (16.96) [15.23]
Class IX-SSC	115 (49.78) [11.24]	67 (29.00) [8.74]	19 (8.23) [3.71]	30 (12.99) [11.72]
HSC	35 (56.45) [3.42]	18 (29.03) [2.35]	5 (8.06) [0.98]	4 (6.45) [1.56]
Degree/Honors	21 (53.85) [2.05]	11 (28.21) [1.43]	1 (2.56) [0.2]	6 (15.38) [2.34]
Masters	9 (60) [0.88]	2 (13.33) [0.26]	1 (6.67) [0.2]	3 (20) [1.17]
Others	0 (0) [0]	0 (0) [0]	1 (50) [0.2]	1 (50) [0.39]
Total	**1,023** **(39.99)** **[100]**	**767** **(29.98)** **[100]**	**512** **(20.02)** **[100]**	256 **(10.01)** **[100]**

**() indicates row % and [] indicates column %.*

5.1.3 Energy and Hygiene

About 71% households in Flash flood prone and drought prone areas have no electricity while in salinity and flood prone area about 63% households do not have electricity. Incidence of the use of solar power is higher in Salinity prone area than others.

Table 5-3: Sources of electricity by DPAs

Sources	Salinity-prone	Flood-prone	Flash-flood-prone	Drought-prone
Grid	254 (24.83)	284 (37.03)	121 (23.63)	66 (25.78)
Solar	90 (8.8)	21 (2.74)	28 (5.47)	8 (3.13)
No Electricity	679 (66.37)	462 (60.23)	363 (70.9)	182 (71.09)
Total	**1,023** **(100)**	**767** **(100)**	**512** **(100)**	**256** **(100)**

**() indicates column %.*

Wood and leaves/hay are the major sources of fuel, which constitute about 87% of the total sources. Wood is the main source of fuel in salinity and Flash flood prone areas while in flood and drought prone areas it is the leaves and hay. There is hardly any use of bio-gas, gas-cylinder, coal or even kerosene.

Table 5-4: Sources of fuel for cooking by DPAs

Sources	Salinity-prone	Flood-prone	Flash-flood-prone	Drought-prone
Gas/cylinder	4 (0.39)	2 (0.26)	0 (0)	0 (0)
Bio-gas	1 (0.1)	1 (0.13)	1 (0.2)	0 (0)
Kerosene	4 (0.39)	1 (0.13)	1 (0.2)	0 (0)
Coal	1 (0.1)	0 (0)	24 (4.69)	1 (0.39)
Wood	656 (64.13)	236 (30.77)	367 (71.68)	85 (33.2)
Cow dung	135 (13.2)	46 (6)	36 (7.03)	19 (7.42)
Leaves/hay	220 (21.51)	438 (57.11)	83 (16.21)	151 (58.98)
Jute-stick/dhaincha	2 (0.2)	43 (5.61)	0 (0)	0 (0)
Total	**1,023** **(100)**	**767** **(100)**	**512** **(100)**	**256** **(100)**

**() indicates column %.*

People use ring slabs (both sealed and not sealed) and kancha toilets more than other types. Incidence of the use of ring slab is higher in Salinity prone area than the other areas. People from flash flood prone area use kancha toilet more and sanitary latrine less than other areas.

Table 5-5: Types of toilet by DPAs

Types	Salinity-prone	Flood-prone	Flash-flood-prone	Drought-prone
Sanitary latrine	65 (6.35)	88 (11.47)	19 (3.71)	31 (12.11)
Ring slab (water sealed)	243 (23.75)	97 (12.65)	32 (6.25)	18 (7.03)
Ring slab (non water sealed)	434 (42.42)	249 (32.46)	160 (31.25)	89 (34.77)
Ordinary pucca	45 (4.4)	47 (6.13)	11 (2.15)	2 (0.78)
Kancha	222 (21.7)	230 (29.99)	236 (46.09)	53 (20.7)
Bush/open space	12 (1.17	56 (7.3)	53 (10.35)	63 (24.61)
Other	2 (0.2)	0 (0)	1 (0.2)	0 (0)
Total	**1,023 (100)**	**767 (100)**	**512 (100)**	**256 (100)**

**() indicates column %.*

5.1.4 Ownership of Livestock

The highest incidence of cattle ownership is in the flood prone area and the lowest in the Salinity prone area. Poultry ownership ranks first, from 36% in the drought prone area to about 50% in the salinity and Flash flood prone area.

Table 5-6: Livestock ownership by DPAs

Types	Salinity-prone	Flood-prone	Flash-flood -prone	Drought -prone	All areas
Cattle	298 (23.43)	297 (38.47)	153 (35.33)	158 (35.83)	906 (31.05)
Buffalo	12 (0.94)	0 (0.00)	5 (1.15)	2 (0.45)	19 (0.65)
Goat/lamb	193 (15.17)	145 (18.78)	50 (11.55)	103 (23.36)	491 (16.83)
Poultry	633 (49.76)	313 (40.54)	216 (49.88)	157 (35.60)	1,319 (45.20)
Others	136 (10.69)	17 (2.20)	9 (2.08)	21 (4.76)	183 (6.27)
Total	**1,272 (100.00)**	**772 (100.00)**	**433 (100.00)**	**441 (100.00)**	**2,918 (100.00)**

5.1.5 Housing

In the saline prone area, most of houses are made of hay wall and shed. Most of the houses in the flash flood prone and drought areas are made of hay wall with tin/tiles shed. Most of the houses in the flood prone area are made of tin wall with tin/tiles shed. Only a negligible number of houses are made from concrete. Hey wall and hey shed houses are most vulnerable and they dominate the saline prone area.

Table 5-7: Type of rooms owned by DPAs

Types	Salinity-prone	Flood-prone	Flash-flood-prone	Drought-prone	All areas
Concrete (wall & roof)	26 (1.72)	3 (0.27)	8 (1.26)	3 (0.89)	40 (1.11)
Concrete wall with tin/tiles shed	116 (7.66)	22 (1.99)	45 (7.06)	37 (10.95)	220 (6.12)
Tin wall with tin/tiles shed	353 (23.32)	542 (48.96)	181 (28.41)	29 (8.58)	1,105 (30.73)
Hay wall with tin/tiles shed	407 (26.88)	354 (31.98)	226 (35.48)	202 (59.76)	1,189 (33.06)
Hay wall with hey shed	485 (32.03)	182 (16.44)	172 (27.00)	66 (19.53)	905 (25.17)
Others	127 (8.39)	4 (0.36)	5 (0.78)	1 (0.30)	137 (3.81)
Total	**1,514 (100.00)**	**1,107 (100.00)**	**637 (100.00)**	**338 (100.00)**	**3,596 (100.00)**

5.1.6 Landownership Patterns

Average size of homestead land varies from 9 to 11 decimals. The drought prone area has the largest average size for homestead garden (29 decimals). It is very similar in other areas, between 13 to 15 decimals. Flash flood prone area has the largest average size of cultivable land, 267 decimals. The lowest is found in the flood prone area, 115 decimals. The drought prone area has a larger average size of cultivable land as compared to the saline and flood prone area. Ponds in the Flash flood area are also the largest on the average (17 decimals). The average size of gher is 96 decimals in the Salinity prone area.

Table 5-8: Types of landownership by DPAs (mean in decimals)

Types	Salinity-prone	Flood-prone	Flash-flood-prone	Drought-prone
Homestead	11.39	9.18	10.93	8.55
Cultivable	124.22	114.75	266.84	174.84
Pond	7.32	12.84	16.65	9.7
Gher	96.13	6	-	-

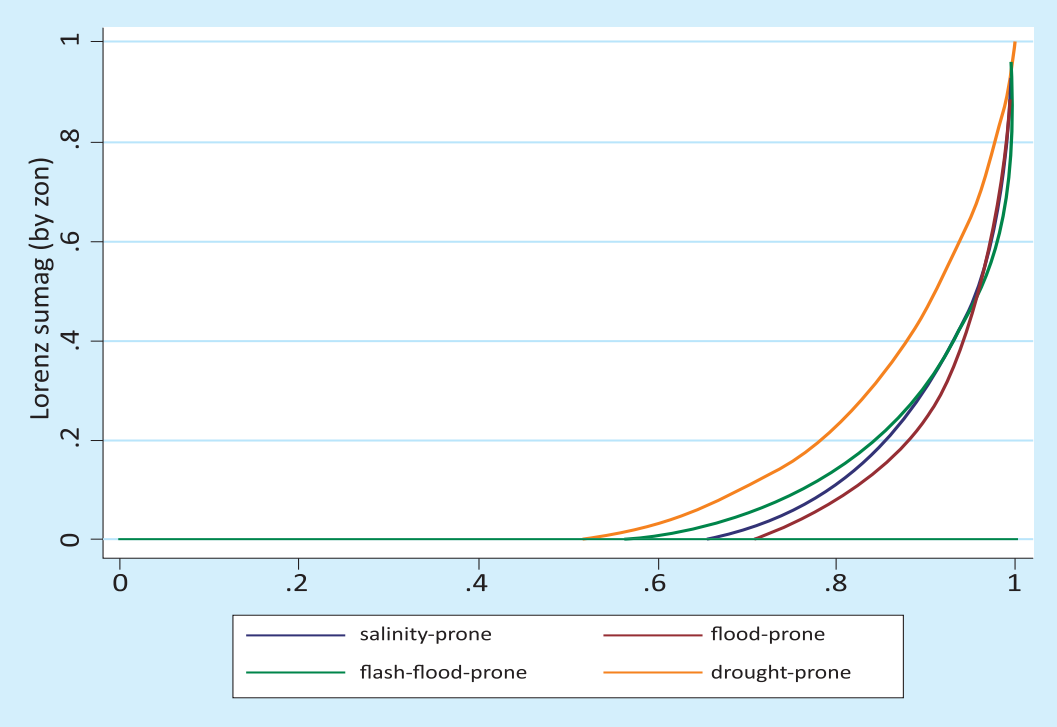


Figure 5-1: Lorenz curve for cultivated land by DPA

Extent of landlessness is highest in the flood prone area and lowest in drought prone area (Table 7-9). About 12% of the households have large or medium cultivable land ownership in flash flood and drought prone areas. This figure is about 4% in salinity and flood prone areas.

Table 5-9: Cultivable landownership by DPAs

	Salinity-prone	Flood -prone	Flash-flood -prone	Drought-prone	All areas
Landless	650 (63.54)	531 (69.23)	279 (54.49)	123 (48.05)	1,583 (61.88)
Marginal (<50 dec.)	138 (13.49)	103 (13.43)	41 (8.01)	30 (11.72)	312 (12.20)
Small (50-249 dec.)	194 (18.96)	106 (13.82)	130 (25.39)	74 (28.91)	504 (19.70)
Medium (250-749 dec.)	35 (3.42)	25 (3.26)	50 (9.77)	26 (10.16)	136 (5.32)
Large (over 750 dec.)	6 (0.59)	2 (0.26)	12 (2.34)	3 (1.17)	23 (0.90)

Table 7-10 shows that inequality in cultivable land is lowest in the drought-prone area. It is highest in the flash-flood area. Distribution of cultivable land is almost the same in salinity area (gini = .58) and flood-prone (gini =.56).

Table 5-10: Gini Coefficient by DPAs for cultivated land

	Salinity-prone	Flood-prone	Flash-flood -prone	Drought-prone
Gini coefficient	.58	.56	.63	.52

5.2 Poverty in Selected Disaster Prone Areas

The expenditure approach was adopted to estimate poverty of the surveyed households.

5.2.1 Constructing Households Monthly Expenditure

Household consumption expenditures are calculated by summing up all food and non-food expenditure except for lumpy expenditure such as expenses on weddings, social and religious programs, dowry and so on.

In order to estimate total consumption expenditure the following criteria has been used:

- All aggregates are estimated at the household level.
- All expenditure converted to monthly.

a. Food Expenditure

Household weekly food expenditure was collected from expenditure on food and food products, betel leaf, betel nut, tobacco, cigarette, firewood and so on. Weekly food expenditures are then converted to monthly food expenditures.

b. Non-food Expenditure

Household non-food expenditure was collected from following seven main components:

- Housing (i.e. house rent, building materials)
- Household operation (i.e. furniture, furnishing, equipment and utensils)
- Transport
- Clothing and footwear
- Education
- Medicine and health care
- Electricity (electricity bill, kerosene, candle, match etc)
- Miscellaneous goods and services

Yearly non-food expenditure is then converted to monthly food expenditure.

c. Poverty Lines and Poverty Measures (CBN)

Poverty lines were estimated using the cost of basic needs (CBN) method, whereby any household with per capita expenditure below a given poverty line is considered as poor. With the CBN method, poverty lines represent the level of per capita expenditure at which the members of a household can be expected to meet their basic needs (comprised of food and non-food consumption). The upper and lower poverty lines are taken from HIES, 2010.

Table 5-11: Poverty lines of HIES-2010 (Tk. per person per month)

Area	Lower poverty line	Upper poverty line
Barisal rural	1,284	1,485
Chittagong rural	1,404	1,687
Dhaka rural	1,276	1,497
Khulna rural	1,192	1,435
Rajshahi rural	1,236	1,487
Sylhet rural	1,240	1,311

Source: BBS (2010)

d. Calculating Poverty Status for the Sample Household

Poverty status of sample household is derived from per capita per month consumption expenditure. In order to calculate per capita per month consumption expenditure, the monthly household consumption expenditure is divided by the family size of that household. Then that per capita per household consumption expenditure is compared with the upper and lower poverty line of HIES, 2010.

After comparing the consumption expenditure, three types of poverty level are determined:

- Extreme poor: The extreme poor households are those households whose per capita expenditure is equal or below the lower poverty line.
- Moderate poor: The moderate poor households are those households whose per capita expenditure is above lower poverty line but below upper poverty line.
- Non-poor: The non-poor households are those households whose per capita expenditure is above upper poverty line.

Table 5-12: Classification of poverty

Poverty status	Definition
Extreme poor	Households with per capita expenditure equal to the lower poverty line.
Moderate poor	Households with per capita expenditure above lower poverty line but below upper poverty line.
Non-poor	Households with per capita expenditure above upper poverty line.

In this section the incidence of poverty amongst the sample households is estimated. In the sample about 39% of the households are poor, including both extreme (25%) and moderate (14%). About one-fourth of the sample households are found to be extreme poor (Table 7-13). Among the households who lie below the poverty line, a bit less than two-thirds are extreme poor. The incidence of poverty hardly changes with the seasons. In the dry season 39.45% households live below poverty line while in the wet season the incidence of poverty is 40.32. This meagre increase in poverty in the dry season is due to the slightly higher increase of the number of extreme poor in this season.

Note that, Household Income and Expenditure Survey (BBS, 2010) shows that at the national level, 31.5% of the households are below the poverty line with 35.2% in rural areas (upper line). Country wide 17.6% household is below the lower poverty line (extreme poor), which is 21.1% in the rural areas. Therefore, the sample households are poorer than the national average and this is expected. By design only the disaster prone areas where the concentration of the poor is high were selected.

Table 5-13: Poverty status of rural households

Poverty status	Wet season		Dry season	
	N	%	N	%
Extreme poor	640	25.02	664	25.97
Moderate poor	369	14.43	367	14.35
Non-poor	1,549	60.56	1,526	59.68
Total *	**2,558**	**100**	**2,557**	**100**

**One household could not be traced during the dry season survey.*

Table 7-14 shows that incidence of poverty varies significantly across the sample households of six divisions. It ranges from about 26% in Sylhet to about 47% in Rajshahi in the wet season and from 25% (Sylhet) to 56% (Chittagong) in the dry season. The households become poorer in dry season in Chittagong division and in wet season in Barisal division. No significant difference in the incidence of poverty between the wet and dry seasons in other four divisions was found. The share of extreme poor does not vary across divisions as much as the share of the poor in wet season. It varies from 21% (Sylhet) to about 31% (Chittagong). But in the dry season, the incidence of extreme poverty varies significantly – from 16% (Barisal) to 40% (Chittagong). Thus the seasonal variation in poverty by administrative divisions is more pronounced in the case of extreme poor households

Table 5-14: Poverty status of rural households by division

Division	Wet season				Dry season			
	Poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Khulna	131 (25.64)	109 (21.33)	271 (53.03)	511 (100)	143 (27.98)	103 (20.16)	265 (51.86)	511 (100)
Barisal	66 (25.78)	21 (8.2)	169 (66.02)	256 (100)	41 (16.02)	26 (10.16)	189 (73.83)	256 (100)
Chittagong	79 (30.86)	31 (12.11)	146 (57.03)	256 (100)	103 (40.23)	41 (16.02)	112 (43.75)	256 (100)
Rajshahi	177 (27.66)	125 (19.53)	338 (52.81)	640 (100)	184 (28.79)	113 (17.68)	342 (53.52)	640 (100)
Dhaka	105 (20.55)	64 (12.52)	342 (66.93)	511 (100)	114 (22.31)	66 (12.92)	331 (64.77)	511 (100)
Sylhet	82 (21.35)	19 (4.95)	283 (73.70)	384 (100)	79 (20.57)	18 (4.69)	287 (74.74)	384 (100)

**() indicates row %.*

Table 7-15 (see Annexure F) also shows that Incidence of poverty varies widely across the households of the 20 districts. It ranges from about 70% (Satkhira) to about 14% (Sherpur) in the dry season. In the wet season it ranges from 71% in Noakhali to 11% in Sherpur. Note that while Sherpur continues to have the least proportion of poor households, whereas the position of Satkhira is taken up by Noakhali. In fact there has been a drastic increase in poverty in Noakhali. It increased from 47% in the wet season to 71% in the dry season. No intuitive explanation can be provided with the information at hand. However, in most cases the changes in levels of poverty have been insignificant and may be attributed to measurement errors.

Table 7-16 (see Annexure F) shows that the variation in the incidence of poverty can also be seen across upazilas. The unexpected results for Noakhali and Sirajganj are explained by huge seasonal differences found in the upazilas of Noakhali, Hatia and Companiganj, and those of the upazilas of Sirajganj (the Sadar upazila and Chauhali). This local level variation in some districts cannot be explained but it has been already observed that poverty changes are insignificant at the aggregate level.

Table 7-17 shows that the variations in the incidence of poverty across the households of the four areas are very similar to that of divisions in the two seasons. Flash flood prone area (23% poor) has the least proportion of poor households and the flood prone area (47% poor) is the poorest in both seasons. Areas with higher poverty rates also have higher incidence of extreme poverty. There is some evidence that shows that flood prone areas have slightly poorer households in the dry season (49% as against 47%). Poverty increases amongst the extreme (29% to 31%) poor households whereas the proportion of moderate poor households remains the same at 18%. As a result there is some marginal decline in the number of non-poor households in the dry period (that is, an increase in the number of poor households). However, there is little decrease in poverty in the flash flood area in the dry period. In the drought prone area poverty slightly declines in the dry period. This can be counter intuitive. However, in mono-crop drought prone area, the rate of migration is quite high (Table 8-1) and remittances can help to smooth consumption in the dry period. Again this is the result of normal period (no major incidence of disaster) and a complex set of factors may be at work. The overall differences in poverty levels remain marginal.

Table 5-17: Poverty Status of rural households by DPA

Areas	Wet season				Dry season			
	Extreme poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Salinity-prone (H)	276 26.98	161 15.74	586 57.28	1,023 100	287 28.05	170 16.62	566 55.33	1,023 100
Flood-prone (H)	222 28.94	138 17.99	407 53.06	767 100	238 31.07	139 18.15	389 50.78	766 100
Flash-flood-prone (L)	90 17.58	29 5.66	393 76.76	512 100	84 16.41	27 5.27	401 78.32	512 100
Drought-prone (L)	52 20.31	41 16.02	163 63.67	256 100	55 21.48	31 12.11	170 66.41	256 100

One main reason for less variation in poverty across season may also be due to the method of poverty measurement used in this study. The expenditure approach was used. Households always make an attempt to maintain a stable level of consumption expenditure. During shocks they try to maintain consumption by drawing on savings or from borrowing. Microcredit also helps to smooth consumption (Osmani and Sen, 2011). Given the short span of the period between the two seasons, this may explain why in the aggregate poverty changes are marginal.

5.3 Livelihoods Structures

In this section the nature and structure of livelihoods pursued by the surveyed households is analyzed. Livelihoods have been classified in to following five categories:

a. Self-employment in agricultural,
b. Self-employment in non-agricultural,
c. Wage labour in agricultural,
d. Wage labour in non-agricultural, and
e. Services.

The first, second and third livelihoods pursued by the households have also been analyzed. These are ranked in terms of their share to total family income. As will be seen, there are variations and similarities in the livelihoods pursued by the households in the four disaster prone areas and in dry and wet seasons.

5.3.1 Occupation Pattern of the Households

In terms of main occupation, all the disaster prone areas but the Flash flood area shows the same pattern (Table 7-18):

Self-employed in Agri > Self-employed in Non-Agri > Agri Labour > Non-Agri Labour > Service

In the flash flood area, there is proportionately more labour involved in the non-agricultural sector (15.94%) as compared to the agricultural sector (12.28%). However, when only the top two occupations are considered, all the areas show the same pattern: self-employment in agricultural ranks first, followed by self employment in non-agricultural.

Table 5-18: Main occupations of the household members by DPA

Main occupation	Salinity	Flood	F. flood	Drought	All areas
Self-employed agri	592 (44.68)	345 (39.66)	357 (52.19)	147 (44.14)	1,441 (44.86)
Self-employed non-agri	309 (23.32)	198 (22.76)	112 (16.37)	75 (22.52)	694 (21.61)
Agri labour	187 (14.11)	150 (17.24)	84 (12.28)	63 (18.92)	484 (15.07)
Non-agri labour	154 (11.62)	112 (12.87)	109 (15.94)	26 (7.81)	401 (12.48)
Services	83 (6.26)	65 (7.47)	22 (3.22)	22 (6.61)	192 (5.98)
Total	**1,325 (100)**	**870 (100)**	**684 (100)**	**333 (100)**	**3,212 (100)**

In terms of secondary occupations, the disaster prone areas show different patterns. Agriculture continues to be the dominant occupation (Table 7-19). This indicates that most of the households are more dependent on the agricultural sector (either as farmers or as agricultural labourers) as a secondary source of income than as a primary source. Agricultural

labour takes the second place in all the areas except for the drought area where self-employment in the non-agricultural sector takes up the second position. This is higher than the percentage of labour involved either in the agricultural sector or in the non-agricultural sector.

In terms of tertiary occupations, most of the households are involved in the agricultural sector as either self-employed or wage labourers.

Involvement of the households in the service sector is very low, around 3-7% as a main occupation.
Most of the household members are self-employed, either in the agricultural sector or in the non-agricultural sector.

Table 5-19: Secondary occupations of the household members by DPA

Secondary occupation	Salinity	Flood	F. flood	Drought	All areas
Self-employed agri	1,049 (73.1)	545 (71.81)	500 (73.64)	303 (76.9)	2,397 (73.37)
Self-employed non-agri	112 (7.8)	71 (9.35)	47 (6.92)	40 (10.15)	270 (8.26)
Labour in agricultural	144 (10.03)	101 (13.31)	94 (13.84)	30 (7.61)	369 (11.29)
Labour in non-agricultural	122 (8.5)	38 (5.01)	35 (5.15)	18 (4.57)	213 (6.52)
Service	8 (0.56)	4 (0.53)	3 (0.44)	3 (0.76)	18 (0.55)
Total	**1,435 (100)**	**759 (100)**	**679 (100)**	**394 (100)**	**3,267 (100)**

Table 5-20: Tertiary occupations of the household members by DPA

Tertiary occupation	Salinity	Flood	F. Flood	Drought	All Areas
Self-employed agricultural	284 (79.78)	163 (77.62)	93 (68.89)	116 (84.67)	656 (78.28)
Self-employed non-agricultaral	24 (6.74)	14 (6.67)	9 (6.67)	6 (4.38)	53 (6.32)
Labour in agricultural	16 (4.49)	18 (8.57)	19 (14.07)	14 (10.22)	67 (8)
Labour in non-agricultural	32 (8.99)	15 (7.14)	14 (10.37)	1 (0.73)	62 (7.4)
Total	**356 (100)**	**210 (100)**	**135 (100)**	**137 (100)**	**838 (100)**

Most of the household members are self-employed, either in the agricultural sector or in the non-agricultural sector.

Involvement of the households in the non-agricultural sector as a labour is very low. Households are employed more in the agricultural sector as an agricultural worker than as a worker in the non-agricultural sector. This may indicate several things: (i) enterprises characterized by self-employment in non-agricultural sector do not hire much labour, (ii) very few labour intensive non-agricultural activities exist, (iii) higher incidence of self-employment in the non-agricultural sector may represent involvement of households in low-skill, low productivity activities. This will be shown in Section 9.

Table 7-21, based on Table 7-18, Table 7-19, and Table 7-20, reclassifies the livelihoods into those based on agricultural (farming and wage labour) and non-agricultural (the rest).

Table 5-21: Agri and non-agri livelihoods by DPA (%)

	Occupations		Flood	F. flood	Drought	All areas
Main occupation	A-based livelihoods	0.59	0.57	0.64	0.63	0.60
	NA-based livelihoods	0.41	0.43	0.36	0.37	0.40
Secondary occupation	A-based livelihoods	0.83	0.85	0.87	0.85	0.85
	NA-based livelihoods	0.17	0.15	0.13	0.15	0.15
Tertiary occupation	A -based livelihoods	0.84	0 .86	0.83	0.95	0.86
	NA-based livelihoods	0.16	0.14	0.17	0.05	0.14

A- Agri; NA- Non-agri

A very similar pattern of livelihoods in all the regions can be observed. Dependence on agriculture is less in terms of main occupation. Dependence on agriculture increases sharply in secondary and tertiary occupations. It goes up to as high as 95% in the drought prone areas as tertiary occupation. Tertiary occupations are slightly more dependent on agricultural livelihoods as compared to the secondary occupations. Non-agricultural based livelihoods are observed more as main occupation but it ranks after agricultural occupations.

Dependence on the agricultural sector can be seen to increase as secondary and tertiary occupations. This indicates that for a large number of households, the non-agricultural sector provides the primary source of income. But when all livelihoods pursued by all the members of the surveyed households are considered, it is found that about a fourth of them are non-agricultural livelihoods. Thus there is a room for increasing the involvement of the households in the non-agricultural sector.

Table 7-22 (see Annexure F) presents the distribution of all livelihoods irrespective of whether they are pursued as primary or secondary or tertiary activity by dry and wet seasons.

If livelihoods are considered, it is observed that about 23% of them are involved with non-agricultural livelihoods in the wet season irrespective of whether they are primary, secondary or tertiary. The disaster prone areas do not vary much in terms of proportion of occupations observed in the agricultural and non-agricultural sectors. non-agricultural livelihoods are lowest in the drought prone area (19%), and highest in flood and Salinity prone areas (about 24%).

In the dry season, the proportion of households involved in the non-agricultural sector increases to around 29%. Thus more households are involved in the non-agricultural sector in the aggregate in the dry season as compared to the wet season. In the salinity prone area, this proportion increases from 24% to 29%, in the flood prone area from 24% to 30%, in the flash flood prone area from 22% to 30% and in the drought prone area from 19% to 25%.

Self-employment in the non-agricultural sector ranks second amongst all areas except for in the Flash flood area. In the Flash flood area the second position is taken by agricultural labour. This is true for both seasons.
It has been observed that involvement in the non-agricultural sector is primarily involvement in self-employed enterprises. These are likely to be low skill, low technology enterprises.

When the top two occupations are considered, in terms of involvement in the main occupation, all the areas show the same pattern: self-employment in agricultural ranks first (61% in all the areas), followed by self employment in non-agricultural (14%). This means that most the household members (75%) are self-employed, either in the agricultural sector or in the non-agricultural sector in the wet season. In the dry season, self employment activities decrease to 69%. Wage employment increases both in the agricultural sector (from 13% to 16%) as well as in the non-agricultural sector (from 9% to 12%).

Involvement of the households in the service sector is very low, around 3% in the wet season and 4% in the dry season.

Involvement of households in the non-agricultural sector as wage labourers is very low in both seasons. Irrespective of the main, secondary or tertiary occupations, the households are, as wage labourers, involved more in the agricultural sector than in the non-agricultural sector. Involvement of the households in the non-agricultural sector as wage labourers is low. This may indicate several things: (i) enterprises characterized by self-employment in non-agricultural sector do not hire much labour, (ii) very few labour intensive non-agricultural activities exist, (iii) higher incidence of self-employment in the non-agricultural sector may represent involvement of households in low-skill, low productivity activities. These are substantiated in Section 9.

5.4 Livelihoods and Poverty

So far the structure of livelihoods in the four disaster prone areas in two seasons, wet and dry is explained. In this section an attempt will be made to find out who are performing what type of livelihoods. To be specific, an attempt will be made to link up livelihoods with poverty. What are the livelihoods taken up by the poor and the non-poor? The overall aggregate picture will be first investigated by looking into all the areas. Then livelihoods and poverty in each area will be analyzed separately.

5.4.1 Livelihoods and Poverty: All Areas

Table 7-23 provides information on the broad category of livelihoods performed by all the members of the households differentiated in terms of their poverty situation.

The incidence of poverty is highest amongst the agricultural labourers. As high as 61% of the wage labourers are poor in the wet season, 40% of them are extremely poor. This proportion remains the same in the dry season although the incidence of extreme poverty increases slightly by two percent points in the dry season. In fact, as will be seen later, in each area the incidence of poverty is highest amongst the households who earn majority of their income from agricultural labouring. Agricultural labouring is usually the second major livelihoods pursued by the extreme poor households. In the wet season, the extent of poverty of the poor households falls down immediately to about 28% with respect to those involved in self-employment in agricultural and to about 40% with respect to wage labouring households in the non-agricultural sector. What is interesting here is that though highest poverty is observed among the agricultural workers, some non-poor households also work as agricultural labourers. Therefore, it is important to identify not only the livelihoods but also the agents who perform the livelihoods for promoting any climate-resilient livelihoods because there are many occupations that are pursued by both.

As can be seen from Table 7-23, more than half of the non-poor households are involved in agricultural in the wet season. This falls down to 28% in the dry season. It is interesting to note that the extreme and moderate poor households are also involved in farming and very significantly. Farming ranks first for both the marginal and moderate poor households. It is about a third for the extreme poor and 39% for the moderate poor households.

The contrast between the non-poor and the poor households becomes apparent in the case of wage labour based livelihoods in the agricultural sector. While only 9% of the non-poor households are involved in the agricultural sector

Table 5-23: Poverty status and livelihoods (all areas)

Occupation Categories	Wet season				Dry season			
	Extreme Poor	Moderate Poor	Non Poor	All groups	Extreme Poor	Moderate Poor	Non Poor	All groups
Self-employed agri	226 (32.15) [15.72]	179 (39.17) [12.45]	1,033 (50.54) [71.84]	1,438 (44.88) [100.00]	128 (19.36) [21.99]	76 (20.94) [13.06]	378 (27.81 [64.95]	582 (24.42) [100]
Self-employed non-Agr	160 (22.76) [23.15]	106 (23.19) [15.34]	425 (20.79) [61.51	691 (21.57) [100.00]	175 (26.48) [25.33]	103 (28.37) [14.91]	413 (30.39) [59.77]	691 (29) [100]
Agri labour	192 (27.31) [39.67]	104 (22.76) [21.49]	188 (9.20) [38.84]	484 (15.11) [100.00]	209 (31.62) [41.97]	95 (26.17) [19.08]	194 (14.28) [38.96]	498 (20.9) [100]
Non-agri labour	106 (15.08) [26.57]	52 (11.38) [13.03]	241 (11.79) [60.40]	399 (12.45) [100.00]	121 (18.31) [29.09]	65 (17.91) [15.63]	230 (16.92) [55.29]	416 (17.46) [100]
Services	19 (2.70) [9.90]	16 (3.50) [8.33]	157 (7.68) [81.77]	192 (5.99) [100.00]	28 (4.24) [14.29]	24 (6.61) [12.24]	144 (10.6) [73.47]	196 (8.22) [100]
All	703 (100.00) [21.94]	457 (100.00) [14.26]	2,044 (100.00) [63.80]	3204 (100.00) [100.00]	661 (100) [27.74]	363 (100) [15.23]	1,359 (100) [57.03]	2,383 (100) [100]

Note: Figures in () are column and in [] row %s

as wage labourers in the wet season, 27% of the extreme poor households and 23% of the moderate poor households work as farm labourers. What this means is that the dependence of the poor households on agriculture (farming and agricultural labouring) is at least as high as the dependence of the non-poor households. 59% of non-poor households and 60% of the extreme poor households are dependent on agriculture either as farmers or as agricultural wage labourers in the wet season. It is the moderate poor households who are most dependent (62%) on agriculture (as farmers and wage labourers). The non-poor households are more involved in self-employment in the non-agricultural sector in the dry season and less in the agricultural sector. This is also true for the extreme and moderate poor households.

The non-poor households are also involved in the service sector (8%). This is done least by the extreme and moderate poor households (3% or less).

The difference between the households appears to be marginal in terms of their involvement in the non-agricultural sector either as a worker or as a proprietor (self-employed). While 15% of the non-poor households work as non-agricultural workers, the corresponding figure for the moderate poor household is very comparable – 11% in the wet season. Their involvement in this sector increases in the dry season. In fact, the participation of the extreme poor households as workers in the non-agricultural sector is the highest, 15%.

Thus participation in the agricultural sector in the dry season declines for all types of households but it declines more for the non-poor households. In a similar vein, the participation of all types of households except for the non-poor households in the non-agricultural sector increases in the dry season. Thus dry season is characterized by more involvement of the households in the non-agricultural sector.
In a similar vein, the extreme and moderate poor households are equally involved (23%) in the non-agricultural sector as self-employed proprietors in the wet season. Their participation in the same sector increases slightly in the dry season. In comparison, 21% of the non-poor households are involved in the non-agricultural sector as self-employed in the wet

season and it increases to 30% in the dry season. If the service sector is ignored and involvement of the households in the non-agricultural sector is defined to include wage labour and proprietor in the non-agricultural sector, the moderate poor households are as involved in the non-agricultural sector as the non-poor (34%) in the wet season. The extreme poor households are most involved in the non-agricultural sector (38%) in the dry season. What makes the difference between the rich and poor households is the service sector. Otherwise, in terms of incidence, the participation of the poor and non-poor households in the agricultural sector (farmers and wage labourers) as well as in the non-agricultural sector (proprietor and workers) is very much comparable. Does it mean that the poor and the non-poor households perform the same kind of activities? To answer this, livelihoods at the detail level have to be analyzed.

There is hardly any difference in the poverty status of the self-employed livelihoods in the non-agricultural between the two seasons. That is a poor rickshaw puller in wet season is very unlikely to become a non-poor in dry season. There is hardly any change in occupation in the self-employment in the non-agricultural sector from wet to dry season in this case.

Forty per cent of the extreme poor households and 35% of the moderate poor households are involved with rickshaws, vans or *nosimons* (Table 7-24; see Annexure F) in the wet season and at a similar rate also in the dry season. Only 20% of the non-poor households have taken up this occupation in the dry season. The second largest occupation taken up by the non-poor households is trading in fish, milk or other agricultural commodities. This represents 22% as compared to 13% by the extreme poor and 14% by the moderate poor. The third largest occupation undertaken by the non-poor is grocery shop business. While 8% of the non-poor households are grocery shop owners, only 4% of the extreme poor and 6% of the moderate poor are grocery shop owners. Some profitable occupations are not taken up by the poor at all. For example, the poor are not observed as being the proprietors of a cloth store or an electronic shop or hardware shops. Thus though the participation of the poor and the non-poor are of similar magnitude in the self-employment in the non-agricultural sector enterprises, they do different things. While the poor are involved with basic transport vehicles such as rickshaws, the non-poor are involved in trading in agricultural commodities and other profitable businesses.

The nature of involvement of the households as workers in the non-agricultural sector is presented in Table 7-25.

As in self-employed livelihood, wage based livelihoods in non-agricultural also sees insignificant change from wet to dry season. A poor wage based worker in non-agricultural in wet season is likely to remain poor in dry season too. Therefore the findings from the wet season have to be referred to.

Irrespective of poverty status, the highest involvement is in the construction sector. For the non-poor, the second largest involvement is in the coal, sand, and stone mining sector. While 22% of the non-poor households are involved in this activity, the participation of the extreme poor is 9% and moderate poor by 6%. While the poor are heavily involved in earth work (30-31%), only 13% of the non-poor are involved here. Also, 11% of the non-poor households are employed in mills and workshops. Since information on the detail nature of the work involved and the wages received in these activities is not available, it is not possible to make any reliable comparisons. But wages can be expected to be higher in activities where the non-poor participate (say in the mills and workshops or in coal, sand and stone mining). These activities also require higher skills.

Food security status of the households in all areas is presented in Table 7-26. Incidence of hunger is more acute in wet season than the dry season. The number and share of households having meal twice a day or less than two times are significantly higher for the wet season. In the last four weeks before the interview, about 180 households, which is about 7%, had food two times or less a day in the wet season. The corresponding number of households and percentage for the dry season are about 107 and 4%.

Among the hardcore poor, lot of seasonal poverty exists in monga prone, river erosion, flood areas, haor-baor, and char areas in Bangladesh. In these areas poor people remain unemployed almost 3 months from September to November and 2 months from March to April, totalling 5 months in a year. These hard-core poor people are leading precarious

Table 5-25: Wage-based livelihoods in the non-agricultural sector (all areas)

Main occupation	Wet season				Dry season			
	Extreme poor	Moderate poor	Non poor	Total	Extreme poor	Moderate poor	Non poor	Total
Worker-construction	34 (32.08)	16 (30.77)	69 (28.63)	119 (29.82)	38 (31.40)	24 (36.92)	55 (23.91)	117 (28.13)
Earth worker (general)	32 (30.19)	16 (30.77)	32 (13.28)	80 (20.05)	34 (28.10)	13 (20.00)	36 (15.65)	83 (19.95)
Earth worker (food/pay)	2 (1.89)	5 (9.62)	2 (0.83)	9 (2.26)	8 (6.61)	3 (4.62)	0 (0.00)	11 (2.64)
Earth worker (40/100)[1]	3 (2.83)	0 (0.00)	0 (0.00)	3 (0.75)	4 (2.48)	0 (0.00)	0 (0.00)	4 (0.96)
Worker-transport	9 (8.49)	6 (11.54)	33 (13.69)	48 (12.03)	8 (6.61)	9 (13.85)	31 (13.48)	48 (11.54)
Coal/sand/stone mining	10 (9.43)	3 (5.77)	53 (21.99)	66 (16.54)	9 (7.44)	3 (4.62)	56 (24.35)	68 (16.35)
Chaial (works with cane/bamboo)	1 (0.94)	0 (0.00)	3 (1.24)	4 (1)	1 (0.83)	0 (0.00)	2 (0.87)	3 (0.72)
Worker-brickfield	1 (0.94)	2 (3.85)	3 (1.24)	6 (1.50)	3 (2.48)	3 (4.62)	2 (0.87)	8 (1.92)
Worker-rice mill	0 (0.00)	0 (0.00)	3 (1.24)	3 (0.75)	1 (0.83)	0 (0.00)	1 (0.43)	2 (0.48)
Worker-mill/workshop	4 (3.77)	1 (1.92)	26 (10.79)	31 (7.77)	5 (4.13)	2 (3.08)	23 (10.00)	30 (7.21)
Worker-fish drying	-	-	-	-	0 (0.00)	0 (0.00)	1 (0.43)	1 (0.24)
Worker-others	10 (9.43)	3 (5.77)	18 (7.05)	32 (7.52)	11 (9.09)	8 (12.31)	22 (9.57)	41 (9.86)
Total	106 (100)	52 (100)	241 (100)	399 (100)	121 (100)	65 (100)	230 (100)	416 (100)

**Column %s are in ().*

Table 5-26: Food security status across seasons (all areas)

Code	Wet season				Dry season			
	Weak 1	Weak 2	Weak 3	Weak 4	Weak 1	Weak 2	Weak 3	Weak 4
Less than two times	13 (0.51)	15 (0.59)	13 (0.51)	13 (0.51)	1 (0.04)	4 (0.16)	5 (0.20)	5 (0.20)
Two times	168 (6.57)	166 (6.49)	168 (6.57)	168 (6.57)	105 (4.11)	98 (3.83)	98 (3.83)	113 (4.42)
Three times but insufficient	1273 (49.77)	1268 (49.57)	1271 (49.69)	1273 (49.77)	1342 (52.48)	1340 (52.41)	1339 (52.37)	1334 (52.17)
Three times and sufficient	1104 (43.16)	1109 (43.35)	1106 (43.24)	1104 (43.16)	1109 (43.37)	1115 (43.61)	1115 (43.61)	1105 (43.21)

lives because of their unemployment as well as recent food price inflation. For that reason, "40-Day" and "100-Day" Employment Generation Programme has started for the rural extreme poor to create employment for unemployed people.

5.4.2 Livelihoods and Poverty: Salinity prone Area

As pointed out already, the highest incidence of poverty in the Salinity prone area is found amongst the agricultural labour households (Table 7-27). As high as 61% of the households pursuing agricultural labouring is either poor or extreme poor. More than half of those involved as wage labourer in the non-agricultural sector are also poor. About 41% of the households who own non-agricultural enterprises are also poor.

Irrespective of poverty status, a clear pattern of involvement of the households in various broad livelihood activities can be observed in the saline prone area in both seasons. The pattern is as follows:

Self-employment in the agricultural sector > Self-employment in the non-agricultural sector > Agricultural wage labouring > Non-agricultural labour > Service

Only 9% of the non-poor households are agricultural workers in the wet season. The non-poor and moderately poor are almost equally involved in the agricultural sector as farmers or workers (about 60-61%) in the wet season. This drops to around 48-50% but remains comparable. The participation of the extreme poor is similar, 56% in the wet season but falls to 46% in the dry season.

The moderate and non-poor are equally involved in self-employed non-farm enterprises (22-23% of these households) and the participation in this sector by the extreme poor is slightly higher, 26% in the wet season. Participation of all types of households in non-agricultural enterprises increases slightly in the dry season. It is quite pronounced for the moderate poor, an increase from 22% in the wet season to 31% in the dry season.

Table 5-27: Poverty status and livelihoods (salinity-prone area)

Occupation category	Wet season				Dry season			
	Extreme poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Self-employed agri	108 (33.54) [18.27]	87 (39.91) [14.72]	396 (50.51) [67.01]	591 (44.64) [100]	69 (22.48) [21.43]	42 (22.04) [13.04]	211 (37.08) [65.53]	322 (30.26) [100]
Self-employed non-agri	79 (25.57) [24.53]	49 (22.48) [15.86]	181 (23.09) [58.58]	309 (23.34) [100]	84 (27.36) [27.81]	59 (31.38) [19.54]	159 (27.94) [52.65]	302 (28.38) [100]
Agri labour	72 (22.36) [38.50]	43 (19.72) [22.99]	72 (9.18) [38.50]	187 (14.12) [100]	73 (23.78) [37.82]	48 (25.53) [24-87]	72 (12.65) [37.31]	197 (18.14) [100]
Non-agri labour	51 (15.84) [33.12]	30 (13.76) [19.48]	73 (9.31) [47.40]	154 (11.63) [100]	60 (19.54) [37.04]	28 (14.89) [17.28]	74 (13.01) [45.68]	162 (15.23) [100]
Services	12 (3.73) [14.46]	9 (4.13) [10.84]	62 (7.91) [74.70]	83 (6.27) [100]	21 (6.84) [24.71]	11 (5.85) [12.94]	53 (9.31) [62.35]	85 (7.99) [100]
Total	**322 (100) [24.32]**	**218 (100) [16.47]**	**784 (100) [59.21]**	**1,324 (100) [100]**	**307 (100) [28.85]**	**188 (100) [17.67]**	**569 (100) [53.48]**	**1,064 (100) [100]**

Figures in () are column and in [] are row %s

The moderate and non-poor are equally involved in self-employed non-farm enterprises (22-23% of these households) and the participation in this sector by the extreme poor is slightly higher, 26% in the wet season. Participation of all types of households in non-agricultural enterprises increases slightly in the dry season. It is quite pronounced for the moderate poor, an increase from 22% in the wet season to 31% in the dry season.

Farming is reported to be a losing concern by the households in the FGDs. This is the case particularly in the areas where only rain-fed aman is grown. In Thongpara village in Barguna district, a piece of land of 33 decimals can have a harvest of 8-10 maunds in an average year. This can be sold for about Tk. 5,000 while the cost of production is around Tk. 4,700-5,000. A farmer can hardly make any profit from farming.

A closer look at the nature of activities undertaken by the households as proprietors will now be made (Table 7-28; see Annexure F). Only the wet season will be discussed because seasonal variations are marginal. It is observed that the incidence of participation in the transport sector is the highest in every poverty status. It is actually highest amongst the extreme poor but also as much as almost a quarter of the non-poor households are also involved in the transport sector. While the moderate poor are also involved in tailoring, for the extreme and non-poor the second position is taken up by trading in agricultural commodities such as fish or milk. The non-poor are also owners of grocery shops. Some extreme poor households also own tea-stalls.

The activities taken up by the households as workers in the non-agricultural sector will now be looked at (Table 7-29; see Annexure F).

Irrespective of poverty status, all households are involved most in earthwork. While this is about a quarter for the non-poor, it is about 43-45% for the poor households in the wet season. Participation in this activity falls in the dry season slightly for all types of households. The second most important source of employment is in the construction sector. What distinguishes the non-poor in the Salinity prone poor area is their involvement as workers in mills and workshops. The participation of the poor is marginal in this field (3% for the moderate poor and 6% for the extreme poor). The transport sector also provides some employment; it ranks third for the moderate poor (10%).

Food security status of the households in the Salinity prone area is presented in Table 7-30. Incidence of hunger is more acute in wet season than the dry season. The number and share of households having meal twice a day or less than two times are significantly higher for the wet season. In the last four weeks before the interview about 63 households, which is about 6%, had food two times or less a day in the wet season. There is hardly any household in the Salinity prone that is so food insecure in the dry season.

Table 5-30: Food security status across seasons (salinity-prone area)

Code	Wet season				Dry season			
	Weak 1	Weak 2	Weak 3	Weak 4	Weak 1	Weak 2	Weak 3	Weak 4
Less than two times	8 (0.78)	8 (0.78)	9 (0.88)	10 (0.98)	-	3 (0.29)	4 (0.39)	4 (0.39)
Two times	59 (5.77)	56 (5.47)	51 (4.99)	53 (5.18)	52 (5.08)	37 (3.62)	36 (3.52)	44 (4.30)
Three times but insufficient	438 (42.82)	440 (43.01)	441 (43.11)	439 (42.91)	475 (46.43)	486 (47.51)	484 (47.31)	484 (47.81)
Three times & sufficient	518 (50.64)	519 (50.73)	522 (51.03)	521 (50.93)	496 (48.48)	497 (48.58)	499 (48.78)	491 (48.00)

5.4.3 Findings from FGDs: Salinity Prone Area

The FGDs carried out in the Salinity prone area provided a more complex picture. There were substantial differences in one site from another. For example, the village visited in Shyamnagar in Satkhira is entirely dependent on natural resources such as land, forests and rivers. It is a charland. Crop production is now completely replaced by shrimp farming. This is, however, not farmed in a large scale. Crop production could provide employment to the people to a limited extent but shrimp-culture, being more labour-displacing, pushed people more and more towards the rivers and forests. This has overcrowded the seas, rivers, and forests. The returns from fishing also declined over time. There is hardly any activity inside the village other than shrimp-farming.

When these natural resources are exploited beyond limit, the poor households will have no livelihoods option locally. Non-farm economy is not there and the shrimp farm does not provide employment. These households will have to migrate out. One participant showed strong belief on the fertility of sea and said that fish in the sea will always be there. Most did not agree to what he said. There are explicit signs of overfishing in the seas and far out rivers and depletion of forest resources. Fish price, as reported by other households, was getting higher with catches becoming smaller.

Increasing number of fishers are now getting fishes of smaller size and they have to travel far to get a good catch. It is the higher prices of these small fish that keeps the activity viable, but it is looking increasingly unsustainable.

A similar picture came out from the visits to other parts of the salinity prone area. In Patuakhali and Barguna, dependence on fishing is very high but catches declined. Fishing in the coast is a risky business. Badal Hawladar, who invested heavily in the fishing industry, lost everything and ended up taking up a petty job in a ferry ghat.

Case study 5-1: From a trawler owner to a staff of a ferry port (ghat)

Name	Badal Hawladar
Age	30+
Father	Ali Akbar Hawladar
Village	Thongpara
Union	Pachakuralia
Upazila	Amtali
Zila	Barguna

After completing grade eight, Badal Hawaladar started a business of Hilsha fishing. He invested about Tk. 1,000,000 for purchasing a trawler, nets and other equipments for fishing. At the beginning he recruited 14 labourers and later the number rose to 39. The return of the business was good and he would earn about Tk. 4,000-5,000 per day, after paying all costs. Unfortunately Cyclone Sidr of 2007 changed everything. Capital worth of Tk. 500,000-600,000 and fishing equipments were damaged. Though he resumed his business by borrowing Tk. 910,000 from several NGOs, after Sidr his income dropped significantly. He could catch fish worth of only Tk. 10,000-12,000 per month. As a result, he incurred heavy losses and could hardly pay the installments of the NGOs. At some point, he had to quit the business and managed to get a job of a staff of the ferry port (ghat). Now, he earns only Tk. 6,000 per month and this barely meets the need of his family. He is also now heavily indebted.

On the other side of the spectrum, the Southpur village in Sarankhola in Bagerhat could still feed the households better because it produced two rice crops. Salinity is low and does not affect rice production seriously. Livelihoods are more diversified. More and more people were getting into livestock and poultry production, and also aquaculture. Migration out of the village has been increasing. Agriculture in Southpur village helped households to diversify their livelihoods. However, this village was seriously affected by Aila. Even the better off households could not recover from the disaster. Roads were not yet completely mended. The most affected persons are the fishers because they lost their valuable assets, mainly fishing nets and boats. The fishers were also affected by Sidr. Badal Hawladar lost his fishing assets Sidr and ultimately had to turn to a low paid service job in a ferry ghat (see the case study above). Dependence on forestry and fisheries is high but, unlike Shyamnagar, local employment opportunities are there because of a thriving local economy. The village was still struggling to come out of the adverse impact of Aila. Support from the government and NGOs and remittances helped the households to cope.

Southpur, according to many, is most affected by Aila. Even the better off households could not yet recover from the stress. The village had 30% farming, 40% forests and 30% fisher's households. So the dependence of livelihoods on land, water and trees is clear. Access to forests is restricted by the state and this increased fishing after Aila. This however did not stop overfishing. Others invested in fishing boats and nets as soon as they could recover from the losses incurred from the disaster. Some moved to the rural transport sector. Loan from NGOs helped. Government imposed closed season also helped as those who received the money could buy essentials and possibly also continued fishing. Those who were away during the disaster returned back to help their families. Those who were there could start to migrate. But not all succeeded. This happened to Billal of South Char Bishash in Patuakhali.

The comparison of Shyamnagar and Southpur shows how agriculture was able to diversify livelihoods in Southpur while the households were pushed more to natural resource based livelihoods in Shyamnagar. In extremely natural resource dependent regions with limited agriculture, there is hardly any opportunity for livelihoods diversification. In these places effort should be made to promote migration or to better manage the forests and the rivers sea.

There is disagreement amongst the households over the effects of CC. In general, some changes are noted by the households. These include seasons becoming less noticeable in terms of their attributes, frequency and occurrence of rain has been changing and disasters are now becoming more frequent. But the impact of these is not always clear. The households mentioned that they now have to travel far to collect drinking water. This has also been observed in Barguna and Patuakhali.

The villages in Barguna and Patuakhali are somewhat between the two extremes of Shyamnagar and Southpur. Both have rain-fed aman cultivation. This somewhat supports local livelihoods but not to the extent of Southpur. Pulses and fruits are also grown. Fishing plays a big role. It is possible for the households to fish for 9 out of 12 months in a year. Migration is common but driven more by inadequate livelihoods opportunities created by the local economy. Communication to the cities is developed through the river transport system. Involvement in the transport sector is also quite high. In a broad sense, the households which participated in the sessions have a similar view on the impact of CC (less predictability of rain, heat, increasing salinity, problem of drinking water and so on). They have also mentioned that frequent warnings from the government about imminent disaster also reflect changes in the climate.

Case study 5-2: From a fisherman to a garment worker

Name	Billal Bari
Age	24 years
Father	Abdul Kashem Bari
Village	South Char Bishash
Union	Char Bishash
Upazila	Golachipa
Zila	Patuakhali

After completing grade 5, Billal started going for fishing in sea with other fishermen of his village. At the beginning he would earn Tk. 140-200 per day from fishing. He would also help in other works of his family besides fishing. Billal's family was doing quite good. However, gradually the size of the catch started waning. Moreover, Billal was afraid to go for deep-sea fishing. As a result, his income dropped to about Tk. 100 a day and he decided to quit this job. Unwillingly, in 2008, Billal went to Dhaka and started working in a RMG factory. Within a few years, his income rose to Tk. 6,000-7,000 a month. Unfortunately after sometime Billal lost his job and had to come back to village. He is unemployed now.

5.4.4 Livelihoods and Poverty: Flood Area

Almost three-fourth of the agricultural labourers are poor, about a half of them are, in fact, extremely poor (Table 7-31). The proportion is similar in both seasons although there are slightly more extreme poor households in the dry season. About 44-45% of those involved in the non-agricultural sector are poor in the wet as well as in the dry seasons.

Most of the households are involved in farming in all poverty categories. There is slightly more involvement of the extreme poor households as agricultural labourers than as farmers (32 and 30%). The involvement of the extreme poor in self-employment in agricultural sector falls in the dry season. However, the non-poor are most involved in farming (45%) in the wet season but their participation falls to19% in the dry season. Participation of the non-poor in the agricultural labour market is the lowest, about 8% and its participation in the service sector as salaried persons is the highest, about 12%. In comparison only 2% of the extreme poor and 3% of the moderate poor have jobs in the service sector.

When farming and wage labouring are included to indicate involvement in the agricultural sector, the extreme poor are more involved in agricultural as compared to the moderate poor who in turn is more involved than the non-poor households.

The households do not differ much in terms of their involvement in the non-agricultural sector as proprietors. They also do not differ much in terms of their extent of involvement in the non-agricultural sector as workers. In fact, the extreme poor are most involved in this activity (15%). This does not change during the two seasons.

The extent of involvement of the extreme and non-poor households in the non-agricultural sector increases in the dry season as compared to the wet season. This is quite noticeable for the non-poor households.

Table 5-31: Poverty status and livelihoods (flood area)

Occupation Category	Wet season				Dry season			
	Extreme poor	Moderate poor	Non poor	Total	Extreme poor	Moderate poor	Non poor	Total
Self-employed agri	68 (30.09) [19.83]	59 (37.58) [17.20]	216 (44.72) [62.97]	343 (39.61) [100.00]	29 (13.43) [28.16]	18 (15.65) [17.48]	56 (18.73) [54.37]	103 (16.35) [100.00]
self-Employed non-agri	47 (20.80) [23.86]	40 (25.48) [20.30]	110 (22.77) [55.84]	197 (22.75) [100.00]	66 (30.56) [32.84]	23 (20.00) [11.44]	112 (37.46) [55.72]	201 (31.90) [100.00]
Agri labour	73 (32.30) [48.67]	36 (22.93) [24.00]	41 (8.49) [27.33]	150 (17.32) [100.00]	83 (38.43) [54.97]	33 (28.70) [21.85]	35 (11.71) [23.18]	151 (23.97) [100.00]
Non-agri labour	34 (15.04) [30.36]	17 (10.83) [15.32]	60 (12.42) [54.05]	111 (12.82) [100.00]	33 (14.98) [30.36]	32 (10.83) [15.18]	47 (12.55) [54.46]	112 (17.78) [100.00]
Services	4 (1.77) [6.15]	5 (3.18) [7.69]	56 (11.59) [86.15]	65 (7.51) [100.00]	5 (2.31) [7.94]	9 (7.83) [14.29]	49 (16.39) [77.78]	63 (10.00) [100.00]
Total	**226 (100.00) [26.10]**	**157 (100.00) [18.13]**	**483 (100.00) [55.77]**	**866 (100.00) [100.00]**	**216 (100.00) [34.29]**	**115 (100.00) [18.25]**	**299 [47.46]**	**630 (100.00) [100.00]**

Figures in () are column and in [] are row %s

The nature of involvement of the households in different livelihood activities at a more concrete level is presented in Table 7-32 (see Annexure F).

Similar to the salinity prone area, most of the households are involved in the rural transport sector. The second position is taken up by trading in agricultural commodities (fish, milk etc.). About 11% of the non-poor households have tailoring businesses. The pattern of involvement in the non-farm enterprises remains more or less the same for the two seasons.

In any poverty category, most of the households are involved as construction sector workers in both seasons. For the non-poor it is 42 % in the wet season but 32% in the dry season, for the moderate poor it is 53% in both the wet and dry seasons and for the extreme poor, 44% in the wet and 48% in the dry season. The second largest occupation is transport sector workers in all poverty groups except for the extreme poor. The extreme poor households in the flood prone area are involved more in earthwork. The moderate poor are also highly involved in earthwork. What is observed here is that about 8% of the non-poor households are workers in the mills and workshops.

Food security status of the households in the flood area is presented in Table 7-34. Incidence of hunger is more acute in the wet season than the dry season. The number and share of households having meals twice a day or less than two times a day are significantly higher during the wet season. In the last four weeks before the interview, about 56 households, which is about 7%, had food two times or less a day in the wet season. Like the salinity prone area, there is hardly any household in the flood area who are as food insecure in the dry season.

Table 5-34: Food security status across seasons (flood area)

Code	Wet season				Dry season			
	Weak 1	Weak 2	Weak 3	Weak 4	Weak 1	Weak 2	Weak 3	Weak 4
Less than two times	2 (0.26)	3 (0.39)	2 (0.26)	2 (0.26)	1 (0.13)	1 (0.13)	1 (0.13)	1 (0.13)
Two times	57 (7.43)	56 (7.30)	54 (7.04)	53 (5.18)	22 (2.87)	23 (3.00)	23 (3.00)	26 (3.39)
Three times but insufficient	362 (47.50)	358 (46.68)	364 (47.46)	365 (47.59)	371 (48.43)	367 (47.91)	369 (48.17)	367 (47.91)
Three times & sufficient	346 (45.11)	350 (45.63)	347 (45.24)	347 (45.24)	372 (48.56)	375 (48.96)	373 (48.69)	372 (48.56)

5.4.5 Findings from FGDs: Flood Area

Floods occur routinely in Lexica union of Jamalpur Sadar upazila when the Brahmaputra overflows during the months of July and August, though its severity varies from year to year. Main occupations of this region are farming and agricultural wage labouring. Among the non-farm occupations, non-farm wage labour in soil excavation (earthwork), micro businesses (hawker, trading of agricultural products, sand mining from Brahmaputra, rickshaw and van pulling and shop-keeping dominate.

The village Uzanpara has 238 hardcore poor households and 30 poor out of a total of 620 households. This village is close to the Sadar and well connected to the district highway. Out-migration is not very popular, perhaps due to the availability of non-farming opportunities during floods. There is no rural industry. The main crop is boro along with vegetables. Tomatoes of this region are very popular. As expected, people dependen on agricultural activities are most affected by flood.

Berpara village of Parthashi union of Islampur upazila, Jamalpur is one of the most river-erosion-affected villages of this region. There are about 335 households in this village and most of them have lost a significant part of their agricultural land to the river Jamuna. This has turned farmers into wage labours. There are also shopkeepers and small traders but they are small in number. Even though there is a sugar mill in Dewangonj, a bordering upazila, only few local people work there. Migration is the dominant coping strategy. As a large number of well-off families have lost all their land to the river, their conditions, according to the participants, are worse than others as they cannot do menial jobs.

Dari Kali Nagar of Jhenaigati Upazila, Sherpur is located to the north of Sherpur Sadar. Fishing is the main occupation in this region behind agriculture. There is only one crop - boro. Aman does not grow here as water deposits too much silt during floods. Flash floods occur mostly in April and May when there is heavy rainfall in upstream India. Big ones stay at best for 3-4 days but sweep away all the standing crops in the field. There was a big flood 3 years ago. Migration to Dhaka and other neighbouring cities is the major coping strategy. Opportunities of non-farm jobs are very thin. It includes van pulling, shop-keeping, small trading, etc.

Uttar Kanduli Village of Jhenaigati Upazila is another Flash flood affected area. It has a similar cropping and occupational pattern (both farm and non-farm). Since this area is located close to India's mountains, Flash floods affect more quickly and severely than in regions located to the south. Siltation is a big problem here. Migration rate is also very high.

Local people observed that the frequency and severity of floods and Flash floods had declined over time due to embankments, high roads and canal digging. However, it is different for river erosion (Berapara Village of Jamalpur District) as they have said that it has aggravated over time in this area.

As expected, farmers and farm wage labourers are most affected by flood and Flash flood. Though absolute monetary loss is higher for larger farmers, loss of income from agriculture or wage income as a share of their average yearly income could be higher for smaller farmers and farm wage labourers due to limited availability of non-farm work.

Being a mono rice-crop area, fishing provides livelihoods for many in this region. Level of livestock and poultry is also very low. One reason is the inundation of land by floods and Flash floods and the availability of fodder.

Occupations independent of agriculture, both temporary and permanent, typically include non-farm wage labour (soil excavation, sand extraction from river, brick-field worker), small trading (hawker, shop keeping), rickshaw and van pulling. However, the last three are also affected by lower demand due to loss of income from crop. Here the linkage between agricultural and non-agricultural livelihoods is clear.

Microfinance activities are also very low as most of the villagers are thought to be very risky borrowers and do not have the flow of cash large enough to pay weekly payments. The case of Hafizur below shows how poor access to credit increases vulnerability in the flood prone area in Gaibandha.

The story in Sirajganj is a bit different and possibly very depressing. A discussion was held with a group of households who are environmental refugees in a village called Gunargati situated in Sirajganj Sadar Upazila. Their homes were lost to the River Jamuna in 2005-7. They moved to the nearest village for survival and became tenants to the homeowners in the receiving village. Paying rent to the landlords has been a big financial constraint to them. They brought with them handloom skills. This was the only major skill most of them could offer. The weavers were locked-in because they could not do any other work. The handloom here is well linked to the neighbouring upazilas of Ullahpara and Shahzadpur. Inputs and outputs of the handloom industry are regularly traded with the markets and agents of these upazilas.

The village is no more protected now by embankment. Water floods the village for 5 months and they move to the embankment and live there during this period. Lack of toilet facilities and safe drinking water are the major problems they said they face when they live on the embankment. Livelihoods here are primarily based on the local handloom industry. They do not have poultry and livestock because their landlords forbid them from raising livestock and poultry. There is absolutely no work in the wet season. Even the handloom industry stops operating as the factory goes under water. This shows how natural disasters affect rural non-farm activities which are remotely linked to natural resources.

Case study 5-3: Hafizar's income has stopped only for six hundred taka

Name	Hafizar Rahman
Age	40 years
Father	Ishak Rahman
Village	Sarkarpara
Union	Padumsahar
Upazila	Saghata
Zila	Gaibandha

Hafizar's only source of income is from riding rickshaw van. He has three daughters and a son. Two of his daughters are married and his son is ten years old. He had to pay Tk. 30,000 as dowry to get one of his daughters married. The money was borrowed from an NGO. Since his daughter's in-laws repeatedly demanded for more as dowry, and he could not meet the demand, she was sent back to his house. He was not fortunate with his own life too. One day, he found the van was broken (rapture of tire and tube) which he could not afford to repair, though it cost only Tk. 600. As a result, he could not pay the installment of the loan that he borrowed to pay the dowry. Then he started living on borrowing from others. Even, no other NGOs were willing to lend him. He has now become an indebted person.

These poor households live from savings, credit and petty work during this difficult time. These households are totally delinked from crop production, livestock and fisheries. The women are involved in low paid backward linkage industries (they make thread, ribbon). They can earn about Tk. 40-50 a day. A handloom worker can earn about Tk. 70-80 a day. Wages are in piece rates. Skill development is relatively easy because it takes 3-4 months to learn weaving and the loom cost between Tk. 6,000-7,000. It is possible for a worker to become an owner if capital is made available to him.

5.4.6 Livelihoods and Poverty: Flash flood Area

Livelihoods pursued by the non-poor, moderate poor and the extreme poor households in the flash flood prone area in the two seasons are given in Table 7-35. The incidence of poverty, again, is the highest amongst the agricultural labour households over the two seasons. More than a third of the agricultural labour households are poor, a quarter of these households are extreme poor in the wet season. The incidence of poverty falls down between 11% and 17% for all the broad occupation groups except for the moderate poor who are self-employed in the agricultural sector or involved as workers in the non-agricultural sector.

Table 5-35: Poverty status and livelihoods (flash-flood area)

Occupation category	Wet season				Dry season			
	Extreme poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Self-employed agri	43 (42.16) [12.04]	16 55.17) [4.48]	298 (54.18) [83.47]	357 (52.42) [100.00]	29 (34.52) [20.14]	13 (41.94) [9.03]	102 (27.87) [70.83]	144 (29.94) [100.00]
Self-employed non-agri	19 (18.63) [17.27]	0 (0.00) [0.00]	91 (16.55) [82.73]	110 (16.15) [100.00]	13 (15.48) [11.82]	11 (35.48) [10.00]	86 (23.50) [78.18]	110 (22.87) [100.00]
Agri labour	21 (20.59) [25.00]	9 (31.03) [10.71]	54 (9.82) [64.29]	84 (12.33) [100.00]	20 (23.81) [22.73]	3 (9.68) [3.41]	65 (17.76) [73.86]	88 (18.30) [100.00]
Non-agri labour	16 (15.69) [14.81]	4 (13.79) [3.70]	88 (16.00) [81.48]	108 (15.86) [100.00]	21 (25.00) [18.26]	3 (9.68) [2.61]	91 (24.86) [79.13]	115 (23.91) [100.00]
Services	3 (2.94) [13.64]	0 (0.00) [0.00]	19 (3.45) [86.36]	22 (3.23) [100.00]	1 (1.19) [4.17]	1 (3.23) [4.17]	22 (6.01) [91.67]	24 (4.99) [100.00]
Total	**102 (100.00) [14.98]**	**29 (100.00) [4.26]**	**550 (100.00) [80.76]**	**681 (100.00) [100. 00]**	**84 (100.00) [17.46]**	**31 (100.00) [6.44]**	**366 (100.00) [76.09]**	**481 (100.00) [100.00]**

Figures in () are column and in [] are row %s

Self-employment in the agricultural sector is the most widely pursued form of livelihoods in the Flash flood area. The moderate poor households are involved slightly more than the non-poor (55% as against 54%) in the wet season. However, this falls sharply for the non-poor households in the dry season. It also falls in the dry season for the moderate poor households. The second largest involvement of the extreme and moderate poor households is wage labouring in agricultural in the wet season. A third of the non-poor households are either involved as self-employed or as wage labourer in the non-agricultural sector in the wet season. This involvement increases to 48% in the dry season. The participation of the non-poor households in service sector jobs is relatively low compared to other areas but it is highest amongst the three poverty groups. Only 10% of the non-poor households are working as agricultural labourers.

While the moderate poor households in the flash flood area do not pursue self-employment in the non-agricultural sector, slightly more extreme poor households are involved here as compared to the non-poor in the wet season (19% as against 17%). The extreme poor households also participate more as workers in the non-agricultural sector.

The extent of involvement in the non-agricultural sector in the dry season is found to be higher when compared to the wet season.

The kind of livelihoods pursued as self-employment in the non-agricultural sector will now be analyzed (Table 7-36; see Annexure F). As can be seen from Table 7-36, all categories of households perform trading in agricultural commodities most, followed by self-employment in the transport sector. In fact, for the extreme poor, two-thirds of the livelihoods in the self-employment non-agricultural sector is explained by these two occupations. For the non-poor and moderate poor households, grocery shop businesses rank third.

The characteristics of the participation of the households as wage labour in non-agricultural sector are presented in Table 7-37.

Table 5-37: Wage-based livelihoods in the non-agricultural sector (flash-flood area)

Main	Wet season				Dry season			
	Extreme poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Earth worker (general)	3 (18.75)	0 (0.00)	7 (7.95)	10 (9.26)	4 (19.05)	0 (0.00)	8 (8.79)	12 (10.43)
Worker-transport	0 (0.00)	0 (0.00)	5 (5.68)	5 (4.63)	1 (4.76)	0 (0.00)	5 (5.49)	6 (5.22)
Coal/sand/stone mining	9 (56.25)	3 (75.00)	50 (56.82)	62 (57.82)	9 (42.86)	1 (33.33)	53 (58.24)	63 (54.78)
Chaial (works with ca ne and bamboo)	1 (6.25)	0 (0.00)	1 (1.14)	2 (1.85)	1 (4.76)	0 (0.00)	0 (0.00)	1 (0.87)
Worker-brickfield	0 (0.00)	0 (0.00)	1 (1.14)	1 (0.93)	0 (0.00)	0 (0.00)	1 (1.1)	1 (0.87)
Worker-construction	0 (0.00)	0 (0.00)	12 (13.64)	12 (11.11)	1 (4.76)	0 (0.00)	12 (13.19)	13 (11.3)
Worker-mill/workshop	0 (0.00)	0 (0.00)	8 (9.09)	8 (7.41)	0 (0.00)	2 (66.67)	6 (6.59)	8 (6.96)
Worker-others	3 (18.75)	1 (25.00)	4 (4.55)	8 (7.41)	5 (23.81)	0 (0.00)	6 (6.59)	11 (9.57)
Total	16 (100)	4 (100)	88 (100)	108 (100)	21 (100)	3 (100)	91 (100)	115 (100)

Figures in () are column %

Most of the workers here are involved in the coal/sand/stone industry. This type of work is available in this part of Bangladesh. The households are also involved in rickshaw pulling. Interestingly, the non-poor households are also involved as workers in mills and factories (9%). There is no participation in this activity from the extreme or moderate poor households in the wet season. Food security status of the households in the Flash flood area is presented in Table 7-38. Incidence of hunger is more acute in wet season than the dry season. The number and share of households having meal twice a day or less than two times are significantly higher for the wet season. In the last four weeks before the interview about 46 households, which is about 9%, had food two times or less a day in the wet season. Such an extent of food insecurity is not reported for the dry season.

Table 5-38: Food security status across seasons (flash-flood area)

Code	Wet season				Dry season			
	Weak 1	Weak 2	Weak 3	Weak 4	Weak 1	Weak 2	Weak 3	Weak 4
Less than two times	3 (0.59)	3 (0.59)	2 (0.39)	2 (0.39)	-	-	-	-
Two times	41 (8.01)	46 (8.98)	54 (10.55)	44 (8.59)	26 (5.08)	33 (6.45)	34 (6.64)	38 (7.42)
Three times but insufficient	342 (66.80)	337 (65.82)	330 (64.45)	339 (66.21)	358 (69.92)	349 (68.16)	351 (68.55)	348 (67.97)
Three times & sufficient	126 (24.61)	126 (24.61)	126 (24.61)	127 (24.80)	128 (25.00)	130 (25.39)	127 (24.80)	126 (24.61)

5.4.7 Findings from FGDs: Flash flood Area

The typical characteristic of a flash flood prone area is that it is a mono-rice crop area. Only boro can be grown. Irrigation is based on surface water from rivers, canals and ditches. Some minor crops are also grown, for example, mustard and potatoes. Vegetables are grown in the homestead gardens. Fishing is another activity pursued by some households.

Dependence on a single rice crop means that the local economy cannot support livelihoods throughout the year. Thus a common feature of this region is migration. During monsoon, people move out for whatever work is available outside.

The types of work undertaken are so diverse that it is not possible to name all of them. Since infrastructure is poor and only a single crop is produced, less transport sector work is available. Agricultural wage is Tk. 200/day with one meal. Work in the quarrying industry pays Tk. 250-300/day. There are different types of work in the quarrying industry and wages therefore differ. However, in many parts, migration is constrained by poor infrastructure.

However, in many parts, poor infrastructure opened up a motorcycle based transport industry. The passenger sits at the back of the driver to reach his or her destination. Poor infrastructure also means that the children have to travel far to reach school and it takes a longer time to take a patient to the nearest available health facility. Some households are also involved in the service sector. Land is relatively less scarce but productivity is low. Since irrigation costs are low, profitability is higher than what has been observed in the coastal zone where rain-fed aman is grown. Most people own some land, the large farmers have more land. It was found that the average land size in the flash flood prone area is highest, about 267 decimal (Table 7-8). Livestock also plays an important role here.

The central problem here is the Flash floods that occur just before the harvest of the boro crop. A severe Flash flood can damage crop to the extent that even the well off farmers find it difficult to cope. A female participant expressed the severity of a Flash flood by saying that even the women have to migrate out for work.

The following natural disasters are identified by the participants: Flash floods (affect mainly crops), normal floods (affect mainly livestock and houses), hailstorms and cold waves. Here CC is explained by untimely rain, excessive Flash floods. The solution to Flash floods is, to them, a sluice gate on the river nearby.

Frequency of Flash floods has increased, according to the participants. Previously there was less chances of crop damage from Flash flood because the variety of crop (i.e. boroshail) that was grown at that time could be harvested in a short time and before the onset of Flash floods. However, more productive boro is grown now and the growing season is longer and hence more prone to damage from Flash floods.

The participants talked of less rain now. They also said it is now hotter in the warm season and cooler in the cold season. There is more fog. Cold waves spoil rice. The participants also reported of more drought-like conditions. As the river bed has started to dry up, sources of irrigation water are shrinking.

5.4.8 Livelihoods and Poverty: Drought Area

The drought area is now considered (Table 7-39). What strikes here the most is the higher incidence of poverty amongst the households who own enterprises in the non-agricultural sector. Though it is the agricultural wage labouring households who are mostly poor (66% and almost a half of the extreme poor households), as high as 43% of those who own enterprises in the non-agricultural sector are poor, 20% of them are extremely poor. This again points towards the low capital, low skill nature of these activities.

While most of the non-poor households are involved in farming (54%), most of the extreme poor households are involved in agricultural labouring (49%) in the wet season. The moderate poor households are mostly and almost equally involved in farming and wage labouring. Once again, the non-poor households are least involved in agricultural labouring and the

extreme and moderate poor households barely have jobs in the service sector. Service sector jobs are mostly taken up by the non-poor.

It is noticed that involvement of the households in farming drastically falls in the dry season. This is expected because it is generally a mono-crop area depending almost exclusively in rain-fed irrigation. As a consequence involvement of the households in the non-agricultural sector increases in the dry season because less agricultural work is pursued.

The extreme poor households outstrip the moderate poor and the non-poor households in terms of their participation in the non-agricultural sector, either as proprietors or as workers. The involvement of the households in the non-agricultural sector as owners and workers will now be analyzed in detail (Table 7-40 and Table 7-41 respectively; see Annexure F).

Most of the households are self-employed in the transport sector (Table 7-40; see Annexure F). They have a rickshaw or a van or hire them to earn a living. As high as 40% of the extreme poor households are involved in the transport sector. The non-poor households also have grocery shops and they are also involved in the trading of agricultural commodities.

Participation in the non-agricultural sector as workers is low in this area (Table 7-41; see Annexure F). Those who are involved in this activity are mainly construction workers.

Food security status of the households in the drought area is presented in Table 7-42. Incidence of hunger is more acute in the wet season than in the dry season. The number and share of households having meals twice a day or less than twice is significantly higher for the wet season. In the last four weeks before the interview about 10 households, which is about 4%, had food two times or less a day in the wet season. The corresponding number of households and percentage for the dry season are about 5 and 2%.

Table 5-42: Food security status across seasons (drought area)

Code	Wet season				Dry season			
	Weak 1	Weak 2	Weak 3	Weak 4	Weak 1	Weak 2	Weak 3	Weak 4
Less than two times	-	1 (0.39)	-	-	-	-	-	5 (0.20)
Two times	11 (4.30)	8 (3.13)	9 (3.52)	10 (3.91)	5 (1.95)	5 (1.95)	5 (1.95)	113 (4.42)
Three times but insufficient	131 (51.17)	133 (51.95)	136 (53.13)	135 (52.73)	138 (53.91)	138 (53.91)	135 (52.73)	1334 (52.17)
Three times & sufficient	114 (44.53)	114 (44.53)	111 (43.36)	111 (43.36)	113 (44.14)	113 (44.14)	116 (45.31)	1105 (43.21)

5.4.9 Findings from FGDs: Drought Area

Both the districts under the drought area, Nilphamari and Naogaon, have been visited. They represent quite a contrasting picture. While the village visited in Naogaon gives the impression of a typical drought prone area, this is not the case with the villages visited in Nilphamari district as many of them are located within the catchment area of Tista River.

In Naogaon, an FGD was conducted at Manikura Utttar Para Village of Sapahar Union under Sapahar Upazila. The village is small, and contain about 80 households. The cultivable lands can support mono-rice crop, and in most of the cases – rain-fed aman. A few household can also grow wheat who have opportunity to irrigate water from pond. Since wheat cultivation requires relatively less labour therefore, those fortunate farmers prefer wheat to maximize income. However, it would be difficult to ensure food supply by the internal production alone for the local dwellers unless the supplies are not changed from outside.

Most of the cultivable lands (about 95%) are owned by the absentee landlords (Sahus). Therefore, share cropping is very common here. Access to land for agricultural practice is attained through various forms of tenancy contracts with the Sahus. Their contracts have been described by the tenants as exploitative. Livestock rearing is very common, and in most of the cases dwellers get the cattle as share-in from the Sahus, as well.

Considering the availability of work, a person might sales his labour for either on-farm or/and non-farm (rickshaw van) activities. Compare to other parts of Bangladesh, wages is very low. For instance, an agriculture labourer can earn Tk. 100-180 (without food); while a rickshaw van rider can earn Tk. 200-250 in a day. A portion of the dwellers also perform temporary migration for work during the lean periods (Ashwin-Kartik).

Water is very scarce even for household activities. It takes atleast 15 minutes to reach the nearest source of water (well). A small pond is the only source of water for washing utensils, bathing etc.

Despite some villages that were visited in Nilphamari are drought prone but some others are in sharp contrast with Naogaon (i.e. Manikura Utttar Para Village). Livelihoods are thriving in the fortunate villages. They have three crops, aman, boro, and a third crop (maize, vegetable etc.). Crops are highly diversified. Land is irrigated by STWs. Almost everybody has access to safe drinking water. Agricultural wages are high, Tk. 200-250 a day. Agricultural labourers also migrate to neighbouring districts. They work in the farms or take up other livelihoods such as in the transport sector. Some also migrate to Dhaka to work in the RMG sector. There are few who have regular service jobs in the urban areas.

As said earlier, agriculture is thriving. Maize production is profitable but this is not the case with rice production. Farmers hardly get a profit from rice farming. The rich farmers are increasingly showing interest in non-farm investments. However, access to ground water irrigation has made water available for irrigation. Those dependent on irrigation equipment run on electricity have problems in getting water in time because of inadequate and unpredictable electricity supply. Hamidul Islam of Dimla, Nilphamari, thought of leaving farming as both rainfall and electricity was becoming more unpredictable.

Case study 5-4: Hafizar's farmer planning to switch profession due to drought

Name	Hamidul Islam
Age	30 years
Father	Sahabuddin Ansari
Village	South Sundarkhata
Union	Balapara
Upazila	Dimla
Zila	Nilphamari

Hamidul is a farmer. He cultivates four bighas of own land as well as rented land. Hamidul grows aman and boro rice, and maize. He does not have access to good irrigation facility, and therefore, has to depend on rain water for cultivation. However, irrigation is costly and irregular supply of electricity disrupts the irrigation system. This interrupted power supply took its toll on crop yield last year when the rainfall was very little in the dry season.

Hamidul's income depends heavily on rainfall. In the face of severe draught in the last few years, irrigation became more expensive which Hamidul could not afford. He is now contemplating to change his profession

Nilphamari is quite similar to Southpur. Both have thriving agriculture and crop diversification which help generate local livelihoods. On top of that there are migration opportunities.

The driver of change in this economy is crop diversification and mechanization of agriculture. It can provide employment to a large number of households. When it cannot do that, people migrate. Thus the drought region that was surveyed was diverse resulting in a contrasting pattern of livelihoods.

5.4.10 Which Livelihoods Should be Promoted?

One major purpose of this report is to identify the non-agricultural livelihoods that can be promoted to enhance CC adaptation of the poor households who live in disaster prone fragile areas of Bangladesh. In this section an attempt is made to identify in detail the livelihoods pursued by the households in the study areas. Attempts have also been made to identify the type of agents who pursue these livelihoods. That is, what are the livelihoods pursued by the extreme poor, the moderate poor and the non-poor households. The summary of the findings on these is presented in Table 7-43.

Table 5-43: Top three non-agricultural livelihoods by area and poverty type

Areas	Self-employment			Wage labour		
	Extreme poor	Moderate poor	Non-poor	Extreme poor	Moderate poor	Non-poor
Salinity-prone	Transport, agri trading, tea stall	Transport, tailoring, agri trading	Transport, agri trading, grocery	Earthwork, construction, transport	Earthwork, construction	Construction, earthwork, mills
Flood	Transport, agri trading, tea stall	Transport, agri trading, tailoring	Transport, agri trading, grocery	Construction , earthwork, transport	Construction, transport, earthwork	Construction, transport, earthwork
Flood	Transport, small cottage, agri trading		Agritrading, transport, grocery	Quarrying industry, earthwork	Quarrying industry	Quarrying industry, construction
Drought	Transport	Transport, agri trading, barber	Transport, agri trading, grocery	Construction	Construction	Construction

The first thing that comes out from the findings is that the moderate poor and extreme poor households are more involved in self-employment in non-agricultural as compared to the non-poor households. In fact their involvement in this activity is almost as high as their involvement as wage labourers in the agricultural sector. Thus, the poor are not only identified by their participation in the agricultural labour market but also in self-employment in the non-agricultural sector.

What is striking here too is the wide range of activities the households is involved in the non-agricultural sector. Though the non-poor also perform a wide range of activities in this sector, so do the moderate and extreme poor households. Livelihood options in the Salinity prone are the highest. What self-employment activities are these households pursuing? The transport sector here plays a big role. This basically represents those who are owners and drivers of transport vehicles such as a rickshaw or rickshaw vans. In the drought prone area the transport sector possibly represents almost the only source of livelihoods diversification to non-agricultural activity. The second position is taken up by trading in agricultural commodities. This again is based heavily on the situation in the agricultural sector (see Section 5.2.3: Linkage Theory).

The non-poor also own grocery stores. Should these livelihoods be promoted? It is important to note that the non-poor also pursue these livelihoods. But most likely these involve a part of their overall portfolio of livelihoods, their enterprises are possibly large and require more capital and market network. Thus from a public policy perspective, the guideline should be the identification of the poor and then the promotion of the activity pursued by that agent.

Just promoting the transport sector will also divert resources to the non-poor households who also own transport vehicles. The issue is that the policy should promote access of the poor to the transport sector. Trading in agricultural commodities has to be viewed with caution. If there is a major crop damage this activity will almost be as affected as farming.

Some tailoring businesses that are pursued by the moderate poor households have been observed. This activity can also be promoted. Otherwise, there is a whole range of activities that are tangentially pursued by the households.

Case study 5-5: Skill development: the case of tailoring

Name Lima Aktar
Age 30 years
Village South Char Bishash
Union Char Bishash
Upazila Golachipa
Zila Patuakhali

Hamidul is a farmer. He cultivates four Bighas of own land as well as rented land. . Hamidul grows Aman and Boro rice and maize. He does not have access to good irrigation facility and therefore has to depend on rain water for cultivation. However, irrigation is costly and irregular supply of electricity disrupts the irrigation system. This interrupted power supply took its toll on crop yield last year when the rainfall was very little in the dry season.

Hamidul's income depends heavily on rainfall. In the face of severe draught in the last few years, irrigation became more expensive which Hamidul could not afford. He is now contemplating to change his profession and switch to a non-agricultural job.

Effort can be made to promote some of these based on the analysis of local conditions. The guiding principle here should be to re-allocate as much labour as possible from farming and wage-labouring. They represent not only very poor households but also a weak spot for climate vulnerability. On the other hand, the technology used in these activities is very simple and easily replicable. Public policy can also consider improvement of technology in this sector.

Participation of the households in the non-agricultural sector as wage labour is lower than their participation in the self-employed non-agricultural activities. Not only participation, but also livelihoods options also seem to be very limited. Again the non-poor have more options here as compared to the extreme and moderate poor households. The flood prone region has some work available in the quarrying industry and it is available to all poverty groups. In Salinity prone areas it is earthwork that dominates the sector. In the drought prone areas it is the construction sector that provides the bulk of the employment. The construction sector also provides most employment in the flood prone area. Thus the construction sector plays a big role in generating non-agricultural livelihoods in Bangladesh. Government policies should aim at promoting this sector and it should also improve the skills of the labourers who can potentially join the construction sector. The non-poor also participate as workers in mills and workshops in salinity and flood prone areas. This activity is hardly done by the poor. The government can find out ways for developing the skills of the poor so that they can also participate in this activity.

CHAPTER 6

Migration and Livelihoods

Migration plays an important role in livelihoods diversification. In this section the nature of livelihoods diversification resulting from migration is analysed. Migration of individual members is considered, not that of entire households. Also, no attempt is made to establish the link between CC and migration, rather the importance of migration as a livelihood strategy is highlighted.

About a quarter of the surveyed households have members who are migrants (Table 8-1). This figure is quite high when compared to the national average of (13.72%) as reported in BBS (2010). Salinity and drought prone areas have similar rates of migration (22-23%). Migration rate is highest in the flood prone area where a third of the households have migrants. It is lowest in the Flash flood area (17%)

Except for the drought prone area, most of the migrants work as non-agricultural labourers at the destination of migration (Table 8-2). Occupation in the destination of migration refers to the occupation taken up by the migrants after migrating. It

Table 6-1: Extent of migration by DPA

	Salinity area	Flood area	Flash-flood area	Drought area	All areas
Number and percentage of households	227 (22.19)	261 (34.03)	88 (17.19)	58 (22.66)	634 (24.78)

does not refer to the occupation the migrant was performing before migration. In the drought prone area, more than half of the migrants are agricultural migrants. These are seasonal migrants who leave home when either no work is available or wages are low. Perhaps, they go out for a short period for employment in harvesting operations when wages are high.

Except for again the drought prone area, the second largest occupation picked up by the migrants is services. In the drought prone area, the second largest occupation pursued by the migrants is self-employment in the non-agricultural sector.

Except for again the drought prone area, the third largest occupation picked up by the migrants is self-employment in non-agricultural. In the drought prone area, this place is taken up by non-agricultural labour.

The pattern of occupations taken up in the destination of migration is very different from those taken up by the households at the origin of migration almost absence of self-employment in agricultural is obvious. Except for the drought prone area, involvement of the households in wage labouring in the agricultural sector is also low. What strikes here is that while non-agricultural involvement of the households in the origin of migration (i.e. home) is not only relatively low but also very much limited to self-employment. In the destination of migration, most employment is in the wage-based non-agricultural activities. Promotion of migration would result in livelihoods diversification with people depending less on natural resource based activities such as farming, for example.

Table 6-2: Occupation in destination of migration by DPA

Occupation in the destination of occupation	Salinity area	Flood area	Flash-flood area	Drought area	All Areas
Self-employed agri	2 (0.65)	0 (0.00)	0 (0.00)	1 (1.59)	3 (0.36)
Self-employed non-agri	33 (10.78)	67 (19.14)	19 (17.43)	13 (20.63)	132 (15.94)
Agri labour	12 (3.92)	37 (10.57)	14 (12.84)	32 (50.79)	95 (11.47)
Non-agri labour	129 (42.16)	157 (44.86)	39 (35.78)	10 (15.87)	335 (40.46)
Services	103 (33.66)	74 (21.14)	26 (23.85)	6 (9.52)	209 (25.24)
Others	27 (8.82)	15 (4.29)	11 (10.09)	0 (0.00)	53 (6.40)
Total	306 (100.00)	350 (100.00)	109 (100.00)	63 (100.00)	828 (100.00)
Agri-liv	4.57	10.57	12.84	52.38	11.83
Non-agri liv	95.43	89.43	88.16	47.62	88.17

** Figures in () represents %*

The nature of employment taken up in the destination of migration as self-employment in the non-agricultural sector is discussed below. Table 8-3 (see Annexure F) provides information on the type of self-employment in the non-agricultural sector taken up by the household members before and after migration.

As can be seen from Table 8-3 except for the flash flood area, transport sector (rickshaws, vans, *nosimons*, etc.) dominated livelihoods pattern before and after migration. In the Flash flood area, most of the households in this sector were involved in trading agricultural commodities such as fish and milk. In the destination of migration most are still involved in the transport sector as self-employed persons.

In all the areas except for the drought prone area, the second dominant involvement is in the electronics equipment shops. This hardly played any role at home before migration. In Flash flood area, tailoring played the third most important role both at home and also at the destination of migration. Involvement in grocery shops ranked third in all the areas except for the Flash flood area. This continues to be the case for the salinity prone area in the destination of migration. But this falls sharply for flood and drought prone areas.

Thus the dominant form of migration induced livelihoods within the self-employment category consists of the transport sector. This is a low skill livelihood. A common scenario here would be that a person pulling a rickshaw at home will possibly be doing the same thing after migration. The relatively interesting case could be found for electronic equipment. These are relatively high-skill jobs. Other businesses ranked the highest in the salinity prone area. It ranked second in the flood area.

The changes in the wage component of the non-agricultural sector will now be analyzed (Table 8-4; see Annexure F). Except for the salinity prone area, the dominant involvement as labourer in the non-agricultural sector in the destination of migration is found in the construction sector. In percentage terms it remains more or less the same in the flood prone area while it increases substantially in the flash flood prone area (from 11% to 54%) and decreases in the drought prone area (69% to 50%). In the salinity prone area, the largest form of migration induced livelihoods is found in mills and workshops. It also increases from 11% to 30%.

Workers in the mills and workshops secured the second rank in all the areas, except for in the salinity area. As mentioned already, this activity is found to be largest in the salinity area. The second largest occupation in the destination of migration is found in the construction sector in the salinity prone area.

While more than a third of the occupations at the origin of migration is in earth work in the salinity prone area (the highest), it drops to about 9% after migration. While involvement in the construction sector remains more or less the same (26% and 29%), involvement in the mills and workshops increases to 30% (the highest) in the destination of migration.

The general pattern that has been observed is the major role played by the construction sector both at home and also in the destination of migration. This is the case in all the areas, except for in the flash flood prone area.

With migration, a noticeable decline in the involvement as workers in the transport sector and increase in involvement as workers in mills and workshops is observed. There is therefore a transformation in skill requirement as one migrated out of village and joins a mill or workshop as a wage labourer. Thus, an improvement in skills will promote non-agricultural livelihoods and migration. However, the changes brought by migration in the structure of employment in the service sector are dealt with in Table 8-5. It has been reveiled that migration significantly promotes salaried jobs in the destination of migration.

Table 6-5: Labour in the service sector taken up by the migrants by DPA (%)*

Occupation	Salinity area	Flood area	F. Flood area	Drought area	All areas
Government service	8.43 (4.90)	15.63 (13.51)	21.05 (0.00)	25.00 (0.00)	13.98 (7.25)
Private service	57.83 (89.22)	60.94 (81.08)	47.37 (92.31)	10.00 (100.00)	52.69 (86.96)
Teacher	28.92 (2.94)	21.88 (4.05)	26.32 (7.69)	65.00 (0.00)	30.11 (3.86)
NGO worker	2.41 (2.94)	1.56 (1.35)	0.00 (0.00)	0.00 (0.00)	1.61 (1.93)
Village doctor	2.41 (0.00)	0.00 (0.00)	5.26 (0.00)	0.00 (0.00)	1.61 (0.00)

** Figures in () are those found at the destination of migration*

The overall pattern of employment changes with migration is drawn at Table 8-6. At home, the dominant non-agricultural activities are concentrated in the self-employed sector (53%). The situation is reverse in the destination of migration, it drops to 20%. Wage labour component increases from 31% to 50%, and number of service related activities increases from 15% to 31%. Thus promotion of migration not only increases the extent of involvement in the non-agricultural sector, it also changes the structure of non-agricultural employment and makes the shift more rewarding because fewer households take employment in the low return self-employment non-agricultural sector. Self-employment in the non-agricultural sector in the origin of migration is normally a low-skill, low return activity. Again, there is a shift in the pattern of employment in the wage component of the non-agricultural sector. The shift is away from involvement in earthwork and transport sector jobs to involvement in the construction sector and in mills and workshops.

There are similarities and variations in terms of migration induced livelihoods patterns across the disaster prone areas. Except for the drought prone area, the three other areas show similar pattern. In the destination of migration in these areas, most of the migrants work as non-agricultural labourers followed in turn by the service sector and self-employment in the non-agricultural sector. A half of the migrants in the drought prone area are agricultural labourers.

Table 6-6: Structure of employment in NA sector at home and destination of migration

Type on NA activities	Home	Away
Self-employed in NA	669 (53.35)	132 (19.58)
Wage labour in NA	399 (31.82)	335 (49.70)
Services	186 (14.83)	207 (30.71)
Total	**1,254**	**674**

Figures in () represent %

The pattern of occupations taken up in the destination of migration is very different from those taken up by the households at the origin of migration. While non-agricultural involvement of the households in the origin of migration is not only low but is also limited to self employment. In the destination of migration, most employment is in the wage-based non-agricultural activities.

Self-employment in the transport sector dominated the pattern of livelihoods both at home and away. Unlike the transport sector, where households were very much involved at home, the second dominant involvement of the households were found in the electronics equipment shops. These livelihoods were rarely performed before migration. Other businesses ranked the highest in the salinity area. It ranked second in the flood area. Thus, in general, within the self-employment category both a relatively low-skill (transport sector) and high-skill (electronics equipment shops) activities are undertaken.

Involvement as wage labourer is found more in the construction sector and in the mills and workshops. While the former is also done in the origin of migration but the latter is not. With migration, a noticeable decline in the involvement as workers in the transport sector and increase in involvement in mills and workshops is observed. There is therefore a transformation in skill requirement as one migrated out of village and joins a mill or workshop as a wage labourer.

It has been observed that the incidence of service sector increases substantially in the destination of migration. Thus, the overall pattern of employment changes with migration. At home, the dominant non-agricultural activities are concentrated in the self-employed sector while it is concentrated more in the wage labour in the non-agricultural sector. This shift from self-employment to wage labour in the non-agricultural sector is a positive shift. Migration also generates more jobs in the service sector. Promotion of migration not only increases the extent of involvement in the non-agricultural sector, it also changes the structure of non-agricultural employment and makes the shift more rewarding because fewer households take employment in the low return self-employment non-agricultural sector. Self-employment in the non-agricultural sector in the origin of migration is normally a low-skill, low-return activity.

CHAPTER 7

The Nature of the Non-Agricultural Sector in the Study Sites

Up to now several remarks have been made in the way of presenting the findings on the nature of non-agricultural sector in Bangladesh. In this section the characteristics of this sector will be summarized. Several observations will be made.

The non-agricultural sector is characterized by low skill activities

More than half of those involved in self-employment in agricultural can only read or write or never attended school. This proportion is slightly higher for the agricultural labourers. About 37% of those involved in self-employment in the non-agricultural sector either as owners or labourers are barely literate (can only read or write or never attended school). Although this proportion is lower than those involved in the agricultural sector, it is quite high. Only 6% of those involved in the service sector are barely educated. Most of the non-agricultural sector participants have only primary level education and only a negligible proportion of them have secondary level education. This shows that those involved in the non-agricultural sector have very poor skill.

Table 7-1: Education by types of occupation

Education category	Self-employment in agricultural sector	Self-employment in non-agricultural sector	Agricultural labour	Non-agricultural labour	Services	Total
Never attended school	271 (18.86)	76 (11.36)	135 (28.13)	39 (9.77)	3 (1.62)	524 (16.53)
Can only read/write	471 (32.78)	179 (26.76)	168 (35.00)	111 (27.82)	9 (4.86)	938 (29.59)
Primary	343 (23.87)	208 (31.09)	129 (26.88)	164 (41.1)	31 (16.76)	875 (27.6)
Less than SSC	254 (17.68)	154 (23.02)	43 (8.96)	66 (16.54)	27 (14.59)	544 (17.16)
SSC	57 (3.97)	38 (5.68)	4 (0.83)	17 (4.26)	30 (16.22)	146 (4.61)
HSC	28 (1.95)	7 (1.05)	1 (0.21)	2 (0.5)	32 (17.3)	70 (2.21)
Graduate	11 (0.77)	7 (1.05)	0 (0)	0 (0)	29 (15.68)	47 (1.48)
Masters	2 (0.14)	0 (0)	0 (0)	0 (0)	24 (12.97)	26 (0.82)
Total	**1,437 (100)**	**669 (100)**	**480 (100)**	**399 (100)**	**185 (100)**	**3,170 (100)**

*() indicates column %

More capitals are used in the non-agricultural sector as compared to the agricultural sector:

Average capital used in non-agricultural enterprises, both current and working, are higher than that of agricultural enterprises. In the sample, non-agricultural enterprises have a current capital of about Tk. 35,126 while agricultural enterprises have less than half of it (Tk. 16,780). Working capital is also more than three times higher for non-agricultural enterprises than the agricultural ones.

The non-agricultural enterprises is run mainly by family labour:

Table 7-2 shows, although non-agricultural enterprises hire more labour than agricultural enterprises but it hires too less of them. On an average, less than one person is hired in a year. Similarly, there is virtually no difference in terms of involvement of family labour. Both agricultural and non-agricultural enterprises employ 1 (one) family labour in a year.

Average number of family labourers is slightly lower for non-agricultural enterprises (1.03) than the agricultural enterprises (1.06). But average number of hired labourers is significantly higher for the former (0.47) than the latter (0.17). This is also reflected in the higher ratio of hired labour to total labour for non-agricultural enterprises. Since a large number of enterprises, both agricultural and non-agricultural, do not hire any labour from market, the ratios are very small.

Table 7-2: A comparison of agricultural and non-agricultural enterprises

Enterprise Information	Agricultural Enterprise	Non-agricultural Enterprise	Total
Average current value of capital (Taka)	16,680	35,126	21,132
Average annual working capital (Taka)	4,186	13,618	6,463
Avg. no. of hired labour (1yr)	0.17	0.47	0.25
Avg. no. of family labour (1yr)	1.06	1.03	1.05
Hired as a proportion of total labour	.007	.012	.008
Average annual net income (Taka)	9,943	39,084	16,978
Net income/working capital	7.75	21.61	10.95
Net income/Total person month	754	3,067	13,06
Average annual labour cost (Taka)	469	2115	866

Net income from non-agricultural enterprises is higher than agricultural enterprises but low:

Average yearly net income from non-agricultural enterprises (Tk. 39,084) is about four times of the income from agricultural enterprises (Tk. 9,943). One taka of working capital earns about 8 taka of net income in agricultural enterprise and 22 taka in non-agricultural enterprises.

In short, although non-agricultural enterprises use more starting capital, more working capital and more hired labour than the agricultural counter, these figures are low and nowhere close to those involved with small and medium industries. Consequently, the former earns more and return to capital and labour is also higher than the latter.

Labour productivity in the non-agricultural enterprises is higher than agricultural enterprises but still yet low:

One month's work of labour in agricultural enterprises brings Tk. 754 to the owner in agricultural enterprises and Tk. 3,067 in non-agricultural enterprises. It is worth noting that average annual cost is more than four times higher in non-agricultural enterprises than agricultural ones.

Table 7-2 provides information in the aggregate. It has already mentioned that many livelihoods are pursued by the poor and the non-poor but these are less likely to have same scale and structure. Thus it is important to make a comparison between agricultural and non-agricultural enterprises by poverty groups. This is done in Table 7-3.

Table 7-3: A comparison of agricultural and non-agricultural enterprises by poverty groups

Enterprise Information	Extreme poor		Moderate poor		Non-poor	
	Agricultural enterprise	Non-agricultural enterprise	Agricultural enterprise	Non-agricultural enterprise	Agricultural enterprise	Non-agricultural enterprise
Average current value of capital (Taka)	10,525	6,658	8,701	14,046	20,792	50,314
Average annual working capital (Taka)	2,600	3,291	2,398	4,410	5,181	19,444
Avg. no. of hired labour (1yr)	0.08	0.01	0.09	0 .03	0 .25	0 .74
Avg. no. of family labour (1yr)	1.01	0 .97	1.02	1.03	1.09	1.05
Hired as a proportion of total labour	0.8	0.1	0.8	0.2	0.6	1.9
Average annual net income (Taka)	7,311	28,313	6,484	32,639	11,714	44,521
Net income/working capital	8.96	30.76	9.87	27.76	6.84	17.10
Net income/Total person month	568	2,515	508	2,679	876	3,349
Average annual labor cost (Taka)	267	38	218	102	601	3,320

What stands out clear is that the extreme poor households have more capital (current) in agricultural enterprises as compared to the moderate poor households. A clear pattern can be seen in the value of capital. If the case just mentioned is ignored, current value of capital in non-agricultural enterprises is higher than agricultural enterprises. The value of current capital for the non-poor is more than 3.5 times higher than the moderate poor households and more than 7.5 times higher than the extreme poor households. This is the same for working capital where non-poor invest far more than the poor households. This represents a larger scale of non-agricultural enterprises owned by the non-poor households. This is also the case with average net income from the enterprises.

Both moderate and extreme poor households employ more hired labour in agricultural enterprises as compared to the non-agricultural enterprises. The non-poor households employ most hired workers and more so in non-agricultural enterprises. While the moderate poor households employ almost a similar amount of family labour in agricultural and non-agricultural enterprises, the extreme poor and the non-poor employ more family labour in agricultural enterprises. The ratio of hired labour to total labour is the highest for the non-farm enterprises owned by the non-poor. While capital productivity is the highest for the extreme poor, labour productivity is the lowest. This is due to lower employment of capital by the extreme and moderate poor households. Thus the following observations can be made:

- Involvement of family labour in non-farm enterprises owned by the non-poor HHs is the highest
- More hired labour is employed by the non-farm enterprises run by non-poor HHs
- More capital is employed by the non-farm enterprises owned by the non-poor HHs
- The non-poor HHs use more capital-intensive techniques as compared to the poor HHs.
- There is a shift of labour from agricultural to non-agricultural and this is partly explained by CC

Section 12.2 provides evidence on how individuals are increasingly dropping agricultural-based livelihoods and picking up non-agricultural based livelihoods. While income differentials play a major role, the respondents have also referred to CC factors behind their decisions to shift away from non-agricultural occupations. Similar evidence is provided by Rahman (2012).

Evidence has been provided to characterize the non-agricultural sector. But it should be recalled that most disaster prone, poverty prone regions have been studied. The nature of this sector may be different in less disaster and poverty prone region.

CHAPTER 8

Household Income and Poverty

A move from livelihoods plane to the income plane will now be made. In this section income of the sample households is estimated. This will help to understand the mapping between livelihoods and income.

8.1 Estimation of Household Income

Households' total income is estimated from different sources of income such as wage and non-wage income, income from self-employed activities both in agricultural and non-farm, remittances, safety nets and income from assets.

In order to estimate total income the following criteria has been used:

- All aggregates are estimated at the household level.
- All income is annualized.
- All income components are net of costs.

8.2 Components of Total Income

Although the calculation of the income takes into consideration all sources of income reported by the household in the survey, some classifications are useful for better conceptualization of the sources of income. First define two categories of income: wage and non-wage.

Wage income includes all activities for which wage earners receive fixed payment for his or her labour in a period (e.g., daily, weekly, monthly, etc.). Non-wage income includes all other sources such as household crop and livestock production, self-employment earnings, transfer income, services and other non-labour income sources. However, income measures are further disaggregated into the following six categories:

a. Income from farming

Income from farming is the aggregate income from crop production, livestock production, fisheries (includes aquaculture and catch from nature), and forestry.

- Crop: The estimation of crop income accounts for the sale of crops, crop by-products, sharecropping earnings, leased earnings, net of input costs.
- Livestock: The livestock income category includes income from the sale of livestock, livestock by-products (i.e. milk, eggs, etc.), net of expenses related to livestock production and livestock purchases, plus the value of household consumption of own livestock and livestock by products.

- Forestry: The forestry income category includes income from the sale of trees, wood, forestry by-products (i.e. fruit), net of expenses related to collecting and purchases, plus the value of household use or consumption of own product and by products.
- Fisheries: Fisheries income consists of all income received from aquaculture and the catch from natural sources, net of expenses related to catching and production, plus the value of household use or consumption.

b. Wage and salary

Wage and salary income consists of all income received in the form of compensation for labour either in cash or in kind or both. Since it is common for household members to simultaneously hold more than one job or change jobs throughout the survey reference period, all income from primary, secondary and additional jobs held in a 12-month period is considered to account for individuals' multiple activities. Furthermore, the estimation of total wage employment income is divided between agricultural and non-agricultural wage income.

c. Non-farm enterprises/self-employed activities

The non-farm self-employment category includes the income earned from all non-farm household activities or enterprises. This includes all earnings for all non-farm activities (i.e. rickshaw riding, tailoring, boatman, contractor, hawker, etc) or businesses (i.e. money lender, tea-shop owner, shopkeeper, mill owner, etc) operated by any member of the household over the last 12-month period.

d. Property income

Property income consists of gross non-labour income from farm land rental, non-farm real estate rental, rental of owned assets.

e. Remittances

This category refers to both domestic and international transfers received by the household, both in cash or in-kind. Domestic transfers primarily refer to incoming remittances from household member working in any part of country and foreign transfers refer to incoming remittances from household member working abroad.

f. Other sources of income

All other non-labour income components that do not fall into the previous five categories are considered in this last grouping. This source of income include household benefit received from social safety net program like: VGD, VGF, allowances like: freedom fighter allowance, old age allowance, relief or grant, educational transfers and pensions.
Pensions and social benefits reported in this section do not include benefits received from employers, as those are included under the wage employment component.

Table 8-1: Classification of the source of income

Principal income categories	Disaggregate components
Income from farming	Crop , livestock, fisheries (aquaculture & natural catch), forestry
Wages and salaries	Agricultural wage, non-agricultural wage, services, others
Non -farm self-employed activities	Rickshaw riding, tailoring, boatman, contractor, hawker, money lender, tea staler, shopkeeper, mill owner, etc.
Property income	Rent from land, rental value of housing, return to other assets, etc.
Remittance	Domestic, international
Other sources of income	Social safety net programs, pension, relief or grants, allowances etc.

8.3 Overview of Household Income

Per capita yearly income of the sample households is about Tk. 21,494. The corresponding national average is Tk. 30,636 (HIES, 2010). If only rural households are considered, the yearly national average per capita income moves down to Tk. 25,660 (HIES, 2010). Therefore, the sample households are poorer than the national average (and also poorer than the national rural average). While there may be methodological differences in calculating household income between HIES and this study, the comparison is useful and it helps put this study in a broader perspective. Since by design, poorer and disaster prone upazilas were selected for this study, lower per capita annual income of the sample households as compared to the national average is expected.

Table 8-2 shows the variations in yearly incomes across four areas and poverty groups. Both the household and per capita incomes are reported, although the analysis is based mostly on household incomes. It shows that average yearly household income of the extreme poor, moderate poor and non poor are about 66, 82 and 126 thousand taka respectively. It shows that average household income of the extreme and moderate poor in drought and flood prone areas are lower than the other two regions. Both the extreme poor and the moderate poor are better off in Salinity prone area than the other three areas. The per capita income also reflects this comparison.

Table 8-2: Average annual household income (Taka) by poverty and areas

Poverty status	Salinity area	Flood area	Flash-flood area	Drought area	All areas
Extreme Poor	73,518 (13,954)	57,613 (12,016)	72,866 (12,576)	52,028 (11,874)	66,163 (12,919)
Moderate Poor	94,812 (19,855)	68,467 (14,768)	87,462 (16,974)	73,423 (15,476)	82,006 (17,240)
Non-Poor	121,987 (26,749)	133,551 (26,458)	118,199 (22,179)	136,183 (31,857)	125,558 (26,051)

Note: figures in () indicate per capita per month income

8.4 Composition of Income by Sources

Table 8-3 shows the composition of income of the sample households. Income from farming makes up about 38% of the income which is much higher than the national rural average, 22% (Khan, 2005). The share of income from crop (14%) is as big as livestock (7%) and fisheries (7%) together. Interestingly, the share of livestock and fisheries in the sample is higher and the share of crop is lower than the national rural average. It indicates that the sample households are more agriculture-dependent than the national estimates but less dependent on crop. This may also indicate poor regions are more agricultural, more natural resource dependent and at the same time it is exacerbated by climate factors.

Wages and salaries constitute about 24% of the income in the sample while the national rural average is 32%. Agricultural and non-agricultural wages are the major components (about 17%) of income from wages and salaries.

Two other major sources are income from non-farm enterprise (16%) and remittance and transfer (14%). These two sources compare well with the national rural average.

Table 8-3: Per capita annual income (Taka) of rural households

Sources	Taka	%
Income from farming	8 , 624	38.01
1. Crop	3 , 154	13.90
2. Livestock	1, 513	6.67
3. Fishery	1 , 543	6.80
a) Aquaculture	376	1.66
b) Natural catch	1 , 166	5.14
4. Forestry	836	3.69
Wages and salaries	5 , 541	24.42
1. Agricultural wage	2 , 077	9.15
2. Non-agricultural wage	1 , 944	8.57
3. Services	1 , 291	5.69
4. Others	229	1.01
Non-farm enterprise	3 , 813	16.81
Property Income	1 , 011	4.46
1. Rent from land	775	3.42
2. Rental value of housing	47	0.21
3. Return to other assets	188	0.83
Remittance and transfer	3 , 261	14.37
1. Domestic	796	3.51
2. International	2 , 46 5	10.86
Other sources of income	43 7	1.93
TOTAL	**22,687**	**100.00**

**Total population for the sample is 12653.*

Table 8-4 (see Annexure F) provides information on sources of income by poverty groups. It is observed that the extreme poor households depend heavily on wage based livelihoods. More than a third of their income comes from this source. So is the case with the moderate poor. They earn about 28% of their income from wage labouring. They also depend more on the agricultural sector as compared to the non-agricultural sector for this source of income. On the contrary, only 14% of the income of non-poor households comes from wage labouring and more so from the non-agricultural source. The non-poor households earn more from the agricultural sector, mainly from crop production. Their second source of income is remittances. They earn as high as 17% of their total income from remittances.

What is interesting here is that the moderate poor households earn most from non-farm enterprises (23%). This is followed by the extreme poor who earns as high as 21% of their income from non-farm enterprises. The non-poor households

make about 17% of their income from this sector. Thus, though the poor and non-poor households are almost equally involved in the agricultural sector, the non-poor households earn most from it. Similarly, the poor households depend more on non-agricultural livelihoods as compared to the non-poor households.

Table 8-4: Per capita income of rural households by poverty groups

Sources	Extreme poor		Moderate poor		Non-poor	
	Taka	%	Taka	%	Taka	%
Income from farming	2,652	20.84	5,241	31.21	9,421	36.45
1. Crop	968	7.60	2,032	12.10	4,390	16.98
2. Livestock	439	3.45	1,465	8.72	1,999	7.73
3. Fishery	808	6.35	1,069	6.37	1,981	7.67
a. Aquaculture	133	1.05	346	2.06	491	1.90
b. Natural	675	5.30	723	4.30	1,490	5.76
4. Forestry	437	3.43	676	4.03	1,051	4.07
Wages and salaries	5,121	40.24	5,392	32.11	5,763	22.29
1. Agricultural wage	2,613	20.53	3,050	18.16	1,606	6.21
2. Non-agricultural wage	1,856	14.58	1,592	9.48	2,068	8.00
3. Services	315	2.48	552	3.28	1,899	7.35
4. Others	337	2.65	199	1.18	189	0.73
Non-farm enterprise	2,626	20.63	3,908	23.27	4,315	16.69
Property income	197	1.55	181	1.08	1,570	6.07
1. Rent from land	171	1.34	125	0.75	1,199	4.64
2. Rental value of housing	0.00	0.00	0.00	0.00	79	0.31
3. Return to other assets	27	0.21	55	0.33	291	1.13
Remittance and transfer	1,805	14.18	1,638	9.76	4,294	16.61
1. Domestic	702	5.52	892	5.31	815	3.15
2. International	1,103	8.66	746	4.44	3,479	13.46
Other sources of income	326	2.56	433	2.58	487	1.88
TOTAL	**12,727**	**100.00**	**16,792**	**100.00**	**25,849**	**100.00**

8.5 Income and Occupation

Table 8-5 illustrates, household heads who are service holders earn most among all broad occupational categories. Their average yearly household income is about Tk. 153,000. Interestingly, this amount also varies widely across regions. Service holders from drought areas earn significantly higher than other areas.

Table 8-5: Average annual income per household

Main occupation	Salinity area	Flood area	Flash flood area	Drought area	All Areas
Self-employed Agricultural	118,939 (24,851)	118,865 (20,746)	102,906 (18,162)	141,244 (30,160)	117,069 (22,682)
Self-employed non-agricultural	110,237 (23,327)	109,804 (24,253)	112,055 (21,915)	108,775 (23,931)	110,302 (23,485)
Agricultural labour	75,837 (16,566)	66,536 (16,410)	85,673 (18,191)	60,536 (16,968)	73,480 (16,844)
Non-agricultural labour	88,902 (20,662)	81,440 (19,902)	91,433 (19,090)	75,565 (19,508)	86,552 (19,986)
Services	125,991 (30,995)	141,372 (28,060)	135,080 (30,087)	202,707 (46,627)	153,392 (31,714)
Others*	94,906 (18,865)	92,185 (17,821)	133,991 (25,538)	54,016 (17,285)	96,788 (19,379)
All occupation	104,634 (22,212)	99,862 (20,175)	108,489 (20,196)	109,038 (25,175)	104,415 (21,494)

Note: *Figures in parentheses indicate per capita income.*

**Others include migrated household head. Note that income is based on main occupation of the household heads*

Self-employed households earn more than that of wage labourers. There is not much difference in yearly household income between self-employed agricultural (about Tk. 117,000) and non-agricultural (about Tk. 110,000). The slightly higher income for self-employed agricultural is due to the drought region. Yearly income of the self-employed in agricultural (mostly land owners) in drought area (about Tk. 141,000) is significantly higher than other regions and this income is also greater than self-employed in non-agricultural.

Among the wage labourers, labourers in the non-agricultural sector earn more (about Tk. 87,000 per year) than that of those in the agricultural sector (about Tk. 73,000 per year). Note that per capita agricultural wage is higher than non-agricultural wage in Table 8-3. However, Table 8-3 is not comparable to Table 8-5 since the former is based on the source of income and the latter is based on the main occupation of the household head. Agricultural labours in drought and flood prone regions earn significantly less than the other two regions. Higher income from self-employed agricultural and lower income from wage labour in the drought region indicates skewed distribution of land and greater supply of labourers. Yearly income of the wage labourer in non-agricultural in drought prone area is also lower than other regions. Interestingly, there is hardly any difference in yearly total income across areas for all occupational categories.

Average yearly income of the households whose heads are self-employed in non-agricultural ranges from about Tk. 29,000-370,000. However, most of them earn between Tk. 70,000-130,000 per year. Leather/hide traders, utensils store owners, hardware shop owners, and pharmacy owners are among the top earners whose yearly household income exceeds Tk. 250,000. However, very few people are involved in this trade (Table 8-6; see Annexure F). *Muri/chira* producer, cottage industry, *sharee/lungi* hawker are the lowest earners among the self-employed in non-agricultural. The income of these households is less than Tk. 50,000 per year.

Figure 8-1: Household income by occupation in descending order

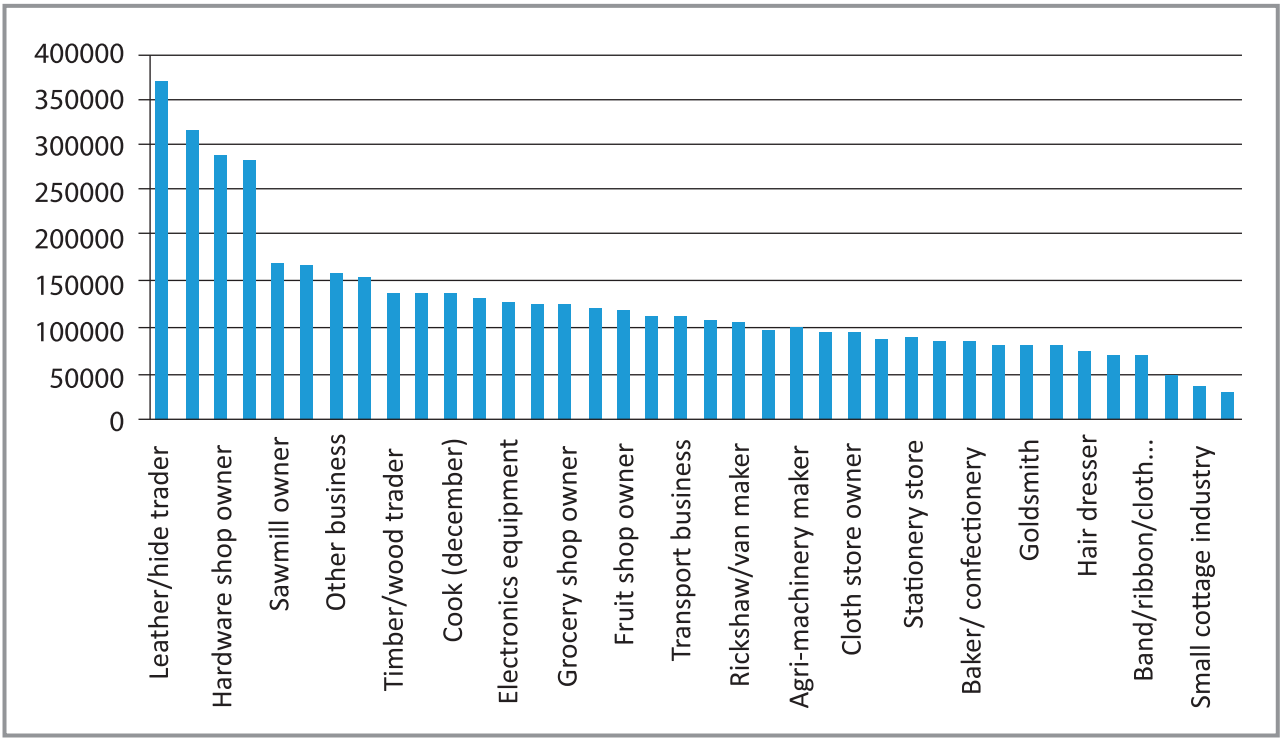
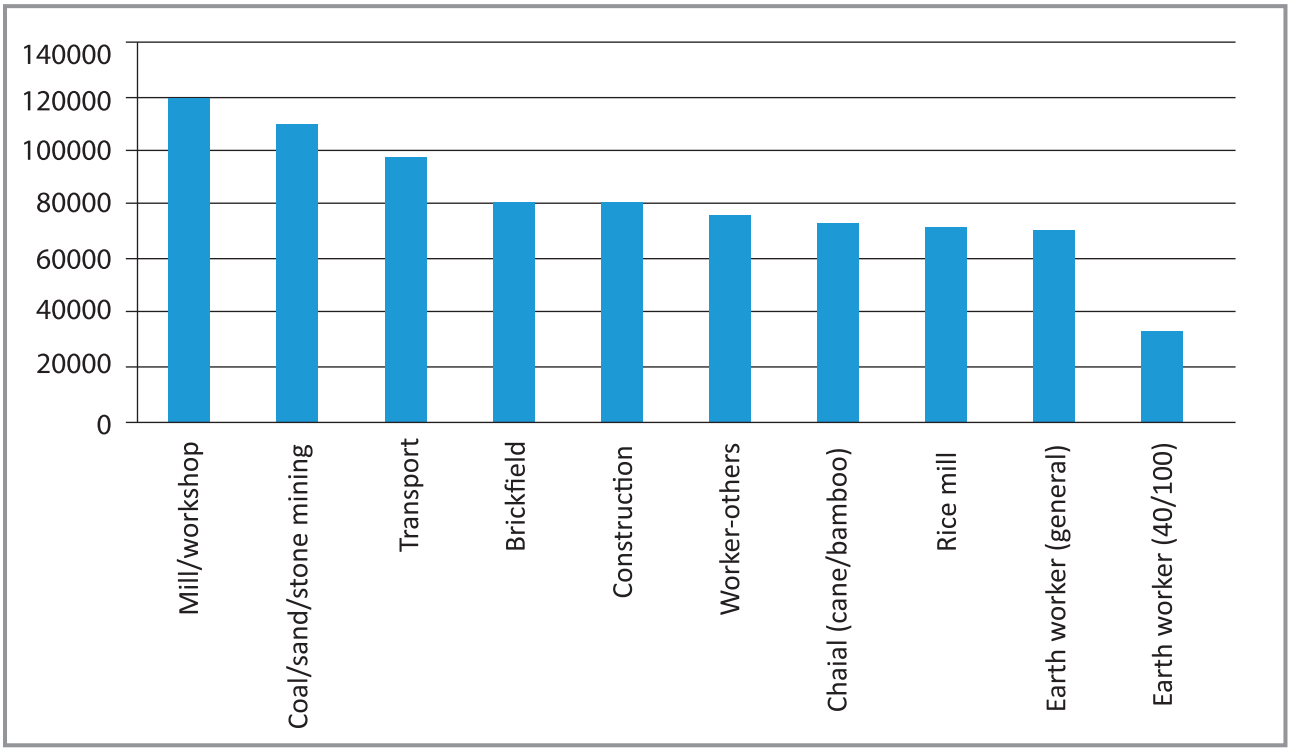


Table 8-7: Average yearly income of households of wage-based workers in the non-agricultural (NA) sector

Main occupation	Area	Flood area	Flash-flood area	Drought area	Areas
Earth worker (general)	78,114 (17,312)	52,616 (15,085)	49,817 (15,451)	-	70,703 (16,706)
Earth worker (food/pay)	126,526 (32,921)	36,250 (7,250)	-	-	108,471 (27,787)
Earth worker (40/100)	-	34,492 (8,623)	-	30,960 (7,740)	33,315 (8,329)
Worker-transport	77,854 (20,662)	109,857 (28,588)	69,500 (23,167)	140,250 (46,750)	97,319 (26,374)
Coal/sand/stone Mining	-	410,200 (51,275)	100,947 (20,568)	-	109,305 (21,398)
Chaial (works with cane/bamboo)	138,600 (27,720)	36,590 (18,295)	58,800 (10,943)	-	73,197 (16,975)
Worker-brickfield	184,000 (36,800)	47,350 (10,205)	-	-	81,512 (16,854)
Worker-rice mill	109,0749 (22,272)	50,500 (25,250)	-	93,150 (15,525)	71,825 (20,387)
Worker-construction	96,642 (22,272)	78,823 (18,823)	67,157 (14,373)	64,243 (16,088)	81,158 (19,082)
Worker - mill/workshop/	109,074 (27,261)	143,450 (34,419)	142,625 (21,944)	-	119,524 (27,544)
Worker-others	88,000 (16,924)	65,010 (14,230)	45,850 (15,283)	109,080 (21,816)	76,642 (16 ,001)

Note: *figures in parentheses indicate per capita income. Note that income is based on main occupation of the household heads.*

Figure 8-2: Household income by occupation (wage earners in non-agricultural) in descending order



If earth workers involved in government's employment generation scheme are disregarded, the yearly household income of the households whose heads are wage-based workers then ranges from Tk. 70,000-120,000. The workers who work in mills, workshops, mining, quarries, and transport earn more than those who work in brickfield, construction, rice mill and earth work.

Table 8-8: Per capita income of rural households (current, in Taka)

Sources of income	1991/92		1995/96		2000		2005	
	Taka	%	Taka	%	Taka	%	Taka	%
Income from farming	2,795	41.4	2,657	35.0	2,190	20.9	3,042	22.2
crop production					1,675	16.0	2,286	16.7
Livestock					153	1.5	262	1.9
Fishery					170	1.6	341	2.5
Forestry					192	1.8	153	1.1
Wages and salaries	1,372	20.3	1870	24.7	3,262	31.2	4,415	32.2
Agricultural wage	732	10.9	838	11.1	1,077	10.3	1,116	8.1
Non-agricultural wage	285	4.2	488	6.4	767	7.3	1,318	9.6
Non-agricultural salary	354	5.3	543	7.2	1,418	13.6	1,981	14.4
Non-farm enterprise	1,034	15.3	1,448	19.1	2,032	19.4	2,276	16.6
Property income	60	0.9	104	1.4	429	4.1	526	3.8
Rent from land					357	3.4	422	3.1
Return to other assets					72	0.7	104	0.8
Remittance and transfer	735	10.9	72	9.6	1,273	12.2	1,985	14.5
Domestic remittance					348	3.3	485	3.5
Foreign remittance					788	7.5	1,300	9.5
Other transfer					137	1.3	200	1.5
Rental value of housing	522	7.7	425	5.6	482	4.6	223	1.6
Other income	227	3.4	354	4.7	797	7.6	1,252	9.1
TOTAL INCOME	**6,744**	**100**	**7,583**	**100**	**10,464**	**100**	**13,720**	**100**

Source: *Khan (2008)*

8.6 From Livelihoods to Income: Who Gets What?

The incidence of livelihoods and incomes can now be compared. That is, not only the livelihoods pursued by the households are now known, but how much their household earns from pursuing these livelihoods is now also known.

In Table 5-43 non-agricultural livelihoods have been differentiated into self-employed livelihoods and wage labouring in the non-agricultural sector. It can be noticed that most of the households in all areas and in all poverty groups are involved in the transport sector. It can be observed from Table 8-6 that a typical household whose household head is involved in this sector earns about Tk. 80,110 per annum. This lies in the lower end of incomes from non-agricultural enterprises. The second important livelihood is trading in agricultural commodities. It can be observed that a typical household involved in this activity earns Tk. 133,117 per annum. This is much higher than income earned by transport sector households. The third frequently observed activity is grocery business. Average household income from this activity is Tk. 124,542.

Wage-based non-agricultural livelihoods will now be considered. Table 5-43 shows that the most common type of livelihoods pursued here is construction sector work. This is pursued by the households in almost all the areas and by all poverty groups. This activity pays as much as Tk. 81,158 on the average per annum. The extreme and moderate poor households in the salinity area are frequently involved in earthwork. This is a very low paid laborious work. Average annual income of such households is Tk. 70,703 on the average. Work in the quarrying industry is exclusively available for households from the Flash flood area. This is relatively a high income activity paying as much as Tk. 109,305 per annum on the average to a household involved in this activity. Some members of the non-poor households are working in mills and workshops. This activity brings the highest income, Tk. 119,524 per annum on the average.

Some activities are participated in by both, the poor and non-poor households (Table 8-9). However, they do not earn the same. The non-poor earn higher than the moderate poor and the moderate poor from the extreme poor from the same activity. For example, in the construction sector, the extreme poor households earn about Tk. 69,905 on the average per annum. The corresponding amount for the moderate poor household is Tk. 84,139 and for the non-poor is Tk. 87,574. This is due to different level of skills and the nature of the work.

Table 8-9: Average annual household income (Taka) of self-employed in some non-agricultural activities

Main occupation	Extreme poor	Moderate poor	Non-poor	All areas
Transport	69,905 (15,165)	84,139 (17,933)	87,574 (23,329)	80,110 (19,171)
Tailoring	72,750 (11,421)	117,990 (19,920)	94,607 (22,659)	98,913 (20,532)
Grocery shop owner	83,700 (18,336)	111,834 (21,466)	132,295 (30,950)	124,542 (28,285)
Fish/milk/agri-commodity trader	88,698 (13,163)	106,533 (21,339)	148,497 (29,022)	133,117 (25,322)

CHAPTER 9

Climate Change Induced Risks on Farm Activities and Outcomes

This section identifies CC induced risks on farm activities and outcomes. The incidence of natural disasters will be first discussed and the way it affects households at different poverty levels. Then focus will be particularly given on agricultural livelihoods and how they are affected by CC and the outcome of these changes.

9.1 Extent of Natural Disasters in the Study Areas

Table 9 -1 (see Annexure F) shows average number of occurrence of disaster in different time spans – last 3 months, last 5 years and last 10 years and the extent to which it affected different types of households. Obviously, when a longer time span is taken, the average number of times a particular disaster affect the households increases. It can be observed that all the households are affected by natural disasters. In general and in most cases the extreme poor are most affected. The non-poor reported of particular disasters not mentioned by the poor. This is the case of hail storm. Similarly, certain disasters seem to have affected the non-poor more. This is the case with cold waves.

One reason why this is the case could be that the non-poor are more involved in farming and both these disasters affect crop. Drought also affects non-poor households more perhaps because of the same reason. The poor households met in Naogaon cope with droughts by migrating year round. They are very much involved in the transport sector.

The last column of the Table 9-1 shows the number and percentage of households affected by each disaster over a period of 5 years. The reference period of 5 years is considered because the last three months are too short while the last five years are too long. About 64% of the households are affected by flood followed by 55% who are affected by cyclone/tornado over the last 5 years. About a third of the households are affected by water-logging.

Table 9-2 (see Annexure F) focuses on the salinity prone area. In most types of disasters, the extreme poor suffer the most. FGD findings also support this. The participants in the village of Naeber Kachari in Patuakhali District reported that the non-poor households do not have to borrow during disasters. They often lend to the poorer households so that they can face the aftermath of these disasters. Salinity intrusion affects the extreme poor most. In the flood prone area the extreme poor households are most affected by floods (Table 9-3; see Annexure F). They are also affected by water logging. In the flash flood prone area the non-poor are slightly more affected by flash floods Table 9-4 (see Annexure F). This again may indicate higher incidence of farming by the non-poor households. In the drought prone area, the non-poor households also reported to have affected most by drought (Table 9-5; see Annexure F). Drought and water logging problems have been reported in all areas. These have affected the livelihoods of the households in many ways. For example, the households in the flood prone area reported problems with irrigation because they rely on surface water irrigation from rivers, ditches and canals.

The non-poor households have been observed to be more directly involved in farming whereas the poor are involved more as agricultural labourer (Table 5-23). Thus certain disasters have been more reported by the non-poor. But it does not mean that the poor are less affected. Since a large part of them also work as agricultural labourers, they are also affected. But the poor have lower incomes. The non-poor are better prepared to withstand the shocks as compared to the poor as they have higher incomes and assets.

9.2 Change in Cropping Pattern

Kharif crops are grown in the spring or summer season and harvested in late summer or in early winter. The season is conveniently divided into Kharif-I and Kharif-II. Kharif-I, often called pre-Kharif, actually starts from the last week of March and ends in May. The Kharif season is characterised by high temperature, rainfall and humidity. The rabi season begins at the end of the humid period when the south-east monsoon starts ceasing in November and extends up to the end of March. (http://www.banglapedia.org/httpdocs/HT/C_0376.HTM, last accessed on 1.10.11)

Farmers in salinity prone area grow aus and aman in Kharif-I and Kharif-II seasons respectively (Table 9-6). In the rabi season, they grow lentils, shrimp, and fish along with the main rice crop boro. In the flood prone area, farmers grow aus and jute in Kharif-I season and aman in Kharif-II season. They grow mustard and potato along with boro. In Flash flood

Table 9-6: The top five crops cultivated at present by seasons

Area	Kharif-I	Kharif-II	Rabi (Boro)
Salinity prone area	Aus - - -	Aman - - -	Boro Lentils Shrimp/prawn Fish
Flood Prone Area	Aus Jute -	Aman - -	Boro Mustard Potato
Flash-flood prone area	Aus (only 4)**	Aman	Boro
Drought prone area	Aus - -	Aman - -	Boro Potato Wheat

Top five crops are determined according to number of household producing that crop is greater or equal to ten.

' Only Four households are producing Aus crop in Kharif-1 season.*

prone area farmers grow *aus, aman and boro* in the three seasons respectively. No other crop is produced in the rabi seasons, unlike other areas. In the drought prone areas, the farmers also grow the main three crops – *aus, aman and boro* in the three seasons. In the rabi season they also grow potato and wheat.
Table 9-8 (see Annexure F) provides information on all the crops produced now and 10 years before (the figures in brackets). With minor crops, no major change is observed. It can be noted that some maize is produced in the drought prone area now which was not the case 10 years ago. More fish and shrimp culture is taking place now.

More households are now producing boro varieties and fewer households are producing aus and aman. This fit the production and acreage trend observed in Bangladesh. First, by and large, the total cropped acreage under rice has changed only a little and that too only during recent years. Second, aman rice acreage has more or less remained unchanged. Third, and this is the most important, the acreage under boro has increased very substantially and that at the expense of aus. This means that irrigated rice cultivation has broadly replaced rain-fed rice agriculture (Asaduzzaman, 2009). What has been happening at the aggregate national level has also been happening in poverty prone fragile disaster prone areas.

Table 9-7: Name of top five crops cultivated 10 years back by seasons

Area	Kharif-I*	Kharif-II*	Rabi (Boro)*
Salinity prone area	Aus - - -	Aman - - -	Boro Lentils Fish Shrimp/prawn
Flood prone area	Aus Jute -	Aman - -	Boro Mustard Potato
Flash-flood prone area	Aus†	Aman	Boro
Drought prone area	Aus -	Aman -	Boro Potato

**Top five crops are determined according to frequency greater or equal to ten.*

† (only 6)

Only 130 households, which represent about 5% of the sample, are found to have changed the main crops over last 10 years (Table 9-9). This incidence is higher in Flash flood and drought prone areas than in the other two regions. Better price and higher productivity for new crops, seed unavailability and lower productivity of the older crops are reported to be the main reasons for the change in salinity prone areas (Table 11-10). In the flood prone area, CC is reported as a major reason for changing crop, on top of better price of new crop and unavailability of seeds of the older crop. In the Flash flood prone area, the reasons for the change are the same as in the flood prone area. The only difference is that even in the Kharif-II season, CC has some role in changing the crop in flash flood prone area. Similar reasons are also reported for drought prone area. Thus apart from market forces, CC factors also contributed to change in cropping pattern.

Though the cropping pattern has not changed much over the last decade, there can be changes at different stages of cultivation such as land preparation, sowing, harvesting time, and so on. Information has been collected on changes in the timing of land preparation (Table 9-11). About one-fourth of the households have reported that the time for land preparation has changed and this change is higher in the Flash flood prone area than elsewhere. Delaying the time for land preparation occurred more than moving the time rearward, mostly in Flash flood prone area. Lack of timely rainfall is reported to be the most important reason for this change in timing in Flash flood prone and drought prone areas. Other reported reasons include less rainfall, coping with natural disaster, water logging and better price (Table 9-12).

Table 9-9: Percentage of households who changed their main crop in 10 years

Area	Kharif-I	Kharif-II	Rabi (*Boro*)	Total
Salinity prone area	14 (1.37)	19 (1.86)	8 (0.78)	41 (4.0)
Flood prone area	4 (0.52)	4 (0.52)	11 (1.43)	19 (2.48)
Flash flood prone area	3 (60.59)	34 (6.64)	11 (2.13)	48 (9.35)
Drought prone area	0 (0)	2 (0.78)	20 (7.81)	22 (8.59)

**() indicates % of the total households.*

Table 9-10: Main reasons for changing crop cultivation by seasons

Area	Kharif-I	Kharif-II	Rabi *(Boro)*
Salinity prone area	- For better price - Seeds unavailability - Lower production from land squeeze	- Higher production from current productivity - For better price	- For better price - Lower production from land squeeze
Flood prone area	- For better price - Seeds unavailability - CC factors	- For better price	- For better price - CC factors
Flash flood area prone	- CC factors	- CC - For better price	- Higher production from current productivity - CC factors
Drought prone area		- CC - Requires comparatively less time for production	- For better price - Lower production from land squeeze - Higher production from current productivity

Table 9-11: Change in time for preparing the land opined by HHs by DPAs

Area	Time Onward	Time Rearward	Unchanged	Total
Salinity prone area	93 (9.09)	90 (8.8)	840 (82.11)	1,023 (100)
Flood prone area	58 (7.56)	42 (5.48)	667 (86.96)	767 (100)
Flash flood prone area	214 (41.8)	86 (16.8)	212 (41.41)	512 (100)
Drought prone area	33 (12.89)	36 (14.06)	187 (73.05)	256 (100)

**() indicates % of the total households.*

The perception about the change in productivity of land is a mixed-bag. It must be mentioned that productivity change due to change in soil fertility has not been referred to. The reference was drawn to actual output produced in the farm. In salinity prone area, about 68% of the households think that there has been no change in land productivity. Among the households who think there has been some change, two-thirds think the productivity has increased. In the flood prone area, about 70% think productivity has not changed while about 28% think it has increased. In flash flood prone area, most of the households (about 58%) think productivity of land has increased while about 37% think it has remained unchanged. In the drought prone area, 53% think it is unchanged while 45% think it has increased.

Table 9-13: Change in productivity in agricultural land during the last 10 yrs by DPAs

Reasons	Salinity prone area	Flood prone area	Flash flood prone area	Drought prone area
Unchanged	696 (68.04)	536 (69.88)	189 (36.91)	135 (52.73)
Increased	209 (20.43)	213 (27.77)	295 (57.62)	116 (45.31)
Decreased	118 (11.53)	18 (2.35)	28 (5.47)	5 (1.95)
Total	**1023 (100)**	**767 (100)**	**512 (100)**	**256 (100)**

**() indicates % of the total households.*

It is interesting to observe that about 12% of the respondents in the salinity prone area have reported that soil productivity has declined. The corresponding figures are about 5% in the Flash flood prone area and 2% in flood prone and drought prone areas. Overall, about 98% of the households reported that productivity either did not decline or increased.

Table 9-14: Main reason for decrease in productivity of cultivated land by DPAs

Reasons	Salinity prone area	Flood prone area	Flash flood prone area	Drought prone area
Salinity raise	95 (9.27)	0 (0)	0 (0)	0 (0)
Drought intensity increased	0 (0)	7 (0.93)	1 (0.19)	5 (1.95)
Sand amount increased	4 (0.39)	2 (0.26)	3 (0.59)	0 (0)
Extent of water logging increased	13 (1.28)	0 (0)	2 (0.39)	0 (0)
River erosion	1 (0.10)	0 (0)	0 (0)	0 (0)
Gets inundated due to flash-flood	2 (0.19)	0 (0)	1 (0.19)	0 (0)
Flood	1 (0.10)	6 (0.79)	13 (2.54)	0 (0)
Advance flood	0 (0)	0 (0)	7 (1.37)	0 (0)
Others	2 (0.19)	3 (0.39)	1 (0.20)	0 (0)
Total	**118** **(11.55)**	**18** **(2.35)**	**28** **(5.47)**	**5** **(1.95)**

**() indicates % of the total households.*

In the salinity area, the main reason for declining land productivity is due to salinity intrusion. In the flood prone area, both drought and floods are almost equally reported as a cause behind declining productivity. In Flash flood area, flood has been pointed out as the main reason for decline in productivity. In the drought area, intensity of drought has been reported as the main cause for declining productivity.

There has been some change in broad cropping pattern in the last ten years. Most of the regions continue to produce the main rice crops: *aus, aman and boro*. There has been change in crops cultivated for about 5% of all households. This figure will increase only if the farming households are considered. Land preparation time has changed for one-fourth of the households. In all the areas, untimely/unpredictable rainfall has been the main cause for this change. They have been associated with CC factors. Land productivity, here understood as the amount of crop produced, is affected by increasing salinity in the salinity prone area or unpredictable or excessive flooding in the flood and flash flood areas. The adverse impact of CC on agriculture is therefore quite clear.

CHAPTER 10

Non-Farm Livelihood Options for Climate Change and Disaster Vulnerable Poor People

The key finding of this study regarding non-farm livelihoods options has been the fact that the poor households are involved in low-return, low-investment and low-skill intensive activities. This is the obvious option for households who are not well endowed with either human capital or financial capital. This explains why a large number of the households are involved either in the transport sector or in trading agricultural commodities. In the wage sector, the participation of the households in non-agricultural sector is very limited. They are involved more in the construction sector and earthwork. This highlights the role played by the construction industry and improvement in rural infrastructure. Participation in factory work is negligible.

The implication of this finding is that participation in a growing or promising non-agricultuale is constrained both by the supply factor (poor human and financial capital) as well as the demand factors (few factories in the rural areas or peri-urban sites in the disaster prone areas). The strategies taken by the households are reactions to lack of work on the one side and also by the ability to do some more gainful work on the other. But the fact remains that these non-farm livelihoods are no less affected by CC factors.

Table 10-1 (see Annexure F) lists the non-farm self employment activities recorded in the salinity prone area and indicates the extent to which these activities are affected by natural disasters. It has been observed that about one-fourth of the households are affected by disasters. For instance, 5.8% of the households are highly affected, and 18.2% are moderately affected. Among the non-farm activities, rickshaw/van pullers and nosimon drivers are the most affected, followed by those involved in fish/milk and agro-based enterprises. Of all the rickshaw/van/nosimon drivers interviewed, about 70% of them reported to be affected and they reported that water logging, flood, flash flood, unexpected tide affected their occupations most (Table 10-2; see Annexure F). Other noteworthy activities affected by disasters are tailoring, small cottage industry, and grocery shops. Households who are involved in non-farm self employment reported that water logging and flood are the most damaging disasters affecting their livelihoods.

Table 10-3 (see Annexure F) lists the non-farm self employment found in the flood prone area and shows whether these non-farm activities are affected by natural disasters such as floods. Table 10-3 also shows that, like the salinity prone area, about one-fourth of the households in flood prone area are affected by disasters. For instance, 5.8% of the households are reported to be highly affected, and 19% are moderately affected. Among the non-farm activities, rickshaw/van puller and nosimon driver, fish/milk and agro businessmen, tailors, owner of small cottage industry, grocery shop owners, and transport businessmen are affected most. As expected, flood and water logging are the main disasters that affected their non-farm occupations. About 19% of the households reported that their non-farm occupations were affected by flood and 4% by water logging in flood prone area (Table 10-4; see Annexure F).

Table 10-5 (see Annexure F) lists the non-farm self employment activities in flash flood prone area and shows whether these non-farm activities are affected by natural disasters such as flash flood and others. Table 10-5 shows that about one-fifth of the households are affected by disasters in the flash flood prone areas, 5.7% of the households are highly affected and 15.8% moderately affected, as far as their occupations are concerned. Among the non-farm activities, fish/milk and agro businessmen, rickshaw/van puller and nosimon driver, grocery shop owners, owners of small cottage industry are the most affected. As expected, flood and flash flood affected their enterprises most. About 21% of the households reported that their non-farm occupations were affected by flood and flash flood (Table 10-6; see Annexure F).

Table 10-7 (see Annexure F) lists the non-farm self employment activities in drought prone area and shows whether these non-farm activities are affected by the natural disaster such as drought (see alsoTable 10-8; see Annexure F). Table 10-7 shows that most of the non-farm activities did not have remarkable affect due to disaster. Only 11% of the households' non-farm occupations in drought prone area are affected by disasters. Among the non-farm activities which are affected, fish/milk and agro businessmen, rickshaw/van puller and nosimon drivers, and *muri/chira* producers are note-worthy.

Case study 10-1: Migration due to river bank erosion

Name	Awal Hawaladar
Age	40 years
Village	Nayeb Kachari Boro Kajol
Union	Charkajol
Upazila	Golachipa
Zila	Potuakhali

Awal Hawaladar studied up to grade eight. After his father's death, at the age of 16, Awal started a shop of betel leaf on the bank of Bura Gourango river at Galachipa. In the last 15 years, Awal's business suffered from river bank erosion for several times. This recurrent disaster forced him to close his business. Consequently, he went to Chittagong and started working in a sugar warehouse. His duty was to write serial numbers of trucks. He saved some money from this work. After working for two years in Chittagong, Awal went back to his village in 2006 and reopened his shop to sell betel leaf. He was fortunate and able to transform the shop into restaurant. Now he can make Tk. 200-250 of net profit in a day. He hopes that disaster might not affect his business that much like his neighbours who still mostly depend on natural resource bases.

Non-farm self-employed livelihoods are most affected in the salinity, Flash flood and flood prone areas. The non-farm self-employed livelihoods are relatively less affected by CC in the drought prone area. Even when they are affected, the affect is mostly described as "moderate". The transport sector (rickshaw, van, *nosimons*) are most affected. Those related to agro-processing are also affected. Most of them are affected by flood, flash flood, its level and unpredictability.

10.1 Coping Strategies

It has been observed that the functioning of the social system were fully or remarkably disrupted in number of cases in many places of the coastal belt during the recent past decades. Therefore, cyclones and storm surges are considered as the most deadly natural hazards that causes sudden on-set. Flood also have dramatic phenomenon to cause sudden on-set as a result of erosion in many parts of the river basins.

Table 10-10 documents the coping strategy adopted by the households. It has been found that the affected households made up the loss of disasters mostly from their own savings and borrowings in all areas. About 30-40% of the households depend on these two strategies. Interestingly, about 25% of the households in salinity and drought prone areas reported that they did not do anything. In flood prone area, the extent of private and public help is very meagre while in salinity prone area about 10 and 8% households received private and public assistance.[2]

flood farm income can also help households to cope with disasters. The aforesaid case study shows how Awal Hawladar could cope with repeated river bank erosion with his the meagre income from a small grocery shop.

Case study 10-2: Sons sent to Dhaka for being unable to repay loan

Name	Kalam Khondokar
Age	40 years
Village	Nayeb Kachari Boro Kajol
Union	Charkajol
Upazila	Golachipa
Zila	Potuakhali

Kalam Khondokar used to fish in Bura Gourango river with his three sons. He borrowed Tk. 18,000 from an aratdar to make fishing net. In a storm they were swept away, and could hardly rescue the boat but the net. That kept them away from fishing. As he could not repay the loan of aratdar, Kalam sent his two sons to Dhaka. One of his sons started working in a small grocery shop for Tk. 140 a day. The other son started working as a construction worker for Tk. 200 a day. But his sons' income is too little to fully repay the aratdar's loan. Kalam now waits for the day when he would be able to repay all his debt and go back to fishing with his sons.

The story of Kalam Khondokar shows how remittances sent by his sons were helping him to repay his loan. He went into debt after losing his fishing gear in a storm.

[2]For a comprehensive study of coping strategies in various disaster prone zones, please see Shafie et. al. (2009)

Table 10-10: First main coping strategy taken by the households to deal with natural disaster

Strategy	Salinity prone area		Flood prone area		Flash flood prone area		Drought prone	
	N	%	N	%	N	%	N	%
From Savings	1,196	30.01	613	42.39	307	31.33	122	31.94
Taking New Loans	637	15.98	311	21.51	215	21.94	75	19.63
Government Help	307	7.7	6	0.41	14	1.43		
Private Sector Help	387	9.71	12	0.83	51	5.2		
Help From Friends And Relatives	311	7.8	190	13.14	215	21.94	58	15.18
Selling Land	16	0.4	25	1.73	7	0.71	2	0.52
Se lling other Assets (Excluding Land)	70	1.76	45	3.11	22	2.24	7	1.83
Mortgaging Land	2	0.05	25	1.73	17	1.73	0	0
Mortgaging Other Assets (Gold, Livestock)	1	0.03	4	0.28	0	0	0	0
Advance Selling Crop	3	0.08	5	0.35	8	0.82	0	0
Advance Labour Sell	4	0.1	8	0.55	13	1.33	10	2.62
Diversify Occupation	9	0.23	10	0.69	4	0.41	9	2.36
Out Migration	21	0.53	11	0.76	29	2.96	0	0
Remittances	33	0.83	5	0.35	9	0.92	0	0
Did Not Do Anything	984	24.69	176	12.17	66	6.73	98	25.65
Others	5	0.13	0	0	3	0.31	1	0.26
Total	**3,986**	**100**	**1,446**	**100**	**980**	**100**	**382**	**100**

**% of household affected by different types of natural disaster*

10.2 Climate Change and Livelihoods Change

People change livelihoods for a complex set of factors. Some of these can be for economic factor while others could be for changes in natural environmental systems. This section looks at the kind of changes observed in the study area.

Table 12-11 (see Annexure F) lists the livelihoods dropped in the four disaster prone areas. The incidence of changing occupation is very high, and varies across the areas. The most changes occurred in the flash flood prone areas, where about 19% of the households have changed their occupations, followed by 15% in flood prone area and 14% in salinity prone area. The incidence of changing occupation is the lowest in drought prone area which is only about 8%.

Cultivation is the single most important occupation dropped by the households in salinity prone area. About 4.7% of the households in Salinity prone area are no longer involved in agriculture. About 2.8% of the households whose heads were agricultural workers also changed their livelihoods. Other notable activities dropped in salinity prone area are fishing and rickshaw/van/nosimon driving.

Similar pattern of dropped occupations is also found in the other three regions. In the flood prone area, about 5.3% of the households, in Flash flood prone area 8.6% and in drought prone area 3.1% households are found to have changed their occupations. In the flash flood prone area about 3.1% of the households have changed their fishing occupation.

A clear pattern has emerged. In all the DPAs, some households dropped farming. This is even the case with the households in the drought prone area where dependence on farming is high compared to other areas. The second important pattern is people dropping the occupation of agricultural workers. This is the second important livelihoods dropped in all the areas, except for the drought area. In the drought prone area, the second important occupation dropped is in the transport sector (rickshaw, rickshawvan). This finding is consistent with the macro level finding as well as findings from other studies that people are moving away from the agricultural sector.

Table 12-11 lists the livelihoods dropped by the households. So, the obvious question is to what occupations they switched to. Table 12-12 (see Annexure F) lists the occupation these households have taken up. Fishing, rickshaw/van pulling and nosimon driving, construction worker, grocery owner, worker in mill/workshop, etc are the major new occupations. This distribution of new occupations does not vary much across areas. Interestingly, very few people have switched to cultivation which happens to be the lowest in the drought prone area.

Case study 10-3: Sidr made a trawler-owner to fishing-labourer

Name	Atahar Hawladar
Age	39 years
Father	Mir Hawladar
Village	Ankujan Para
Union	Pachakuralia
Upazila	Amtali
Zila	Barguna

Atahar started fishing with his father since he was 12. They were happy with the daily income, Tk. 500-600 for the daily needs. Sidr took everything they had including trawler, net, etc. Atahar was rescued from Sundarban after three days of the incident. After the disaster, Atahar started working as a trawler-labourer, and could earn Tk. 100-150 a day. Sidr has turned an employer of 5-6 labourers into a labourer. Atahar is now planning to restart fishing business by borrowing Tk. 1,000,000 from any bank, NGO or even an aratdar.

Shah Alam started fishing with his father since he was 7, and he himself became a fisherman by the age of 20. After sometime, Shah Alam realized that fish stock has been depleted. He was noticed, he needs to be at off shore for a reasonable catch. He also identified that the shift would cost him huge investment and risk, as well. He pointed, the frequency and intensity of the calamities were getting higher and the guarantee of having fish was getting lower. Even the fishermen had to risk their lives in the deep sea. Compared to the past days, the average daily income was reduced from Tk. 500-700 to Tk. 150-200, which provoke Shah Alam to trade off.

Shah Alam decided to buy a Nosimon. He borrowed Tk. 50,000 from different NGOs. Now he is earning Tk. 200-300 a day. Shah Alam believes, the profession would give him a stable income even in emergency situation.

Case study 10-4: From farmer to motorbike driver

Name	Shanu Talukdar
Age	40 years
Father	Hashem Talukdar
Village	Gab Baria
Union	Pachakuralia
Upazila	Amtali
Zila	Barguna

Shanu Talukdar never attended school. Since childhood he has been working in agriculture. He worked in his family's owned lands, mortgaged lands and shared lands. Ten years ago he went to Dhaka to work as an earth worker. Later he worked as a rickshaw puller, and could earn Tk. 200-250 a day. His wife, who lived in village, also raised poultry and livestock.

Shanu returned to his village from Dhaka this year. He bought a motorbike for Tk.124,000 in instalment for rent. He paid a down payment of Tk. 50,000 (that he got by selling 5 cows from his wife's livestock). Now with his motorbike he can earn minimum of Tk. 500 a day. Shanu finds agriculture is now a losing concern. With the increased income from motorbike, Shanu is now able to send their three children to school.

In all areas, except the flood prone area, what people have done most is start working in the transport sector. Only in flood and salinity prone areas can some shift towards agricultural be seen. But in general, the movement towards non-agricultural sector is clear.

Table 12-13 documents the reasons for changing livelihoods. Higher income, CC, higher sustainability and health factors are the most important reasons reported in salinity prone area for changing occupations. In flood prone area, the reported reasons are better income, health reason, higher sustainability and greater opportunity for work. In the Flash flood area higher sustainability is the most important cause after better income. CC and higher scope of work also dominate. Similar reasons are also reported in the drought prone areas.

Case study 10-5: From agricultural labourer to van driver

Name Abdul Jalil
Age 45 years
Father Abtar Hossain Mallick
Village Gab Baria
Union Pachakuralia
Upazila Amtali
Zila Barguna

Since his childhood, Abdul Jalil has been working for the local chairman as an agricultural labourer. In return he used to get very little (about 30 mounds of rice in a year). He has to feed six in his family. Therefore, he was forced to leave the profession. He sold his goat, chicken, duck and tree for Tk. 5,500 and bought a rickshaw van. Now he can make atleast Tk. 200 a day. Jalil could never dream of sending his children to school while working as an agricultural labourer. Now all the three daughters attend school.

Table 10-13: Reasons for changing livelihood

Reasons	Salinity prone		Flood prone		Flash flood		Drought prone	
	N	%	N	%	N	%	N	%
For better income	44	4.30	46	6.00	37	7.23	7	2.73
For better sustainability	25	2.44	15	1.96	22	4.30	3	1.17
Scope for working is high	8	0.78	12	1.56	6	1.17	3	1.17
For CC	35	3.42	7	0.91	15	2.93	0	0.00
For health purpose	15	1.47	21	2.74	7	1.37	5	1.95
Income less for CC	6	0.59	4	0.52	3	0.59	0	0.00
Sustainable income falls for CC	2	0.20	1	0.13	3	0. 59	0	0.00
Others	10	0.98	10	1.30	5	0.98	3	1.17
Total	**145**	**14.17**	**116**	**15.12**	**98**	**19.14**	**21**	**8.20**

**% of all households belonging to the respective area.*

Table 12-14 broadly categorizes the change in livelihoods – whether the change has occurred within agricultural, non-agricultural, and natural resource collection or change has occurred across sectors. It had been found that most changes occurred from agricultural to non-agricultural and also within non-agricultural. In the flash flood prone area about 13% have changed their livelihood from agricultural to non-agricultural. In the salinity, flood prone and drought prone areas these percentages are about 7, 8 and 4 respectively.

Table 10-14: Change in livelihood status

Change	Salinity area		Flood area		Flash flood area		Drought area	
	N	%	N	%	N	%	N	%
Agricultural to non-agricultural	74	7.23	61	7.95	66	12.89	10	3.90
Agriculture to natural resource collect	6	0.59	1	0.13	5	0.98	0	0
Non-agricultural to agricultural	9	0.88	14	1.83	2	0.39	3	1.17
Non-agricultural to natural resource collect	6	0.59	2	0.26	0	0.00	1	0.39
Natural resource collect to agricultural	2	0.20	0	0.00	1	0.20	0	0
Natural resource collect to non-agricultur al	3	0.29	0	0.00	0	0.00	0	0
Within agricultural	16	1.56	5	0.65	3	0.59	0	0
Within non-agricultural	26	2.54	32	4.17	20	3.91	7	2.73
Within other natural Collect	1	0.10	0	0.00	1	0.20	0	0
Others	2	0.20	1	0.13	0	0.00	0	0
Total	**145**		**116**	**15.12**	**98**	**19.14**	**21**	**8.20**

**% of all households belonging to the respective area.*

Table 10-15: Changing pattern in income

Changing pattern	Salinity prone area		Flood prone area		Flash flood prone area		Drought prone area	
	N	%	N	%	N	%	N	%
Declined a little bit from previous	30	2.93	13	1.69	4	0.78	4	1.56
Declined a lot from previous	15	1.47	11	1.43	9	1.76	2	0.78
Increased a bit from previous	65	6.35	55	7.17	59	11.52	9	3.52
Increases a lot from previous	17	1.66	26	3.39	22	4.30	4	1.56
Unchanged	18	1.76	11	1.43	4	0.78	2	0.78
Total	**145**	**14.17**	**116**	**15.12**	**98**	**19.14**	**21**	**8.20**

**% of all households belonging to the respective area.*

10.3 Mainstreaming Non-Farm Livelihood Options into National Development Process

National development process should attack on two fronts. The first front is obvious: it should try to lessen the shock and stresses of CC factors either through awareness raising programmes or through adaptation activities or, when possible, mitigation activities. The second front is the economic front where policies should be taken to foster the growth of the non-farm economy. The issue here is not only the quantity of growth but more importantly, the quality of growth. Policy issues are dealt with in Section 14 but here some limited discussion on mainstreaming non-farm livelihood options into the national development process in Bangladesh is made.

10.3.1 Climate Change Factors: The First Front

Few strategies are already in place and have been contributing towards reducing vulnerabilities of the rural households to CC. Both NAPA (2009) and BCCSAP (2010) have addressed these issues. While NAPA was prepared as an immediate response to CC, the BCCSAP was formulated to promote climate-resilient development in Bangladesh. It developed strategies based on six pillars that include comprehensive disaster management, development of climate-resilient cropping systems in all disaster prone systems, adaptation against drought, salinity, and flood.

All livelihoods are exposed to CC factors, agricultural and non-agricultural. Given that the two are intrinsically related, what affects one has strong implications on the other sector. It has been found in this study that a large number of poor households are involved in trading in agricultural commodities. If agricultural is affected by CC, trading in agricultural commodities cannot stay immune from this. This is the analytical approach taken in this report and represented in Figure 3-3. The livelihoods approach taken in this report also focuses not only on employment but also on other factors such as health, water, education, poverty and so on. Therefore the key factors that affect the livelihoods of the rural households have to be first approached along with the specific factors which have been identified in this study.

In salinity prone area the central problem is associated with tidal waves, cyclones, water-logging, salinity intrusion, among others. These issues must be addressed on a priority basis. Similarly, in the flood prone area, it is obviously flood that affects livelihoods in general and non-farm livelihoods in particular. In the flash flood area it is the extent and severity of flash flood. In the drought prone area it is drought that causes serious problem to the poor households. In fact, discussions held with the households at the villages in all areas were often done more in terms of broader factors that affect all livelihoods rather than in terms of specific livelihoods.

Of course, most focused on farming but they unanimously emphasised supply of some public goods that is essential for their survival. In Sirajganj, the households have to live on the embankment during the entire flood season as that is the only dry place found for living at that time of the year. The embankment that was saving them a few years ago is now severely breached and does not protect the villages around that part of the River Jamuna. In this situation, the key public policy would be to fix the embankment. When this is done, not only the direct well-being of these people will improve, but also agricultural and non-agricultural livelihoods would flourish. Similarly, in the drought prone area in Naogaon, people wanted water not only for irrigation but also for drinking and bathing. These are fundamental building blocks of livelihoods and have to be supplied by the government. The upshot of this argument is that the government should first prioritize the known problems in each disaster prone area and then try to address them as soon as possible. The non-farm livelihoods should be identified and explicitly promoted. This study has identified some livelihoods that are within the reach of the poor households. More information is needed for investment in the promotion of non-farm livelihoods. This is required for mainstreaming non-farm options in the development process.

10.3.2 The Economic Factors: The Second Front

Households do not only react to CC, they also react to economic opportunities. When agricultural cannot sustain livelihoods, people move to non-agricultural. People also move to the non-agricultural sector when returns are high. Given that a large number of poor households are now involved in the non-agricultural sector, the government should explicitly recognize its role in livelihoods generation and poverty reduction. The rural non-farm sector has not yet received enough explicit strategic position in the overall development strategy of Bangladesh. This attitude has to be changed. Of course, existing rural development strategy has been contributing to promoting rural non-farm activities. Development of growth centres, linking them with better road infrastructure, spending on health, education etc. is contributing towards the growth of this sector. This rural development strategy should be continued but with an added focus on CC factors. The government can start to think of creating a directorate under the Ministry of Industry or Ministry of Agriculture to promote non-farm livelihoods.

CHAPTER 11

Technology for Non-Farm Options

In this section the technologies and viability of the technologies for the non-farm options will be identified and discussed. Adaptation measures and strategies to put these technologies in place will also be mentioned. It has to be emphasized that the households living below poverty line in the rural areas are the targeted population for the study. These households are selected from the most poverty and disaster prone areas in Bangladesh.

11.1 Identification of the Technologies

Before identification of the technologies in the non-farm sector is made, it is important to identify the non-agricultural activities pursued by the poor households.

It has been found in this study that most of the households are involved in self-employment in agricultural, about 45%, about 22% of the households in self-employment in non-agricultural activities and about 12% in the non-agricultural sector as wage labourers (Table 5-23). The relatively backward state of this sector is reflected in the poor size of the labour force employed as wage labourers. This implies that factory based, hired-labour based non-farm enterprises are not growing enough. This is a general trend in many sectors of the rural economy of Bangladesh. For example, although the aquacultural sector is growing fast in Bangladesh, the dominant form of aquaculture farms continues to be homestead-based (Belton, et. al. 2011). It has also been seen that although non-agricultural enterprises use more hired labour and capital as compared to the agricultural enterprises, the levels are too low (Table 7-2) for this sector to be considered as a dynamic sector.

Table 11-1: List of technologies for non-farm options

Non-farm livelihoods	Description of livelihoods	Capital goods
Transport sector	Rickshaws, vans, nosimons, etc	Vehicles, repair machines
Trading in agricultural commodities	Trading in agricultural outputs (milk, eggs) and inputs (feed)	Fixed premises in markets
Tailoring	Done by moderate poor households	Sewing machines, fixed premises

In section 7.4.10, a list of livelihoods that can be promoted by the policy-makers is identified. This is based on the incidence of non-agricultural livelihoods pursued by the surveyed households (Table 5-43). In the self-employment category, transport sector comes first, followed by trading in agricultural commodities. Transport sector is here characterized by rickshaws, vans, *nosimons* and other mechanized or non-mechanized vehicles. These vehicles are increasingly being used in farming, in transporting goods and people. Trading in agricultural commodities involves trading agricultural inputs (feed, for example)

oroutputs (selling milk, eggs, etc.). Some moderate poor households are also involved in tailoring. It is proposed to promote these activities because they are already pursued by the poor households in large numbers as already found in this study. This indicates that there is really not many financial or human capital barriers to entry to these activities and the poor can enter these trades when required. In the wage employment sector construction work comes first (Table 5-25).

11.2 Viability of the Technologies

The technology used in these activities is obviously very simple. In most cases it involves one main capital good such as a rickshaw. In trading agricultural commodities, it involves often a physical space for a shop or a platform on which the goods can be transported. The viability of these technologies depends more on other supporting factors. For example, for the transport sector to flourish, one needs developed road infrastructure. Where this infrastructure is missing, the transport sector lags behind. This is the case in the flash flood prone area. In the drought area, infrastructure is relatively better developed and the poor can participate in the transport sector in a larger scale. Thus the crucial question is how infrastructure projects are developed so that it can take the shocks and stresses of CC effects. Similarly, as already noted, trading in agricultural commodities is directly linked to the farm sector and will therefore be affected when the farm sector is affected by CC factors.

11.3 Adaptation Measures

Adaptation measures therefore relate not only to these technologies as such but also to the technologies involved in supporting activities such as rural road infrastructure or more resilient agriculture. Rural road infrastructure is very crucial because if it does not address CC factors, livelihoods will be affected. For example, bridges and culverts should take into consideration not only current flood levels, but also projected flood levels as determined by changes in the climatic conditions.

The policy-makers first need to prioritize the non-farm livelihoods they want to promote among the host of livelihoods rural people pursue. Note that some of them are more affected by climatic changes than the others. The list of non-farm livelihoods has already been provided in the previous sections (see Table 11-1 in particular).

11.4 Strategies to Put Technologies in Place

A large part of these activities is already supported by micro-credit. Credit is a major constraint to development of these activities along with skills. These activities are less skill constrained. This strategy should be complemented with those that promote the supporting factors such as rural road infrastructure, more climate-resilient crops and so on.

Specifically, the policy-makers can adopt the following strategies:

a. Involve local government and local NGO-MFIs to introduce livelihood specific insurance schemes.
b. Involve local government and local NGO-MFIs to introduce livelihood specific flexible credit schemes.
c. Ensure smooth transition from farm to no-farm sectors for the affected people through information, training and credit.
d. Engage engineers and disaster management experts to come up with indigenous technology for transport sectors which are better equipped for climate change adaptation (CCA).
e. Build awareness among the local people to prevent building of infrastructure that is not disaster-proof.

CHAPTER 12

Policies to Promote Non-Farm Livelihoods

The policy space to promote non-farm livelihoods should focus on the strong relationship between the agricultural sector and the non-agricultural sector as depicted in Figure 5-3. The core of this relation is the agricultural sector, particularly in the context of Bangladesh. Agricultural growth translates into non-farm growth and is the key driver of the non-farm sector. This in some East Asian countries. In those countries small and medium firms are located in peri-urban areas and produces spare parts for industries located in the urban areas. In this situation the source of growth was less based on agricultural development but overall industrial development with strong backward linkages. In Bangladesh, this has been mimicked by growth in high value agricultural products such as milk and other commercial crops (i.e. Pran and Aftab).

The literature on non-farm economy of Bangladesh has already adequately pointed out the policy implications for fostering the non-farm sector. The following quote from Toufique (2002) still remains valid:

> *"The general guideline is simple: we need to strengthen the links within the rural sector – between agriculture, non-agriculture and the missing third dimension – the external sector (migration, urbanisation, etc.). Broadly speaking, we need investment in infrastructure, education, credit and agro-processing. At the same time we have to strengthen the system of local governance. These are the entry points to improve livelihoods based on non-agricultural activities, migration and urbanisation. Investment in infrastructure will encourage specialisation and division of labour. It will expand the exchange of inputs and outputs between villages and small towns, urban areas and possibly export markets. Trade, commerce and marketing will also thrive. Investment in education will enhance productivity, improve entrepreneurial capabilities and help migrants to secure better jobs at destination. This will also reduce differentiation in the non-agricultural sector to some extent because participation in the non-agricultural sector is often constrained by lack of appropriate skills. Investment in agro-processing will create backward linkages. Demand-side constraints have to be relaxed for the growth of the non-agricultural sector. Self-governing local governments may stimulate growth of the non-agricultural sector by facilitating the development of physical, social and human infrastructure at the local level. For this, the local governments need decision-making, implementing and financial powers."*

A CPD study conducted by Prof. Sattar Mandal emphasized the same. It recommended strengthening the key drivers of rural non-farm growth. The agricultural sector has been identified there as the key driver. It also emphasized strengthening the rural-urban linkages and improving market linkages.

Hossain (2004) mentions that the researchers on rural industries in Bangladesh have identified major constraints on the development of the sector as shortage of finance, deficient entrepreneurship, traditional technology, low quality of output, inadequate infrastructure and marketing facilities, and unfair competition with large and medium scale industries due to discriminating macro-economic policies. He also pointed out that two public sector programs which have indirectly helped expansion of the non-farm sector are: (a) the development of the rural road network since the mid-1980s, (b) the

expansion of rural electrification, and (c) improvement in functional literacy. Thus, the policy suggestions coming from Prof. Sattar Mandal and Dr. Mahbub Hossain are very much in line with those suggested by Toufique (2002).

Here some important non-farm livelihoods and their possible adaptation measures are discussed. We have grouped the policies as those related more to the national level and those related more to the regional level and/or occupation specific.

12.1 National Level Policy

12.1.1 Identifying and Engaging Local Institutions and Communities

Local knowledge is the key in disaster management as the locals generally have more information and knowledge than the national policy-makers and leaders. The following strategies can be put in place to address the adaptation technology of non farm livelihoods:

a. Identify appropriate local institutional partners – public, private and NGO.
b. Any public intervention can be complemented by both private and NGO sectors while local government (e.g., Union Parishad and upazila parishad) can take the lead of implementation.
c. Build a political consensus regarding the adoption measures and the livelihoods to be promoted.
d. Engage local communities in planning and implementation stage by creating a database of local volunteers and experts.
e. Support building community awareness of CC and the possible adaptation strategies, including less affected non-farm activities.
f. Engage community to assess their resilience to CC.
g. Promote more participatory and community-based natural resource management.
h. Promote decentralized resource management.

12.1.2 Assessing Climate Risk and Livelihood Options

In order to develop policy tools tailored to specific region, disaster and occupation, it is imperative to assess the climate risk first. The appropriate strategies would be:

a. Create multi-stage bodies of experts and stakeholders to assess climate risk at a national, regional and local level.
b. Create multi-stage bodies of experts and stakeholders to document and assess livelihood options at a national, regional and local level.
c. Create a database of local livelihoods, income from that livelihood, technology used and extent of vulnerability to CC at a regional and local level.
d. Create a regional map of the spatial distribution of major occupations and compare it with the climate risk map of the country.

12.1.3 Strengthen Institutional Capacity and the Policy Framework

Institutional capacity and an enabling policy framework are central to managing CC-related strategies and adoption technologies. Specific recommendations include:

a. Assess institutional capacity and needs – both local and national.
b. Assess and foster an adaptation-friendly policy, legal and public spending framework.
c. Arrange regular and effective training of the local and national stakeholders on assessing climate risks and means of promoting non-farm livelihoods.
d. Strengthen institutional coordination at different tiers of government and also with non-government partner organization.

12.1.4 Evaluate, Analyze and Monitor Adaptation Strategies

Once certain livelihoods are chosen for promotion in certain areas to help minimize CC-induced risks, it is essential to determine and evaluate the required interventions. Strong economic analysis is required to analyze the impact of such initiatives. Constant monitoring of such initiative is also needed to successful implementation. Specific recommendations are:

a. Form an impact assessment group of experts including economists and practitioners who are eligible to assess such intervention.
b. Form a monitoring cell at local and regional government level who would oversee the implementation of such initiatives.

12.2 Regional/Occupation Level Policy

Promotion of self-employment based livelihoods requires, among others, investment in capital goods, softening the credit market, development of rural infrastructure. Linking with the market is also important. Livelihoods gain, at least a large part of it, are realized through the markets. Promotion of wage-based non-agricultural livelihoods requires development of skills, improvement of health facilities and nutrition. It also requires information so that high-return employment can be obtained at home or in the towns and cities.

12.2.1 Promotion of Some Self-Employment Based Livelihoods

Transport:

a. Build high roads or elevate the existing ones so that they are not affected by floods and cyclones.
b. Introduce insurance for transport workers for the loss of income due to CC.
c. Introduce special credit schemes for purchasing rickshaws, vans, etc. with lower interest rates and flexible term structures.
d. Use local knowledge and technology to make these vehicles more durable and disaster-proof.
e. Inform the rural people involved in the transportation sector about the possible income opportunities elsewhere which are less affected by disasters.

Grocery:

a. Introduce insurance for the possible income loss due to disasters.
b. Introduce special credit with lower interest rate and flexible term structure for them.
c. Help them build their shops at few meters above the ground in flood and flash flood prone areas.
d. Prepare them with specific evacuation/storage plans so that the owners do not lose products kept in the shop.

Trading:

Most of the intermediaries in trading at the rural level (*faria, bepari*) are poor and disadvantaged people. They play an important role in the circulation of commodities from one point of the market to the other. A small capital support to them may help to get proper price of agricultural production. This will help both producers and consumers:

a. Introduce insurance for the traders for possible income loss due to disasters.
b. Introduce special credit with lower interest rate and flexible term structure for them.
c. Help them with information about the areas where trade is not affected by disaster so that they can relocate their business.

Tailoring:

This study has found high incidence of tailoring amongst the surveyed households. Tailoring here not only includes small rural tailoring shops in the market but also at home done by men and women. Tailoring should be diversified to include stitching of bags, pillow covers and other more commercial items.

12.2.2 Promotion of Some Wage Labour-Based Livelihoods

Construction work:
Construction work ranked first amongst the most performed wage-based livelihoods undertaken by the poor households. There is a tremendous demand and scope in the construction sector. Construction sector has huge potential for the private sector. It has strong and diversified backward and forward linkages with other livelihoods such as carpenters, electricians, plumbers etc.
Earth Worker:
A large number of poor households are involved in rural road construction, digging of ponds, minor road maintenance and repair. The government also promotes this activity through its safety-net programmes. Although these livelihoods do not pay much, it helps improve food security of the poor households. Government should continue and promote these livelihoods. It must also be mentioned that the development of rural roads infrastructure will also provide employment in this activity.

Promotion of wage-based livelihoods requires, above all, development of skill. Basic skills improvement, vocational and technical training by the GOs, NGOs should be promoted.

12.3 Gaps in Policies and Measures to Fill the Gaps

Existing policies will contribute to the promotion of the non-farm sector. However, there are some gaps that can be identified on the basis of the findings of this study.

First, though the goal, implicit or explicit, of these policies is to reduce the number of poor, it does not adequately deal with it. One of the major findings of this study is that the poor are involved in low-return non-farm activities. Should a non-farm activity promoting policy support this kind of enterprises which may not help the poor to come out of the poverty trap? Should policy intervene at the enterprise level or at developing skills that will help the poor get work in non-farm enterprises? It has been found that the migrants find more skill intensive work at the destination of migration. These basic skills are therefore not difficult to develop. The policy should identify these skills and promote them. It has been observed that the migrants pick up a wide range of activities (Table 8-2, Table 8-3 and Table 8-4).

In this study it has been found that the migrants are heavily involved in the construction sector and in mills and workshops. Skills of the poor households can be developed in these areas. If the focus is more on poverty reduction, enterprise level intervention has to take a cautious approach. For example, it has been seen that some activities are pursued both by the poor and non-poor households. As observed, both poor and non-poor household pursue same type of non-farm activities in many cases. This is the case with the transport sector and also with trading in agricultural commodities. If poverty reduction is the main thrust of non farm policy, the agent pursuing an activity should also be first identified. Non-farm enterprises are supported more by the MFIs. The government should focus more on promoting small and medium rural industries that can hire the poor households.

Second, the matter is even worse for the extreme poor. Some of them are possibly excluded from this sector. They are better not included in this strategy in a big way at the initial stage of any programme intervention. They are not the right microcredit client. They should rather be supported by direct asset transfer so that they can gradually build up physical and financial capital to start a non-farm activity. Krishna et al. (2012) provides evidence from an evaluation study of BRAC's Ultra-Poor Programme to show how asset transfer effectively helps the extreme poor to improve their wealth position. The moderate poor should be the main focus of any policy for promoting non-farm livelihoods. Though they may not be very different from the extreme poor, they may need a shorter time to improve their non-farm enterprises and employment opportunities. The data shows that the moderate poor households are slightly more involved in non-farm enterprises. But the non-farm enterprises owned by the moderate poor do not employ much labour.

It has been observed that the non-poor hire more capital and labour. Policy should also focus on these households so that they can scale up their enterprises and hire more labour. They may not be the right client for the MFIs because they will

need larger capital and weekly payment may not suit their nature of activity. Finally, the focus should not be static poverty. These households frequently face unforeseen shocks such as illness, damage to houses and so on. A household just above the poverty line can fall below when affected by shocks, business or personal. Quisumbing (2007) has found that household events such as illnesses, dowry, flood and legal costs reduce household income and consumption. Persistent support and help should be provided to them to keep their involvement in the non-farm sector going.

Third, existing policy does not take into account the influence of environment and CC. For example, if too many resources are invested in the development of trading in agricultural commodities, these activities may become very vulnerable because they are directly and heavily linked to the shocks and stresses in farming. Though strengthening the linkages between the agricultural and non-agricultural sectors is emphasized, what becomes important here is the role of adaptation in the farming sector. Otherwise, vulnerability will be exported from the farm to the non-farm sector. This is the reason why this study has also made an effort to understand the livelihoods effects of CC on the farming sector.

As this study has amply demonstrated, non-farm livelihoods development is more than creating enterprises and developing skills. Particularly in a CC context one has to focus on disaster prone areas, the linkages between agricultural and non-agricultural, types of households whose livelihoods will be promoted, and the types of activities.

CHAPTER 13

Summary and Conclusions

This report has made an attempt to understand the complex interface between livelihoods in diverse disaster prone areas and poverty in a Climate Change context. The implicit notion of the study is that the non-agricultural activities are comparatively less prone to Climate Change effects and therefore, should be promoted. Thus this study identified a set of livelihoods the policy-makers can consider of promoting to help the poor adapt to Climate Change. The technologies that characterize these livelihoods have also been analyzed. The viability of these technologies has also been discussed. Finally, gaps in existing policy to promote non-agricultural livelihoods are highlighted.

Four disaster prone areas are considered: salinity, flood, flash flood and drought. To understand the nature of poverty and vulnerability, HHs from twenty districts from economically and ecologically fragile areas of these areas have been selected. Two most poor and disaster prone upazilas were selected from each of these selected districts. Finally, two villages were randomly selected from each upazila. In the process 2,558 households from 80 villages have been selected. This report is based on findings from two surveys. The first survey was carried out in the wet season and the second in the dry season. The results from household surveys have been juxtaposed with findings from 20 FGDs and 11 case studies. The study followed an eclectic approach drawing from the literature on sustainable livelihoods, linkage theory and the poverty-environment nexus literature.

Poverty and livelihoods in the disaster prone areas: major findings

This study has found that poverty is highest in the flood prone area. About 47% of the households are poor in this area. The Salinity prone area ranks second with 43% households below the poverty line. Poverty is lowest in the Flash flood area where only 23% of the households are poor. However, the incidence of poverty varies across villages, upazilas and districts. Note that these are static poverty measures estimated from cross section data. What is more relevant in this context is transitory poverty estimates. Transitory poverty arises from shocks and stresses which push households down to poverty and when these are favourable (good weather, for example), they push households up and over the poverty line. Incidence of poverty hardly changes with the seasons at the aggregate level and also in the disaster prone areas. The survey period witnessed no abnormal changes in terms of shocks and stresses affecting the study areas. There are complex set of factors at work and this may also include measurement errors. Both may explain insignificant changes in poverty between the two seasons. One main reason for less variation in poverty across season may also be due to the method of poverty measurement which is based on household expenditure. Households smooth consumption over periods through borrowing and drawing on savings. Microcredit has played a big role in smoothing consumption in rural Bangladesh in the 2000s. Given the short span of the period between the two seasons, this may explain why in the aggregate poverty changes are insubstantial.

There are variations and similarities in the livelihoods pursued by the households in the four disaster prone areas. Livelihoods have been classified into five categories: a) self-employment in agricultural, b) self-employment in non-agricultural, c) wage labour in agricultural, d) wage labour in non-agricultural, and e) services.

When the top two main occupations are considered, all the areas showed the same pattern: self-employment in agricultural ranks first (45% in all the areas), followed by self employment in non-agricultural (21%). This means that most the household members (66%) are self-employed, either in the agricultural sector or in the non-agricultural sector.

Involvement of the households in the non-agricultural sector as a wage labourer is very low. This is the case because self-employment in the non-agricultural sector largely involves low-skill, low productivity, home-based activities. Involvement of the households in the service sector is very low, around 5-7% as main occupation. Wage labouring is therefore dominated by labouring in the agricultural sector. This would indicate that those who could not take more reliable employment in the urban or peri-urban areas, either in the factories or in the service sector are stuck in rural non-farm activities. This seems to be more like a residual involvement. It is not known if this is a trap in the sense that people who take up this occupation have less chance to move up. They are most likely to be served by microcredit which helps them smooth consumption over periods of stresses brought about by natural disasters or other unforeseen events.

Farming ranks first for all types of households irrespective of their poverty status but it is highest among the non-poor households. The non-poor households were found least to seek employment in the agricultural labour market. This market is served mainly by the poor households. Dependence of the poor households on agricultural (farming and agricultural labouring combined) is at least as high as the dependence of the non-poor households on this sector. The difference between the households appears to be marginal in terms of their extent of involvement in the non-agricultural sector either as a wage labour or as a proprietor (self-employed). If the service sector is ignored and involvement of the households in the non-agricultural sector is defined to include both wage labour and proprietors, the moderate poor households are as involved in the non-agricultural sector as the non-poor. What makes the difference between the rich and poor households is their involvement in the service sector where the poor participate marginally.

The findings from this study suggest that the participation of the poor and non-poor households in the agricultural sector as farmers or wage labourers as well as in the non-agricultural sector as proprietors and workers is very much comparable. What then differentiates the non-poor from the poor is the nature and scale of the activity pursued. While the poor are involved in the transport sector activities such as in rickshaw-pulling, the non-poor are involved in trading in agricultural commodities and other profitable businesses.

Thus mere participation in various non-agricultural activities is not enough to understand the true nature of the involvement of the households. It may be relatively easier to help the poor to get a better wage-based employment as compared to a more rewarding proprietorship in non-agricultural enterprises because the latter may require large investment in capital, market links and entrepreneurship. The former, however, require training which may require longer time plans.

The non-poor are more likely to be involved in more-skill intensive high-wage component of the non-agricultural labour market. It has been found that skills, as represented by level of education, play an important role in livelihoods options. In general, those involved in self-employment in non-agricultural have higher levels of education when compared to their counterpart self-employed in the agricultural sector. Similarly a non-agricultural worker is, on the whole, more educated than his/her counterpart in the agricultural sector, i. e. an agricultural labour. Those who are in the service sector have the highest levels of education.

It has been found that more households are involved in the non-agricultural sector in the aggregate in the dry season as compared to the wet season. In the wet season, however, extreme poor households are more involved in self-employment in agricultural than in the dry season. In the dry season, the extreme poor households are involved more in agricultural labouring than in other livelihoods. It indicates that there occurs a switch in livelihoods strategy by the extreme poor households - self employment in agricultural in wet season to wage labouring in agricultural in dry season. This may be due to higher demand for agricultural labourer in the dry season which is likely to be the case because of boro cultivation.

Interestingly, it has been also found that the incidence of hunger is also more acute in wet season than the dry season. The number and share of households having meals twice a day or less than two times are significantly higher for the wet season as compared to the dry.
Thus participation in the agricultural sector in the dry season declines for all types of households but it declines more for the non-poor households. In a similar vain, the participation of all types of households except for the non-poor households in the non-agricultural sector increases in the dry season. Thus dry season is characterized by more involvement of the households in the non-agricultural sector and relatively more food security.

The extreme and moderate poor households depend heavily on wage-based livelihoods. Between 28% and 33% of their income comes from this source. They also depend more on the agricultural sector as compared to the non-agricultural sector. The non-poor households earn more from the agricultural sector, mainly from crop production. Their second source of income is remittances.

What is interesting here is that the moderate poor households earn most from non-farm enterprises (23%). This is followed by the extreme poor who earns as high as 21% of their income from non-farm enterprises. The non-poor households make about 17% of their income from this sector. Thus, though the poor and non-poor households are almost equally involved in the agricultural sector, the non-poor households earn most from it.

Household heads who are service holders earn most among all broad occupational categories. Among the wage labourers, labourers in non-agricultural sector earn more (about Tk. 87,000 in a year) than that of agricultural sector (about Tk. 73,000 in a year). The workers who work in mill, workshop, sand/stone mining, quarry, and transport earn more than those who work in brickfield, construction, rice mill and earth work.

Self-employed households earn more than that of wage labourers. There is not much difference in yearly household income between self-employed agricultural (about Tk. 117,000) and non-agricultural (about Tk. 110,000). This indicates the dominance of low end non-farm activities.

It has been noticed that most of the households in all areas and in all poverty groups are involved in the transport sector. It has been also found that a typical household whose household head is involved in this sector earns about Tk. 80,110 per annum. This lies in the lower end of incomes from non-agricultural enterprises. The second important livelihood is trading in agricultural commodities. It has been found that a typical household involved in this activity earns Tk. 133,117 per annum. This is much higher than the income earned by transport sector households. The third frequently observed activity is grocery business. Average household income from this activity is Tk. 124,542.

The most common type of livelihood pursued in wage-based non-agricultural livelihoods is construction sector work. This is pursued by households in almost all the areas and by all poverty groups. This activity pays as much as Tk. 81,158 on the average per annum. The extreme and moderate poor households in the salinity area are frequently involved in earthwork. This is a very low paid laborious work. Average annual income of such households is Tk. 70,703. Work in the quarrying industry is exclusively available for households from the Flash flood area. This is relatively a high income activity paying as much as Tk. 109,305 per annum on the average to a household involved in this activity. It has been observed that some members of the non-poor households are working in mills and workshops. This activity brings the highest income, Tk. 119,524 per annum on the average.

An attempt is made to characterize the nature of the non-farm sector. The non-farm sector is characterized by low skill activities. Skill is proxied by the level of education. Most of the non-agricultural sector participants have only primary level education and only a negligible proportion of them have secondary level education.

More capitals are used in the non-agricultural sector as compared to the agricultural sector. Average capital used in non-agricultural enterprises, both current and working, are higher than that of agricultural enterprises.

The non-agricultural enterprises are run mainly by family labour. Although non-agricultural enterprises hire more labour from the labour market as compared to the agricultural enterprises, it hires too less of them. However, labour productivity in the non-agricultural enterprises is higher than the agricultural enterprises but low.
It must be recalled that most disaster prone, poverty prone regions are studied. The nature of this sector may be different in less disaster and poverty prone region.

It has been found that the net income from non-agricultural enterprises is higher than agricultural enterprises but low. Although non-agricultural enterprises use more starting capital, more working capital and more hired labour than the agricultural counter, these figures are low and nowhere close to those involved with small and medium industries. Consequently, the former earns more and return to capital and labour is also higher than the latter.

An attempt is made to identify the similarities and lack of it in the nature of non-farm enterprises owned by the three types of households; extreme poor, moderate poor and the non-poor. It has been found that the involvement of family labour in non-farm enterprises owned by the non-poor households is the highest. The non-poor households employ hired labour most. The ratio of hired labour to total labour is the highest for the non-farm enterprises owned by the non-poor. They also employ more capital as compared to the other groups. While capital productivity is highest for the extreme poor, labour productivity is the lowest. This is due to lower employment of capital by the extreme and moderate poor households.

Migration is an important livelihoods strategy, particularly in disaster and poverty prone areas. About a quarter of the households have one migrant member, at least. This figure is quite high when compared to the national figure of 12% as reported in BBS (2010). The pattern of occupations taken up in the destination of migration is very different from those taken up by the households at the origin of migration. While non-agricultural involvement of the households in the origin of migration is not only low but is also limited to self employment, most employment is in the wage-based non-agricultural activities in the destination of migration.

Self-employment in the transport sector dominated the pattern of livelihoods both at home and away. But the second dominant involvement of the households was found in the electronics equipment shops. In general, within the self-employment category both a relatively low-skill (transport sector) and high-skill (electronics equipment shops) activities are undertaken by the households.

With migration, a noticeable decline can be observed in the involvement as workers in the transport sector and increase in involvement in mills and workshops. There is therefore, a transformation in skill requirement as one migrated out of village and joined a mill or workshop as a wage labourer. The incidence of service sector increases substantially in the destination of migration.

Thus, the overall pattern of employment changes with migration. At home, the dominant non-agricultural activities are concentrated in the self-employed sector while it is concentrated more in the wage labour in the non-agricultural sector. This shift from self-employment to wage labour in the non-agricultural sector a positive one. Migration also generates more jobs in the service sector. Promotion of migration not only increases the extent of involvement in the non-agricultural sector, it also changes the structure of non-agricultural employment and makes the shift more rewarding because fewer households take employment in the low return self-employment non-agricultural sector. As already observed, self-employment in the non-agricultural sector in the origin of migration is normally a low-skill, low return activity.

Livelihoods can be thought of those based on natural resources such as farming, fishing, and agricultural labouring. Livelihoods can also be based on non-agricultural or not entirely or closely dependent on natural resources. These can involve ownership of enterprises such as grocery shops or repair shops. Dependence on natural resource is a matter of degree. When water surge destroys a coastal neighbourhood, it affects the crops on the field as well as the roads on which rickshaws ply. Hardly any livelihood is spared. This study is based on the assumption that the livelihoods not based

on natural resources are relatively less affected by CCs and hence should be promoted as an adaptation strategy. True, a rickshaw after a tidal surge can start plying on roads not affected (say, through migration) while the farmers have to stay put and wait for a season or more to successfully grow another crop for making up the losses.

Identification of climate change induced risks on farm activities and outcomes

The impact of cyclones and storm surges on livelihoods in the salinity prone area is very strong. A large number of livelihoods are either totally or partially damaged. Impact of such an extent is not observed in other areas, certainly not at this scale. Floods in the flood prone area have generally remarkable or moderate impact. Less than 1% of the households reported of total damage to livelihoods in the flood prone area. Thus the Salinity prone area is affected more by natural disasters and the impact on livelihoods is also strong.

There has not been any major change in broad cropping pattern in the last ten years. Most of the regions continue to produce the main rice crops: *aus*, *aman and boro*. There has been change in crops for about 5% of the households. Land preparation time has changed for a fourth of the households. In all the areas, untimely/unpredictable rainfall has been the main cause for this change. They have been associated with CC factors. Land productivity, here understood as the amount of crop produced, is affected by increasing salinity in the Salinity prone area or unpredictable or excessive flooding in the flood and Flash flood areas. The adverse impact of CC on agricultural is therefore quite clear. The extent of the impact should be best understood with longitudinal data and the processes involved with more qualitative studies.

Given that the poor are as much involved in agricultural as the non-poor, CC factors affect both social groups. Given that the non-poor are more able to withstand these shocks and changes because of their better wealth positions, it is the poor who suffer most from CC impact on agricultural. This unequal incidence of CC can be ameliorated by helping the households which are primarily involved in the agricultural sector to diversify their livelihoods.

Identification of non-farm livelihood options for climate change and disaster vulnerable poor people

One major purpose of this report is to identify the non-agricultural livelihoods that can be promoted to enhance CC adaptation capability of the poor households who live in disaster prone fragile areas of Bangladesh. A major finding of this study is that the poor are not only identified by their participation in the agricultural labour market but also in self-employment in the non-agricultural sector. Promotion of the non-agricultural sector therefore also benefits the poor.

The households surveyed pursue a wide range of livelihoods in the non-agricultural sector. The transport sector here plays a big role. This basically represents those who are owners and drivers of transport vehicles such as a rickshaw or rickshaw vans. The second position is taken up by trading in agricultural commodities. The issue is that the policy should promote access of the poor to the transport sector. Trading in agricultural commodities has to be viewed with caution because it is directly linked to the agricultural sector. It has been also found that tailoring business is pursued by some moderate poor households. This activity can also be promoted. Otherwise, there is a whole range of activities that are tangentially pursued by the households. Effort can be made to promote some of these based on the analysis of local conditions. The guiding principle here should be to re-allocate as much labour as possible from farming and wage-labouring. They represent not only very poor households but also a weak spot for climate vulnerability. This shift will increase income as it has been found that a household whose head is a non-agricultural labourer earns more than a household whose head is an agricultural labourer. On the other hand the technology used in these activities is very simple and easily replicable. Public policy can also consider improvement of technology in this sector. This will not lead to any labour shortage in the agricultural sector because many households straddle between agricultural labouring and non-farm activities.

Participation of the households in the non-agricultural sector as wage labour is lower than their participation in the self-employed non-agricultural activities. The construction sector generates most wage-based non-agricultural livelihoods in Bangladesh. The non-poor also participate as workers in mills and workshops in salinity and flood prone areas. This

activity is hardly done by the poor although it provides the highest income to the participating household. The government can find out ways for developing the skills of the poor so that they can also participate in this activity. All these activities provide an annual income to the households which are higher than the poverty income.

The non-farm self-employed livelihoods are relatively less affected by CC. Even when they are affected, the affect is mostly described by the affected households as "moderate". The transport sector (rickshaw, van, *nosimons*) are most affected. Those related to agro-processing are also affected. While the former is pursued more by the poor, the latter is pursued more by the non-poor households. Most of them are affected by flood, flash flood, and its level and predictability.

In all the DPAs, the households dropped farming and agricultural labouring. In most of the areas the households have taken up non-agricultural livelihoods. Existing evidence shows that non-agricultural activities have been increasing in Bangladesh at a rapid rate. This is happening mainly due to economic factors. Thus, there is a built-in process that contributes to climate adaptation abilities. A conscious policy for the government should be to enhance this process.

It has been found that disaster-affected households had to rely on their own savings and borrowings for coping against disasters. Only a few households received support from public and private sources, otherwise they had to depend on themselves and on the community.

Approaches and strategies in adopting non-farm livelihood options and measures and mainstream into national development process

National development process should attack on two fronts. The first front should try to lessen the shock and stresses of CC factors either through awareness raising programmes or through adaptation activities or, when possible, mitigation activities. The second front is the economic front where policies should be taken to foster the growth of the non-farm economy. The issue here is not only the quantity of growth but more importantly, the quality of growth.

All livelihoods are exposed to CC factors, agricultural and non-agricultural and changes in one affect the other. The key factors that affect the livelihoods of the rural households have to be first approached along with the specific factors which have been identified in this study. In salinity prone area the key factors are salinity water intrusion, in flood and flash flood prone areas, floods and flash floods, in drought area. These issues must be addressed on a priority basis. The government should first prioritize the known problems in each disaster prone area and try to address them as soon as possible.

Identification of the technologies and viability of the technologies for the non-farm options, adaptation measures and strategies to put technologies in place

It has been found that most of the households are involved in self-employment in agricultural. Factory-based, hired-labour based non-farm enterprises are not growing enough. Although non-agricultural enterprises use more hired labour and capital as compared to the agricultural enterprises, the levels are too low. A list of livelihoods that can be promoted is identified. In the self-employment category, transport sector comes first, followed by trading in agricultural commodities. Transport sector is here characterized by rickshaws, vans, *nosimons* and other mechanized or non-mechanized vehicles. Trading in agricultural commodities involves trading agricultural inputs or outputs. The technology used in these activities is simple. The viability of these technologies depends more on other supporting factors. For example, for transport sector to flourish, one needs developed road infrastructure. Thus the crucial question is how infrastructure project is developed so that it can take the shocks and stresses of CC effects. Adaptation measures therefore relate not to these technologies as such but to the technologies involved in supporting activities such as rural road infrastructure or more resilient agriculture.

Identification of policy gaps and measures to fill gaps

Existing policies are contributing towards the development of the non-farm economy. These include development of rural infrastructure, construction and linking of the growth centres, investment in skill development and growth of the microcredit sector. This study has identified some gaps. These policies do not adequately deal with the issue of poverty and growth and their linkages. It does not taken into account the type of livelihoods, who are pursuing them, whether some poor can be at all benefitied from involvement in the non-farm sector. It is suggested that the extreme poor should not be immediately supported for the development of enterprises because this may not lead to their sustained move out of poverty. The more appropriate group is the moderate poor and they can be served by microcredit. The non-poor, on the other hand, may require different type of support (large credit). Existing policy does not take into account the influence of environment and CC on the growth of the non-farm economy.

Limitations and constraints of the study

This has been a complex and difficult study. Studying livelihoods across 20 districts, four ecological areas in such a short period is a herculean task. The study, therefore, has some limitations and constraints.

The study was carried out for two seasons, dry and wet in almost within a span of 8 months. Although it was able to cover the two seasons, the gap between them was very short. Many factors neither change nor had much influence on livelihoods. CC factors have a very slow impact over a longer period. It is difficult to understand the changes in a short period study. Ideally, a study like this should at least have a gap of a couple of years or more between the two seasons (dry and wet) to be able to notice and record livelihoods changes and relate them persuasively to CC.

The study put a higher weight on representativeness by design. It should have rather studied rather a limited number of districts within a given area and then had a detailed look into livelihoods options. This had implications on methodology. The mix of techniques was more in favour of questionnaire based survey by design. Ideally it would have been more balanced with a strong emphasis on use of qualitative techniques. The extent of the impact can be best understood with longitudinal data and the processes involved with more qualitative studies.

Livelihoods change affects different persons differently. The study also did not focus on the implications of non-farm livelihoods on women in the context of CC.

Finally, this study ignored the enterprise level of investigation, the focus was households. Ideally peri-urban enterprises had to be included in the study or cluster of industries could have been specifically studies.

Future research

Future research can be guided by the limitations of the study mentioned here. In particular, a study can be conducted based on secondary data. Labour force and household expenditure survey data are available for this purpose.

This study did not deal with vulnerability of the households across areas, poverty levels and livelihoods in a rigorous way. A study can be commissioned to do this and this is possible with the dataset already generated by this study.

While this study has identified a set of livelihoods that can be promoted, detail study is required for each of the activity here proposed to identify the points of intervention.

Annexure A

List of Study Districts, Upazilas and Villages

Area	District	Dist. Code	Upazilla	Upz. Code	Union	Union Code	Village	Vill. Code
1	Satkhira	01	Shyamnagar	01	Gabura	01	Dumuria	01
1	Satkhira	01	Shyamnagar	01	Munshiganj	02	Munshiganj	02
1	Satkhira	01	Assasuni	02	Ashashuni	03	Jelekhali	03
1	Satkhira	01	Assasuni	02	Ashashuni	03	Manikhali	04
1	Khulna	02	Dacopea	03	Tildanga	05	Betbunia	05
1	Khulna	02	Dacopea	03	Chalna	06	Par Chalna	06
1	Khulna	02	Koyra	04	Koyra	07	Madinabad	07
1	Khulna	02	Koyra	04	Moharajpur	08	Pashchim Maharjpur	08
1	Bagerhat	03	Sarankhola	05	Khontakata	09	Khontakata	09
1	Bagerhat	03	Sarankhola	05	Khontakata	10	Rajoir	10
1	Bagerhat	03	Morrelganj	06	Balai Bunia	11	Patabaria	11
1	Bagerhat	03	Morrelganj	06	Balai Bunia	11	Balai Bunia	12
1	Barguna	04	Barguna Sadar	07	Noltona	13	Garjanbunia	13
1	Barguna	04	Barguna Sadar	07	Noltona	13	Gazi Mamud	14
1	Barguna	04	Amtali	08	Pochakoraliya	15	Char Para	15
1	Barguna	04	Amtali	08	Pochakoraliya	15	Chhota Bagi	16
1	Patuakhali	05	Galachipa	09	Char Kajal	17	Chato Char Kajal	17
1	Patuakhali	05	Galachipa	09	Char Biswas	18	Uttar Char Biswas	18
1	Patuakhali	05	Bauphal	10	Bauphal	19	Uttar Billbilash	19
1	Patuakhali	05	Bauphal	10	Nazirpur	20	Nimdi	20
1	Noakhali	06	Hatia	11	Burir Char	21	Aladigram	21
1	Noakhali	06	H atia	11	Sukhchar	22	Dakshin Char Amanullah	22
1	Noakhali	06	Companiganj	12	Rampur	23	Rampur Gram	23
1	Noakhali	06	Companiganj	12	Char Kakra	24	Dakhsin Char Kakra	24
1	Cox's Bazar	07	Chakaria	13	Badarkhali	25	Badarkhali No.1	25
1	Cox's Bazar	07	Chakaria	13	Vaola	26	Purba Darbeshkata	26
1	Cox's Bazar	07	Ukhia	14	Palongkhali	27	Paschim Farirbeel	27
1	Cox's Bazar	07	Ukhia	14	Jalia Palong	28	Sonarpara	28
1	Jessore	08	Avaynagar	15	Chalishia	29	Anda	29
1	Jessore	08	Avaynagar	15	Chalishia	29	Kota	30
1	Jessore	08	Keshabpur	16	Pajia	31	Bramon Danga	31
1	Jessore	08	Keshabpur	16	Pajia	31	Baghdanga	32
2	Gaibandha	09	Fulchari	17	Gajaria	33	Baushi Para	33
2	Gaibandha	09	Fulchari	17	Gajaria	34		34
2	Gaibandha	09	Saghata	18	Padumshahar	35	Barot Padumshahar Kani Para	35
2	Gaibandha	09	Saghata	18	Ghoridaha	36	Khamarpabantayer	36
2	Sirajganj	10	Sirajganj Sadar	19	Khokshabari	37	Shailabari	37
2	Sirajganj	10	Sirajganj Sadar	19	Chongacha	38	Dakshin Bhatpiari	38
2	Sirajganj	10	Chauhali	20	Khaskawlia	39	Dakshin Jotpara	39
2	Sirajganj	10	Chauhali	20	Khaspukuria	40	Kodalia Uttarpara	40
2	Faridpur	11	Faridpur Sadar	21	Aliabad	41	Vojondanga	41
2	Faridpur	11	Faridpur Sadar	21	Dickmirchar	42	Munshedangi	42
2	Faridpur	11	Char Bhadrasan	22	Char Bhadrasan	43	Baliadang Muslim	43
2	Faridpur	11	Char Bhadrasan	22	Char Bhadrasan	43	Hajidang	44
2	Kurigram	12	Kurigram Sadar	23	Ghogadaha	45	Char Aulia	45
2	Kurigram	12	Kurigram Sadar	23	Vogdanga	46	Madhoram Sardarpara	46
2	Kurigram	12	Raumari	24	Datvanga	47	Chat Koraibari	47
2	Kurigram	12	Raumari	24	Bondaber	48	Bondaber	48
2	Jamalpur	13	Dewanganj	25	Chikajani	49	Char Magurihat	49
2	Jamalpur	13	Dewanganj	25	Bahadurbad	50	Vangergram	50
2	Jamalpur	13	Madarganj	26	Gunaretata	51	Moslempara	51
2	Jamalpur	13	Madarganj	26	Jorkhali	52	Poshchim Atapara	52

Area	District	Dist. Code	Upazilla	Upz. Code	Union	Union Code	Village	Vill. Code
2	Munshiganj	14	Louhajang	27	Holudia	53	Uttar Haldia	53
2	Munshiganj	14	Louhajang	27	Kolma	54	Madhya Kalma	54
2	Munshiganj	14	Munshiganj	28	Chorkeoar	55	Uttar Char Masura	55
3	Sunamganj	15	Tahirpur	29	Dakhhin Sreepur	57	Patabuka	57
3	Sunamganj	15	Tahirpur	29	Tahirpur	58	Ratansree	58
3	Sunamganj	15	Dharampasa	30	Paikurhati	59	Rajapur	59
3	Sunamganj	15	Dharampasa	30	Juysree	60	Borai	60
3	Moulvibazar	16	Barlekha	31	Talimpur	61	Bara Maidan	61
3	Moulvibazar	16	Barlekha	31	Sujanogor	62	Vholarkandi	62
3	Moulvibazar	16	Rajnagar	32	Fatapur	63	Daskin Betahunja	63
3	Moulvibazar	16	Rajnagar	32	Pachgaon	64	Dhulijura	64
3	Sherpur	17	Jhenaigati	33	Jhenaigati	65	Dari Kalinagar	65
3	Sherpur	17	Jhenaigati	33	Dhanshail	66	Dakshin Dariar Para	66
3	Sherpur	17	Nalitabari	34	Kalaspar	67	Naksi	67
3	Sherpur	17	Nalitabari	34	12#Kalaspar	68	Ghonapara	68
3	Sylhet	18	Companiganj	35	Purbo Islampur	69	Rangpuri Basti	69
3	Sylhet	18	Companiganj	35	Ichakolosh	70	Shibpur	70
3	Sylhet	18	Jaintiapur	36	Jaintapur	71	Birakhai	71
3	Sylhet	18	Jaintiapur	36	Dorbost	72	Khanjar	72
4	Naogaon	19	Sapahar	37	Sapahar	73	Puratan Sapahar	73
4	Naogaon	19	Sapahar	37	Sapahar	73	Bahapur	74
4	Naogaon	19	Porsha	38	Ghatnagar	75	Ghatnagar	75
4	Naogaon	19	Porsha	38	Ghatnagar	75	Bangabari	76
4	Nilphamari	20	Dimla	39	Balapara	77	Uttar Sundarkhata	77
4	Nilphamari	20	Dimla	39	Balapara	77	Chhatni Bala Para	78
4	Nilphamari	20	Domar	40	Boragari Panga	79	Naodabas	79
4	Nilphamari	20	Domar	40	Matukpur	80	Melapanga	80

(a) Initial suggestion was Batiaghata. Koyra was suggested by CDMP

(b) Initial suggestion was Moheshkhali. Chakaria was suggested by CDMP

(c) Initial suggestion was Jhikargacha. Avaynagar was suggested by CDMP

(d) Initial suggestion was Jessore Sadar. Keshabpur was suggested by CDMP

(e) Initial suggestion was Dewanganj. Fulchari was suggested by CDMP

(f) Initial suggestion was Belkuchi. Chauhali was suggested by CDMP

Annexure B

Classification of Livelihoods

A. Self-employed in agriculture	B. Self-employed in non-agriculture	C. Labourer in agriculture	D. Labourer in non-agriculture	E. Service	F. Others
101 agriculture 102 poultry rearing 103 livestock rearing 104 livestock bathan (raised in pasture/open field) 105 duck bathan (raised in open water) 106 fish culture-pond 107 fish/prawn culture in gher/farm 108 agro-forestry 109 tree nursery 110 salt-pan mining 111 fisherman 112 crab harvester 113 shrimp/prawn fry collector 114 forest resource harvester 115 others (specify)	305 rickshaw/van/nosimon driver 306 rickshaw/ van maker 307 agri-mechinary maker 308 electronics equipment maker 309 key maker 311 shoe maker 318 tailoring* 319 hair dresser 321 cook (decorator) 323 boatman 401 dry fish producer 402 rice mill owner 403 flour mill owner 404 muri/chira producer 405 grocery shop owner 406 restaurant/sweetmeat/café owner 407 tea stall owner 408 tea hawker 409 small cottage industry 410 contracto r 411 money lender 412 sawmill owner 413 gold smith 414 cloth store owner 415 electronics shop owner 416 utensils store owner 417 hardware shop owner 418 cement/rod shop owner 419 brickfield owner 420 brick traders 421 corrugated sheet trader 422 transport business 423 sharee/lungi hawker 424 laundry 425 sawmill owner 426 timber/wood trader 427 firewood trader 428 pharmacy 429 flower trader 430 cinema hall owner 431 export-import 432 band/ribbon/cloth hawker 433 fruit shop owner 434 leather/hide trader 435 led machine 436 shop/warehouse/house renting 437 recycling materials trading 438 ice trading 439 baker/ confectionery trader 440 stationery store 441 hand loom 442 fish/milk/agri commodity trader 443 flexi load trading 444 other business 513 ozha 514 kabiraj 515 homio doctor 506 private tutor	201 agriculture worker 202 poultry rearing worker 203 livestock rearing worker 204 gher/fish farm worker 205 fishing worker 207 others	310 worker-transport 312 coal/sand/stone mining worker 313 chaial (works with cane/bamboo) 314 worker-brickfield 315 worker-rice mill 316 worker-construction (masion carpenter rod) 317 worker-mill/workshop/industry 322 worker-handloom 324 worker-others (specify) 206 salt pan worker 301 worker-fish drying 302 earth worker (general) 303 earth worker (food/pay for works) 304 earth worker (40/100 days plan)	501 government service 502 private service 503 teacher 504 Ngo worker 505 village doctor	320 domestic/hh assistant 509 student 510 retired 512 bagger 516 public representative 519 migration (works in other districts or abroad) 520 stipend 521 others 508. Housewife 511. Unemployed 517. Disable 518. Child

** Tailoring includes hand and machine sewing and pressing techniques done by men and women at home for money or in the market.*

Annexure C

Wet Season Questionnaire

Non-Farm Livelihood Adaptation Approaches and Technologies – Wet Season

Section 1: HH Roster

Surveyor: _____ Date Day Month Year HH ID Vil. code

Dist. _____ Upazila _____ Union _____ Vil _____ Zone

Special identity/location of the house _____

1. HH head _____ 2. Religion (1. Islam, 2. Hindu, 3. Buddhist, 4. Christian, 5. others) 3. Father/husband of HH head _____

4. Respondent _____ 5. Sl. of Respondent 6. Availability of electricity at home (1.grid, 2.solar, 3.no electricity)

7. Source of fuel for cooking (1. LPG/Pipe, 2.bio-gas, 3.kerosine, 4. coal, 5.wood, 6.cowdung, 7.leaves/hay, 8.jute-)

8. Type of latrine (1.Sanitary latrine with septic tank, 2. Ring slab (water sealed), 3.Ring slab (water not sealed), 4.Ordinary pucca, 5.Kancha (without septic tank), 6.Bush/open space, 7.Other (specify)

Section 2: Household Data (All household members)

2.1

#	Name of the household member	Sex (1.M, 2.F)	Relation with the household head (code)	Age (years)	Marital status (code)	Years of schooling (code)	Main occupation		2nd Occupation		3rd Occupation	
							occupation	code	occupation	code	occupation	code
1	2	3	4	5	6	7	8	9	10	11	12	13
01			1									
02												
03												
04												
05												
06												
07												
08												
09												
10												
11												
12												
13												

Code:

- **Relationship with HH head:** 1. Self, 2. Husband/wife, 3. Son/daughter, 4. Brother/sister, 5. Father/mother, 6.Father-in-law/mother-in-law, 7. Son-in-law/daughter-in-law, 8. Brother-in-law/sister-in-law, 9. Grand son/ granddaughter, 10. Nephew/niece, 11. Grandparents, 12. uncle/aunt, 13. Cousin, 14. Son's wife, 15. Daughter's husband, 16. Brother's wife, 17. Sister's husband, 18. Tutor, 19. Domestic worker, 20. Others (specify)

- **Marital Status:** 1.Unmarried, 2.Married, 3.Widow/Widower, 4.Separated, 5.Divorced

- **Years of schooling:** 99. Never attended school/can't read or sign, 90. Can sign only, 91.Can read through adult literacy, 92. Can read and write through adult literacy, 93. Did not start schooling (age <5), 1 to 12. Name of class completed (i.e. 5. if completed class 5, 10. If completed SSC, 12. If completed HSC), 14. Degree (Pass), 15. Honors, 16. Master's, 17. Others (specify)

- **Occupation-Agri:** 101. Agriculture, 102. Poultry rearing, 103. Livestock rearing 104. Livestock bathan (raised in pasture/open field), 105. Duck bathan (raiseed in openwater), 106. Fish culture-pond, 107. Fish/prawn culture in gher/farm, 108. Agro-forestry, 109. Tree nursery, 110. Salt-pan mining, 111. Fisherman, 112. Crab harvester, 113.Shrimp/prawn fry collector, 114. Forest resource harvester, 115.others (specify), 201. Agriculture worker, 202.Poultry rearing worker, 203. Livestock rearing worker, 204. Gher/fish farm worker, 205. Fishing worker, 206. Salt pan worker, 207. Others (specify)

- **Occupation-Non-Agri:** 301. Worker-fish drying, 302. Earthworker (general), 303. Earthworker (food/pay for works), 304. Earthworker (40/100 days plan), 305. Rickshaw/van/nosimon driver, 306. Rickshaw/ van maker, 307.Agri-mechinary maker, 308.Electronics equipment maker, 309. Key maker, 310. Worker-transport, 311. Shoe maker, 312. Coal/sand/stone mining worker, 313. Chaial (works with cane/bamboo), 314. Worker-brickfield, 315. Worker-ricemill, 316. Worker-construction (i.e. mason, carpenter, rod), 317. Worker-mill/workshop/ industry, 318. Tailoring, 319. Hair-dresser, 320. Domestic/HH assistant, 321. Cook (decorator), 322. Worker-Handloom, 323.Boatman, 324. Worker-Others (specify), 401. Dryfish producer, 402. Rice mill owner, 403. Flour mill owner, 404.*Muri/chira* producer, 405. Grocery shop owner, 406. Restaurent/sweetmeat/café owner, 407. Tea stall owner, 408.Tea hawker, 409. Small cottage industry, 410. Contructor, 411. Money lender, 412. Sawmill owner, 413. Goldsmith, 414. Cloth store owner, 415. Electronics shop owner, 416. Utensils store owner, 417. Hardware shop owner, 418.Cement/rod shop owner, 419. Brickfield owner, 420. Brick traders, 421. Corogated sheet trader, 422. Transport business, 423. *Sharee/lungi* hawker, 424. Laundry, 425. Sawmill owner, 426. Timber/ wood trader, 427. Firewood trader, 428. Pharmecy, 429. Flower trader, 430. Cinema hall owner, 431. Export-import, 432. Band/ribbon/cloth hawker, 433. Fruit shop owner, 434. Leather/hide trader, 435. Led machine, 436. Shop/warehouse/house renting, 437. Recycling materials trading, 438. Ice trading, 439. Baker/ confectionery trader, 440. Stationery store, 441. Hand loom, 442. Fish/milk/agri commodity trader, 443. Fexiload trading, 444. Other business (specify), 501.Government service, 502. Private service, 503. Teacher, 504. NGO worker, 505. Village doctor, 506. Private tutor, 507. Imam/purohit/kazi, 508. Housewife, 509. Student, 510. Retired, 511. Unemployed, 512. Begger, 513. Ozha, 514. Kabiraj, 515. Homeo doctor, 516. Public representative, 517. Disable, 518. Child, 519. Migration (works in other districts or abroad), 520. Stipend, 521. Others (specify)

Section 3: Days, hours and wages of all income earning members of the household in the last 12 months 3.1

Member code*	Occupations		Description	Boishakh	Joishtho	Ashar	Srabon	Bhadro	Ashwin	Kartik	Agrahaiyon	Poush	Maagh	Phalgun	Chaitra
	Order (√)	(Code)													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	1. 1st		# days worked												
	2. 2nd		Ave. hours/day												
	3. 3rd		Daily Wage (Tk.)												
	1. 1st		# days worked												
	2. 2nd		Ave. hours/day												
	3. 3rd		Daily Wage (Tk.)												
	1. 1st		# days worked												
	2. 2nd		Ave. hours/day												
	3. 3rd		Daily Wage (Tk.)												
	1. 1st		# days worked												
	2. 2nd		Ave. hours/day												
	3. 3rd		Daily Wage (Tk.)												
	1. 1st		# days worked												
	2. 2nd		Ave. hours/day												
	3. 3rd		Daily Wage (Tk)												
	1. 1st		# days worked												
	2. 2nd		Ave. hours/day												
	3. 3rd		Daily Wage (Tk)												
	1. 1st		# days worked												
	2. 2nd		Ave. hours/day												
	3. 3rd		Daily Wage (Tk)												
	1. 1st		# days worked												
	2. 2nd		Ave. hours/day												
	3. 3rd		Daily Wage (Tk)												
	1. 1st		# days worked												
	2. 2nd		Ave. hours/day												
	3. 3rd		Daily Wage (Tk)												
	1. 1st		# days worked												
	2. 2nd		Ave. hours/day												
	3. 3rd		Daily Wage (Tk)												
	1. 1st		# days worked												
	2. 2nd		Ave. hours/day												
	3. 3rd		Daily Wage (Tk)												

** Member code should be picked from the column-1 of Table-2.1*

Section 4: Household Assets

4.1: Land

#	Description	Decimal	Current Market Price(Tk.)
1	2	3	4
1.	Agricultural land		
2.	Homestead land		
3.	Garden		
4.	Pond		
5.	Gher/fish farm		
6.	Salt pan		
7.	Others (specify)		

4.2: Domestically raised animals

#	Description	Current no.	Current price (taka)	No. sold (in the last one year)	Amount sold for	No. bought (in the last one year)	Amount bought for.
1	2	3	4	5	6	7	8
1.	Cattle (Cow+bull+calf)						
2.	Buffalo						
3.	Goat/lamb						
4.	Poultry						
5.	Others (specify)						

4.3: House (for living)

#	Description of the house	No. of houses	Current market price of the house(taka)
1	2	3	4
1.	Concrete (wall & roof)		
2.	Concrete wall with tin/tiles shed		
3.	Tin wall wit tin/tiles shed		
4.	Hay wall with tin/tiles shed		
5.	Hay wall with hey shed		
6.	Others (specify)		

4.4: Agricultural/fishing Equipment

#	Description	No.	Current market price (taka)
1.	Irrigation tools (all kind)		
2.	Power tiller		
3.	Threshing machines		
4.	Weeding machine		
5.	Plough		
6.	Spade		
7.	Fishing boat		
8.	Fishing gear (net, trap etc)		
9.	Others (specify)		

4.5: Transportation

#	Description	No.	Current Market Price (taka)
1	2	3	4
1.	Cow/Bull cart		
2.	Boat/Engine boat		
3.	Rickshaw/Van		
4.	Bicycle		
5.	Motor cycle		

#	Description	No.	Current Market Price (taka)
1	2	3	4
1.	Auto Rickshaw		
2.	Bus/Truck		
3.	Microbus/jeep/car		
4.	Nochimon/Korimon		
5.	Others (specify)		

4.6: Fixed assets used in the industry

#	Description	Market price when new (taka)	Current Market Price (taka)
1	2	3	4
1.	Land and rooms		
2.	Tools and equipment		
3.	Computer		
4.	Others (specify)		

4.7: Assets used in Business/shops

#	Description	No.	Current Market Price (taka)
1	2	3	4
1.	Land		
2.	Shop		
3.	Warehouse		
4.	Goods available for sale		
5.	Computer		
6.	Others (specify)		

4.8: Financial and various assets

#	Description	No.	Current Market Price (taka)
1	2	3	4
1.	Bank deposit		
2.	Loan given out		
3.	Cash		
4.	Jewellery		
5.	T.V., Radio, etc.		
6.	V.C.D., D.V.D.		
7.	Mobile/land phones		

#	Description	No.	Current Market Price (taka)
1	2	3	4
8.	Frieze		
9.	Computer (at home)		
10.	Chairs/Sofa		
11.	Tables		
12.	Beds		
13.	Almira/dressing table		
14.	Others (specify)		

Section 5: Cultivated land and harvested crop in the last 1 year

5.1 Cultivation in own land

#	Crop (code)	Variety (code)	Land Size (dec.)	Trillage Type (code)	Irrigation Type (code)	Production		Price Rate (Tk/unit)	Production Cost (Tk)	Sold (quantity)	Consumed (quantity)	Present Stock (quantity)
						Unit	Quantity					
1	2	3	4	5	6	7	8	9	10	11	12	13
1.												
2.												
3.												
4.												
5.												
6.												

Code:

- **Crop:** 1. Rice-Aush, 2. Rice-Aman, 3. Rice-Boro, 4. Rice-Aromatic, 5. Wheat, 6. Maze/corn, 7. Onion, 8. Chili, 9. Garlic, 10. Ginger, 11. Other spices, 12. Cauliflower, 13. Cabbage, 14. Papaya, 15. Bean, 16. Tomato, 17. Bottle gird, 18. Sweet pumpkin, 19. Pointed gird, 20. Snake gird, 21. Other vegetables, 22. Leafy vegetables, 23. Potato, 24. Jute, 25. Tobacoo, 26. Sugarcane, 27. Betel leaf, 28. Lentils(Dal), 29. Mustared, 30. Sesame, 31. Mango, 32. Jackfruit, 33. Coconut, 34. Betelnut, 35. Other plant-based crops (specify), 36. Fish, 37. Shrimp/prawn, 38. Crab, 39. Salt, 40. Others (specify)

- **Variety (applicable only for rice):** 101.Rajashail, 102.Kajalshail, 103. Latashail, 104. Lotashail, 105. Nazirshail, 201. Shadamota, 202. Notunmota, 203.Zaminimota, 204. Zhamlimota, 205. Kalamota, 206. Lalmota, 207. Chikondhan, 208. Guradhan, 301. Dingamoni, 302. Haida, 303. Ausha, 304. IRRI, 305. Vojon-IRRI, 306. Dudkalam, 307. Shakkorkona, 308. Kalizira, 309. Durgavogh, 310. Kalakura, 311. Chaplaish, 312. Ferandoli, 313. Hamida, 314. Lathipanja, 315. Birain, 316. Beti, 317. Kesrail, 318. Darshail, 319. Chinikani, 320. Gochi, 321. Baigunbichi, 322. ITCL-fine, 323. ITCL-corse, 324. Horkoch, 325. Khejurdana, 326. Kachura, 327. Haldibatali, 328. Derimuri, 329.Boyarboat, 330. Panboat, 331. Patnai, 333. Kalapaijam, 401. BR-10, BR-11, 402. BR-12, 403. BR-14, 404. BR-16, 405. BR-22, 406. BR-23, 407. BR-26, 408.BRRI-28, 409. BRRI-29, 410. BRRI-30, 411. BRRI-32, 412. BRRI-33, 413. BRRI-40, 414. BRRI-41, 415. BRRI-42, 416. BRRI-43, 417. BRRI-47, 418. BRRI-51, 419. BRRI-52, 420. BRRI-53, 421. BRRI-54, 501. BINA-7, 502. BINA-60, 601. Hybrid-1, 602. Hybrid-2, 603. Hybrid-3, 604. Hybrid-4, 701. Others (specify)

- **Tillage:** 1. tructor, 2. powertiller, 3. plough (livestock), 4. plough (livestock & human), 5. plough (only human), 6. spade, 7. Others (specify)

- **Irrigation:** 1.Govt. irrigation project, 2.Private/cooperative (surface water), 3. Private/cooperative (underground water), 4. Surface water by self/rented machine, 5. Underground water by self/rented machine, 6. irrigation was not required, 7.irrigation was required but did not irrigated, 8. Others (specify)

- **Unit:** 1.number, 2.mond, 3.litre, 4.bira

5.2 Cultivation in Mortgage-in land

#	# Mortgage	Land Size (dec.)	Mortgage Fee (Tk.)	Crop (code)	Variety (code)	Trillage Type (code)	Irrigation Type (code)	Production		Price Rate (Tk/unit)	Production Cost (Tk)	Sold (quantity)	Consumed (quantity)	Present Stock (quantity)
								Unit	Quantity					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.														
2.														
3.														
4.														

5.3 Cultivation in Leased-in land

#	# Lease	Land Size (dec.)	Duration of Lease (Month)	Tk. To be paid as Lease Fee	Quantity of crop to be paid as Lease Fee	Crop (code)	Trillage Type (code)	Irrigation Type (code)	Variety (code)	Production		Price Rate (Tk/unit)	Production Cost (Tk)	Sold (quantity)	Consumed (quantity)	Present Stock (quantity)
										Unit	Quantity					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1.																
2.																
3.																
4.																

5.4 Share Crop-out

#	Land Size (dec.)	Crop (code)	Variety (code)	Trillage Type (code)	Irrigation Type (code)	Production			Price Rate (Tk/unit)	Total Production Cost (Tk)	Production Cost				Sold (quantity)	Consumed (quantity)	Present Stock (quantity)
						Unit	Total Quantity	Quantity Received			% of total cost paid	% of irrigation cost paid	% of fertilizer & insecticide cost paid	% of seed cost paid			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.																	
2.																	
3.																	
4.																	
5.																	

5.5 Share Crop-in

#	Land Size (dec.)	Crop (code)	Variety (code)	Trillage Type (code)	Irrigation Type (code)	Production			Price Rate (Tk/unit)	Total Production Cost (Tk)	Production Cost				Sold (quantity)	Consum (quantity)	Present Stock (quantity)
						Unit	Total Quantity	Quantity Received			% of total cost paid	% of irrigation cost paid	% of fertilizer & insecticide cost paid	% of seed cost paid			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.																	
2.																	
3.																	
4.																	
5.																	

Section 6: Farming and climate change

#	Season	Agriculture at present (most major one in a season)		Agriculture at 10 years ago (most major one in a season)		Changes in crops during last 10 years				Changes in varieties during last 10 years			
		Crop (code)	Variety* (code)	Crop (code)	Variety* (code)	Change (code)	1st Reason (code)	2nd Reason (code)	3rd Reason (code)	Change (code)	1st Reason (code)	2nd Reason (code)	3rd Reason (code)
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Khari p -1 (Aush season)												
2.	Khari p -2 (Aman season)												
3.	Robi (Boro season)												

** Applicable only if the crop is rice*

Code:

- **Change:** 1.no change, 2.changed
- **Reason (in favour of new one):** 1. provides better price, 2. provides easy marketing, 3. requires less production cost, 4. the seed of previous crop/variety is not available anymore, 5. climate has changed, 6. can tolerate more drought, 7. can tolerate more water, 8. can tolerate more salinity, 9. more disease resistant, 10. requires less cost for disease fighting, 11. considering the changed productivity of land new crop/variety grows better, 12. considering the change in plot size, the new crop/variety provides better benefit, 13. as government/project personnel suggested to do so, 14. requires comparatively less culture period, 15. others (specify)

6.2 Have you made any changes to the timing of land preparation for your main crop? (1.came forward, 2.went backward, 3. no change) ☐

6.3 What were the major reasons (name 2) to changes the timing of land preparation for your main crop? ☐☐

Code: (1. to get crop in appropriate time so that can get better price, 2.rainfall does not occur in appropriate time, 3.less rainfall, 4.water logging, 5.temparature change, 6.climate change, 7.to cop with natural clamities, 8.Govt/project personnel suggested, 9.others (specify)

6.4 Have you observed any changes in productivity of your agriculture lands? (1.on change, 2.increased, 3.decreased) ☐

6.5 What were the major reasons (name 3) to changes the productivity of agriculture lands? (code) ☐☐☐

Code: (1.increased salinity affect, 2.increased drought intencity, 3.increased sand carpeting, 4 .increased water logging duaration, 5.river bank errosion, 6.gets inundated due to unexpected tides, 7.flood, 8. flash-flood, 9.others (specify)

Section 7: Details of Non-Farm Activities

Description of self-employed non farm activities of the household members

#	Non farm activities		Initial capital (Tk)	Source of initial capital (Tk)					No. of hired workers	The year this non farm activity first started	Where did you hear about this activity?	Where did you learn about the activity?	Major 3 obstacles starting this activity (code)			How it is affected by disaster (code)	Major 3 disasters affect most? (code)		
	Name of non farm activity	code		Own savings	Selling assets	Bank loan	N.G.O. loan	Pers onal loan											
1	2	3	4	5	6	7	8	9	10	11	12	13	14			15	16		
1.																			
2.																			
3.																			
4.																			

Code:

- **Activity code:** As mentioned in the Section 2.
- **How did you know:** 1. NGO personnel, 2. Govt. personnel, 3. friends/relatives/neighbours, 4. someone does this activity, 5. radio/TV
- **Where did you learn the know-how:** 1. NGO personnel, 2. Govt. personnel, 3. friends/relatives/neighbours, 4. someone does this activity, 5. radio/TV
- **What are the constrains to start:** 1. requires more investment, 2. it is not easy to learn the know-how, 3. raw materials are not locally available, 4. not easy marketing, 5. others (spacify)
- **Affected by disaster:** 1. not affected, 2. moderately affected, 3.highly affected
- **What disaster causes more:** 1. salinity, 2. drought, 3. sand carpetting (on land), 4. watter lagging, 5. errosion, 6. unexpected tide, 7. flood, 8. Flash flood, 9. others (spacify)

Section 8: Livelihoods and climate change

Provide the following information for those members of the households who have changed their livelihoods in the last 5 years

#	HH member Identification number	Main livelihoods dropped (code)	Main livelihoods taken up (code)	Why has the person changed the livelihood? (code)	Type of Livelihoods diversification (code)	How did his income change? (code)
1	2	3	4	5	6	7
1 .						
2 .						
3 .						

Code:

- Why did you change occupation: 1.for better income, 2.for better sustainability, 3. provides better scope of work, 4. became less productive due to climate change, 5. due to health reason, 6. provides less income as it is affected by climate change, 7. provides less scope of work as it is affected by climate change, 8. others (specify)

- What diversity of occupation has been taken place: 1. from agri to non-agri, 2. from agri to other natural resource (i.e. forest/fish) exploitation, 3.from non-agri to agri, 4. from non-agri to other natural resource (i.e.forest/fish) exploitation, 5. from other natural resource (i.e. forest/fish) exploitation to agri, 6. from other natural resource (i.e. forest/fish) exploitation to non-agri, 7. within agri, 8. within non-agri, 9. within other natural resource (i.e. forest/fish) exploitation, 10. others (specify)

- Changes in income: 1.declined a bit, 2. declined a lot, 3. increased a bit, 4. increases a lot, 5. unchanged

Section 9: Income from Other Sources

9.1 Income from pension and other social securities (last 1 year)

9.1 Income from pension and other social securities (last 1 year)

#	HH member Identification number	Programme (code)	Total Income (Tk/equivalent)
1 .			
2 .			
3 .			
4 .			
5 .			
6 .			

Code - source: 1. VGD, 2.VGF, 3. senior citizen, 4. widow, 5. freedom fighter, 6.relief/donation, 7. scholarship, 8.pension, 9.Others (specify)

9.2 Income from rents/mortgages: (last 1 year)

#	Assets and equipment given on rent/mortgage	Total income (Tk/equivalent)
1 .	Land leased out	
2 .	House rent	
3 .	Shop/ warehouse rent	
4 .	Irrigation equipment rent	
5 .	Power tiller rent	
6 .	Draft animals(Bull)	
7 .	Other assets (specify)	

9.3 Income agricultural/natural products (including home consumption) : last 1 year

#	Description	Unit	Sold (Tk)	Consumption (Tk)	Production/harvest Cost (Tk)
1	2	3	4	5	6
1	Trees	No.			
2	Timber	cft			
3	Fruits				
4	Egg	No.			
5	Milk	litre			
6	Goolpata				
7	Fuel wood	mond			

#	Description	Unit	Sold (Tk)	Consumption (Tk)	Production/harvest Cost (Tk)
1	2	3	4	5	6
8	Straw				
9	Jute stick				
10	Honey	mond			
11	Fish/prawn/shrimp	mond			
12	Crab	mond			
13	Prawn/shrimp fry	No.			
14	Other (specify)				

Section 10: Food Intake and Cost of Food

10.1 Food intake	Last week	2 weeks before last	3 weeks before last	4 weeks before last
Month (Code: 1.Boishak, 2.Joistho, 3.Ashar, 4.Srabon, 5.Bhadro, 6.Ashwin, 7.Kartik, 8.Agrohayon, 9.Poush, 10.Magh, 11.Falgun, 12. Choitra)				
No. Meal taken/day (code: 1.less than twice, 2.twice, 3.thrice but insufficient, 4. thrice and sufficient)				
Any natural disaster during the week? (code: 1.yes, 2.no)				

10.2 Cost of Food

(The data should be taken of last week. If there were invitations in the given week then give the data of the previous week)

Number of household members taken food during the week: ..... Persons

Code	Food Items	Unit	Amount consumed during the week	Market price (Tk/unit)	Cost (Tk/equivalent) *
1	2	3	4	5	6
1.	Fine rice	Kg			
2.	Coarse rice	Kg			
3.	Flour	Kg			
4.	Puffed rice	Kg			
5.	Lentils	Kg			
6.	Beef	Kg			
7.	Mutton	Kg			
8.	Duck meat	Kg			
9.	Chicken	Kg			
10.	Egg	No.			
11.	Fish	Kg			
12.	Vegetable	L/S			
13.	Fruits				

Code	Food Items	Unit	Amount consumed during the week	Market price (Tk/unit)	Cost (Tk/equivalent)*
1	2	3	4	5	6
14.	Tea/biscuits				
15.	Spices				
16.	Oil	litre			
17.	Butter				
18.	Milk	litre			
19.	Milk products	Kg			
20.	Baby food				
21.	Molasses	Kg			
22.	Sugar	Kg			
23.	Betel nuts and leaf	L/S			
24.	Cigarette	L/S			
25.	Fuel wood	L/S			
26.	Other (specify)				

**Cost should be considered even though if it is consumed from stock*

10.3 Expenditure excluding food (for the last 1 year)

#	Description	Expenditure (Tk)
1	2	3
1.	Clothing	
2.	Shoes and socks	
3.	Toiletries	
4.	Soap	
5.	Utensils	
6.	Blankets/pillows etc.	
7.	Furniture and fittings	
8.	Hurricane lamps etc.	
9.	Kerosene/matches/ candle lights etc.	
10	Electricity expenses	
11	Education	

#	Description	Expenditure (Tk)
1	2	3
12	Maintenance of household items	
13	House maintenance and repairs	
14	House extension and renovation	
15	Land/House purchase	
16	Land and Guards rent	
17	Transport expenditure	
18	Medicine	
19	Doctor fees	
20	Entertainment/p ersonal travels	
21	Shoe shiner/laundry	
22	Gift	

#	Description	Expenditure (Tk)
1	2	3
23	Stationery	
24	Radio/TV	
25	Mobile phones/telep hone set	
26	Mobile phones/telep hone bill	
27	Weddings, d eaths anniversary etc.	
28	Religious, social programmes	
29	Dowry	
30	Legal cases expenses	
31	Lost money	
32	Helping hands' and servants' salaries	
33	Other (specify)	

Section 11: Access to Formal and Informal Credit

11.1 Use of credit (last year)

HH member's ID	1st Source			2nd Source			3rd Source			4th Source		
	Source code	Amount (Tk)	Sector use-major 3 (code)	Source code	Amount (Tk)	Sector use-major 3 (code)	Source code	Amount (Tk)	Sector use-major 3 (code)	Source code	Amount (Tk)	Sector use-major 3 (code)
1	2	3	4	5	7	8	9	10	11	12	13	14

- Source: 1. NGO/micro-credit providing institution, 2.Govt. bank, 3.private bank, 4.money lender, 5.friends/relatives/neighbours, 6. others (specify)
- Utilization of credit: 1.non-agri related activity, 2.agri related activity, 3.treatment, 4.food, 5.land purchase/construction or renovation of house, 6.education, 7. wedding, 8.dowry, 9.funeral, 10. repay debts, 11.assist relative/friend, 12.fish cultivation, 13.poultry rearing, 14.livestock rearing

11.2	Did you get any loan during or post disaster periods (to over come) in last 5 years? (1. yes, 2.no, 3.credit was not required)	
	If yes, than what are the sources?	
11.3	Did you ever get extended repayment/grace period or waived interest payments during or post disaster periods in last 5 years? (1.yes, 2.no)	
11.4	If yes, than what are the sources?	(1.NGO/micro-credit providing institution, 2.Govt. bank, 3.privatebank, 4.money lender, 5.friends/relatives/neighbours, 6. others)

Section 12: Migration and Remittances

12.1 Did anyone of the household migrated? (1.yes, 2.no)

HH Member ID	Main occupation of the migrant (code)	Type of migration (code)	Migated to (code)	Sending cash (Ave.Tk./year)		If migrated to another district/place of the country for less than a year						
				Times	Total Amount (Tk.)	Times of migration taken place last year	1st Spell		2nd Spell		3rd Spell	
							Start month (code)	For how many days	Start month (code)	For how many days	Start month (code)	For how many days
1	2	3	4	5	6	7	8	9	10	11	12	13

- HH Member ID : from Column-1 of Section 2
- Occupation code: fro Section 2
- Type of migration: 1. permanent, 2. for few years, 3. less than a year
- Where: 1. abroad, 2. within the country
- Month: 1. Boishak, 2.Joistho, 3. Ashar, 4. Srabon, 5. Bhadro, 6. Ashwin, 7. Kartik, 8. Agrohayon, 9. Poush, 10. Magh, 11.Falgun, 12. Choitra

12.3	Did anyone of the HH had to migrate as a result of disaster during last 5 years? (1.yes, 2.no)		
12.4	If yes, than for what disaster? (1. flood, 2. flash-flood, 3. cyclone, 4. tidal surge, 5.drought, 6. riverbank errotion, 7. watter lagging, 8. salinity, 9. others (spacify)		
12.5	Type of assistance extended by the migrant during/after the disasters during last 5 years		
	1.visited home and assisted, 2. sent money (more than usual time), 3. sent money (as much as usual time), 4. sent materials/kind, 5. others (spacify)		
12.6	How the assistance from the migrants helped to overcome the disaster? (1.a bit, 2.moderate, 3.remarkably, 4.fully)		

Section 13: Disasters and Coping Strategies

#	Disasters	How many times occurred in last			Loss incurred (major 3) during last 5 years (code)			Affect on the major occupations of the HH (code)	Amount of loss (Tk)			Coping Strategies-3 major (code)		
		3 month	5 years	10 years	1st	2nd	3rd		1st	2nd	3rd	1st	2nd	3rd
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	Flood													
2.	Flash -flood													
3.	Cyclone/ tornado													
4.	Storm surge													
5.	Extreme high tide													
6.	Cross damn failure													
7.	Salinity intrusion													
8.	Drought													
9.	River bank erosion													
10.	Water logging													
11.	Other (specify)													

Code:

- Loss incurred: 1.mortality-family member, 2.injured/sick remarkably -family member, 3.mortality-livestock, 4. injured/sick remarkably- livestock, 5.gher/fish farm/pond over topped, 6. gher/fish farm lost under river/ channel, 7.broken house, 8.homeste.ad lost under river/channel, 9. valuable big trees uprooted, 10. fishing boat/agri mechinary was broken, 11. agri-land lost under river/channel, 12. crop was lost, 13. declined the productivity of land/gher/fish farm, 14.drought, 15.increased pest infestation, 16.increased use of underground water, 17. declined crop intensity, 18.created water logging, 19.work-days lost/declines, 20.forced to migrate, 21. changed occupation, 22.homestead went under water, 23.business infrastructure affected, 24.capital asset affected, 25.mortality-poultry, 26.others (specify)
- Impact on main occupations: 1.very little, 2.moderate, 3.remarkably, 4.got ruined
- Coping Strategies: 1. from savings, 2. from insurance, 3. taking new loans (from banks, micro credit organizations, non-institutional sources), 4. Government help (i.e. relief), 5. Private sector help (i.e. relief), 6. support from friends and relatives, 7. Sale of land, 8. Sale of assets (excluding land), 9. Mortgaging land, 10. mortgaging other assets (gold, livestock etc), 11. Selling harvest (i.e. crop/fish) in advance, 12. Selling labour in advance, 13. diversify occupation, 14. out migration, 15. remittances, 16. Did not do anything, 17. others (mention if applicable)

Section 14: Health

12.3	Did anyoe of the HH had to migrate as a result of disaster during last 5 years? (1.yes, 2.no)				
12.4	If yes, than for what disaster? (1. flood, 2. flash-flood, 3. cyclone, 4. tidal surge, 5.drought, 6. riverbank errotion, 7. watter lagging, 8. salinity, 9. oth ers (spacify)				
12.5	Type of assistance extended by the migrant during/after the disasters during last 5 years				
	1.visited home and assisted, 2. sent money (more than usual time), 3. sent money (as much as usual time), 4. sent materials/kind, 5. others (spacify)				
12.6	How the assistance from the migrants helped to overcome the disaster? (1.a bit, 2.moderate, 3.remarkably, 4.fully)				

Section 13: Disasters and Coping Strategies

#	Disasters	How many times occurred in last			Loss incurred (major 3) during last 5 years (code)			Affect on the major occupations of the HH (code)	Amount of loss (Tk)			Coping Strategies-3 major (code)		
		3 month	5 years	10 years	1st	2nd	3rd		1st	2nd	3rd	1st	2nd	3rd
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	Flood													
2.	Flash-flood													
3.	Cyclone/ tornado													
4.	Storm surge													
5.	Extreme high tide													
6.	Cross damn failure													
7.	Salinity intrusion													
8.	Drought													
9.	River bank erosion													
10.	Water logging													
11.	Other (specify)													

Code:

- Loss incurred: 1.mortality-family member, 2.injured/sick remarkably -family member, 3.mortality-livestock, 4. injured/sick remarkably- livestock, 5.gher/fish farm/pond over topped, 6. gher/fish farm lost under river/ channel, 7.broken house, 8.homestead lost under river/channel, 9. valuable big trees uprooted, 10. fishing boat/agri mechinary was broken, 11. agri-land lost under river/channel,, 12. crop was lost, 13. declined the productivity of land/gher/fish farm, 14.drought, 15.increased pest infestation, 16.increased use of underground water, 17. declined crop intensity, 18.created water logging, 19.work-days lost/declines, 20.forced to migrate, 21. changed occupation, 22.homestead went under water, 23.business infrastructure affected, 24.capital asset affected, 25.mortality-poultry, 26.others (specify)

- Impact on main occupations: 1.very little, 2.moderate, 3.remarkably, 4.got ruined

- Coping Strategies: 1. from savings, 2. from insurance, 3. taking new loans (from banks, micro credit organizations, non-institutional sources), 4. Government help (i.e. relief), 5. Private sector help (i.e. relief), 6. support from friends and relatives, 7. Sale of land, 8. Sale of assets (excluding land), 9. Mortgaging land, 10. mortgaging other assets (gold, livestock etc), 11. Selling harvest (i.e. crop/fish) in advance, 12. Selling labour in advance, 13. diversify occupation, 14. out migration, 15. remittances, 16. Did not do anything, 17. others (mention if applicable)

Section 14: Health

14.1	How long does it take you to get to a health facility (in minutes)?		
14.2	Is anybody in your household chronically ill? (1.yes, 2.no)		
14.3	Has anyone in your family been so sick in the past 2 weeks that they had to miss work or school? (1.yes, 2.no)		

Section 15: Water

15.1	What kind of water is consumed? (1. tubewell, 2.haor/river/canal, 3.pond, 4.rainwater, 5.well, 6.tap, 7. other (specify)		
15.2	Is this water safe for drinking? (1.yes, 2.no)		
15.3	If not, why (codes)? (1.not clean, 2.saline, 3.iron, 4.arsenic, 5.other (specify)		
15.4	How long does it take to get to your drinking water source (in minutes)?		
15.5	Is this water available every day? (1.yes, 2.no)		
15.6	In the past year, have you heard about any conflicts over drinking water in your village? (1.yes, 2.no)		
15.7	In the past year, have you heard about any conflicts over irrigation water in your village? (1.yes, 2.no)		

Section 16: Social Networks and Political Capital

16.1	In the past month, dd relative/friends help your family (e.g. get medical care, take care of children, sold goods/produced by you? (1.yes, 2.no)		
16.2	In the past month, did your family help relative/friends (e.g., get medical care, take care of children, sold goods produced by you? (1.yes, 2.no)		
16.3	Did you borrow any money from relatives or friends in the past month? (1.yes, 2.no)		
16.4	Did you lend any money to relatives or friends in the past month? (1.yes, 2.no)		
16.5	In the past 12 months, have your or someone in your household gone to local administration, murubbi, for help? (1.yes, 2.no)		
16.6	Are you or anyone of your household a member of any cooperative? (1.yes, 2.no)		
16.7	Is anyone from your household active in local politics? (e.g., union parishad)? (1.yes, 2.no)		

Section 17: Link with Markets

#	Name of the most visited markets	Distance from your household (km)	How old is the market? (years)	Why do you visit this market (name 3 reasons? (code)			How frequently do you go to the market (code)	Growth of the market (code)	Who visit the market most? (code)	How is your livelihood dependent on the market? (code)
1	2	3	4	5			6	7	8	9
1.										
2.										
3.										

Code:

- Reason to go: 1.to sell products, 2.to buy raw materials of the IGAs, 3. to buy household materials/goods, 4.recreation, 5.to sell labour, 6.other (specify)
- Frequency: 1.daily, 2.twice a week, 3. once a weak, 4. once a month, 5. twice a month, 6. once in couple of month
- Growth of the market: 1.expanding, 2.declining, 3.no change
- Who comes: 1.mostly involved in agriculture, 2.mostly involved in non-agriculture
- Dependency: 1. very little, 2.moderate, 3.remarkable, 4.entirely

Annexure D

Dry Season Questionnaire

Non-Farm Livelihood Adaptation Approaches and Technologies – Dry Season

Section 1: HH Roster

Surveyor: _____ Date: Day ___ Month ___ Year 2012 Vil. code HH ID _____

Dist. _____ Upazila _____ Union _____ Vil _____ Zone _____

1. HH head _____ 2. Father/husband of HH head _____ 3. Special identity/location of the house _____

4. Respondent (must be HH member _____ 5. Sl. of Respondent (from the questionnaire of Wet Season) _____

Section 2: Income from Labour sale (agri and non-agri; livelihood type-C & D) and Service (livelihood type-E & F) (Last 3 months) 2.1.

#	# HH Mem*	Occupation	Occupation code	Occupation order (code)	Last month			Month before last			2 Months before last		
					# days worked	Ave. hours/ day	Daily/ monthly ** Wage (Tk.)	# days worked	Ave. hours/day	Daily/ monthly ** Wage (Tk.)	# days worked	Ave. hours/ day	Daily/ monthly ** Wage (Tk.)
1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.													
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													

** From the questionnaire of Wet Season. Data of new members of the HH need to be collected if added following Dry Season survey.*
*** Daily wages for labour sale, and monthly for service;*

Code: *Occupation order: 1. 1st; 2. 2nd, 3. 3rd.*

Classification of Livelihood/occupation and their codes:

A. **Self employment-Agri:** 101. Agriculture, 102. Poultry rearing, 103. Livestock rearing 104. Livestock bathan (raised in pasture/open field), 105. Duck bathan (raiseed in openwater), 106. Fish culture-pond, 107. Fish/prawn culture in gher/farm, 108. Agro-forestry, 109. Tree nursery, 110. Salt-pan mining, 111. Fisherman, 112. Crab harvester, 113. Shrimp/prawn fry collector, 114. Forest resource harvester, 115. Others (specify)

B. **Self employment-non-Agri:** 305. Rickshaw/van/nosimon driver, 306. Rickshaw/ van maker, 307. Agri-machinary maker, 308. Electronics equipment maker, 309. Key maker, 311. Shoe maker, 318. Tailoring, 319. Hair dresser, 321.Cook (decorator), 323. Boatman, 401. Dryfish producer, 402. Rice mill owner, 403. Flour mill owner, 404. *Muri/chira* producer, 405. Grocery shop owner, 406. Restaurant/sweetmeat/café owner, 407. Tea stall owner, 408. Tea hawker, 409. Small cottage industry, 410. Contructor, 411. Money lender, 412. Sawmill owner, 413. Gold smith, 414. Cloth store owner, 415. Electronics shop owner, 416. Utensils store owner, 417. Hardware shop owner, 418. Cement/rod shop owner, 419. Brickfield owner, 420. Brick traders, 421. Corogated sheet trader, 422. Transport business, 423. *Sharee/lungi* hawker, 424. Laundry, 425. Sawmill owner, 426. Timber/wood trader, 427. Firewood trader, 428. Pharmacy, 429. Flower trader, 430. Cinema hall owner, 431. Export-import, 432. Band/ribbon/cloth hawker, 433. Fruit shop owner, 434. Leather/hide trader, 435. Led machine, 436. Shop/ warehouse/house renting, 437. Recycling materials trading, 438. Ice trading, 439. Baker/ confectionery trader, 440. Stationery store, 441.Hand loom, 442. Fish/milk/agri commodity trader, 443. Fexiload trading, 506. Private tutor, 513. Ozha, 514.Kabiraj, 515. Homeo doctor, 444. Other business (specify)

C. **Labourer-Agri:** 201. Agriculture worker, 202. Poultry rearing worker, 203. Livestock rearing worker, 204. Gher/ fish farm worker, 205. Fishing worker, 206. Salt pan worker, 301. Worker-fish drying, 302. Earthworker (general), 303.Earthworker (food/pay for works), 304. Earthwrker (40/100 days plan), 207. Others (specify)

D. **Labourer-non-Agri:** 310. Worker-transport, 312. Coal/sand/stone mining worker, 313. Chaial (works with cane/ bamboo), 314. Worker-brickfield, 315. Worker-ricemill, 316. Worker-construction (i.e. mason, carpenter, rod), 317. Worker-mill/workshop/industry, 322. Worker-Handloom, 324. Worker-Others (specify)

E. **Service:** 501. Government service, 502. Private service, 503. Teacher, 504. NGO worker, 505. Village doctor, 507. Imam/purohit/kazi, 522. Others (specify)

F. **Miscellaneous:** 320. Domestic/HH assistant, 509. Student, 510. Retired, 512. Begger, 516. Public representative, 519. Migration (works in other districts or abroad), 520. Stipend, 521. Others (specify) 508. Housewife, 511. Unemployed, 517. Disable, 518. Child

Section 3: Details of Self-employment agricultural and Non-Farm Activities (livelihood type-A & B)

Note: excluding 101) 3.1

#	# HH Mem*	Occupation	Occupation code	Occupation Order (code)	Current capital (taka)	Source of capital (code)**		Operating capital*** (taka)	Net profit		No. of family labourer (1 yr)	Man-month of hired labourer (1 yr)	Total wages of hired labourer (1 year)	Has this activity been affected by disaster? (1 year)	If yes, which disaster? (code)
						1st	2nd	Last 1 year	Last 3 month	Last 1 year					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1.															
2.															
3.															
4.															
5.															
6.															
7.															
8.															
9.															
10.															

* From the questionnaire of Wet Season. Data of new members of the HH need to be collected if added following Dry Season survey. **land rent, fixed assets, stock, raw materials, dadan, etc. *** raw materials, fixture, pay bills, transportation, etc.

- Occupation code: From the questionnaire of Wet Season; Has this activity been affected by disaster?: 1. Yes, 2. No.;
- If yes, which disaster?: 1. Flood; 2. Flash flood; 3. Cyclone/tornado; 4. Storm surge; 5. Unexpected high tide; 6. Embankment failure; 7. Salinity intrusion; 8. Drought; 9. Riverbank erosion; 10. Water logging; 11. Others (specify); 12. Cold wave; 13. Hail
- Source of capital: 1. Own savings; 2. Property sale; 3. Bank loan; 4. NGO loan; 5. Non-institutional loan; 6. Others (specify

Section 4: Disasters and Coping Strategies 4.1

#	Disasters	Loss incurred (major 3) during last 3 months						Affect on the major occupations of the HH (code)	Coping Strategies-3 major (code)		
		Highest Loss incurred		2nd Highest Loss incurred		3rd Highest Loss incurred					
		Type of loss (code)	Amount of loss (Tk)	Type of loss (code)	Amount of loss (Tk)	Type of loss (code)	Amount of loss (Tk)		1st	2nd	3rd
1	2	3	4	5	6	7	8	9	10	11	12
1.	Flood										
2.	Flash-flood										
3.	Cyclone/ tornado										
4.	Storm surge										
5.	Extreme high tide										
6.	Cross damn failure										
7.	Salinity intrusion										
8.	Drought										
9.	River bank erosion										
10.	Water logging										
11.	Other (specify)										
12.	Cold wave										
13.	Hail										

Code:

- Type of Loss: 1. mortality-family member, 2. injured/sick remarkably -family member, 3. mortality-livestock, 4. injured/sick remarkably- livestock, 5. gher/fish farm/pond over topped, 6. gher/fish farm lost under river/ channel, 7. broken house, 8. homestead lost under river/channel, 9. valuable big trees uprooted, 10. fishing boat/agri machinery was broken, 11. agri-land lost under river/channel,, 12. crop was lost, 13. declined the productivity of land/gher/fish farm, 14. drought, 15. increased pest infestation, 16. increased use of underground water, 17. declined crop intensity, 18. created water logging, 19. work-days lost/declines, 20. forced to migrate, 21. changed occupation, 22. homestead went under water, 23. business infrastructure affected, 24. capital asset affected, 25. mortality-poultry, 26. others (specify)

- Impact on major occupations: 1. very little, 2. moderate, 3. remarkably, 4. got ruined

- Coping Strategies: 1. from savings, 2. from insurance, 3. taking new loans (from banks, micro credit organizations, non-institutional sources), 4. Government help (i.e. relief), 5. Private sector help (i.e. relief), 6. support from friends and relatives, 7. Sale of land, 8. Sale of assets (excluding land), 9. Mortgaging land, 10. mortgaging other assets (gold, livestock etc), 11. Selling harvest (i.e. crop/fish) in advance, 12. Selling labour in advance, 13. diversify occupation, 14. out migration, 15. remittances, 16. Did not do anything, 17. others (mention if applicable)

4.2. Affect on Agricultural Activities (Livelihood category- A & C) (Last 5 years)

#	Disasters	Affect on agriculture (code)	Type of loss (code)		
			Highest	2nd Highest	3rd Highest
1	2	3	4	5	6
1.	Flood				
2.	Flash-flood				
3.	Cyclone/ tornado				
4.	Storm surge				
5.	Extreme high tide				
6.	Cross damn failure				
7.	Salinity intrusion				
8.	Drought				
9.	River bank erosion				
10.	Water logging				
11.	Other (specify)				
12.	Cold wave				
13.	Hail				

Section 5: Social Networks and Political Capital

5.1. **Did you receive assistance/help in the following cases from relatives, neighbours or friends? (code: 1. Yes; 2. No; 3. Did not required)**

	Health care (code)	Take care of children (code)	Children's education (code)	At income generating activities (code)	Financial/food assistance (code)	Other assistance (code)
1	2	3	4	5	6	7
Last 3 months						
During last Jun-Aug						

5.2. **Did you extend assistance/help in the following cases to your relatives, neighbours or friends? (code: 1. Yes; 2. No; 3. Did not required)**

	Healthcare (code)	Take care of children (code)	Children's education (code)	At income generating activities (code)	Financial/food assistance (code)	Other assistance (code)
1	2	3	4	5	6	7
Last 3 months						
During last Jun-Aug						

5.3. Did you borrow any money from relatives or friends in last 3 months? (1.yes, 2.no; 3. Did not require) ☐

5.4. Did you lend any money to your relatives or friends in last 3 months? (1.yes, 2.no; 3. Did not require) ☐

5.5. Did you receive any assistance/help from local administration, UP or local elites in last 3 months? (1.yes, 2.no; 3. Did not require) ☐

5.6. Is any of your HH a member of any local association/committee? (1.yes, 2.no) ☐

5.7. How many of your family members have membership to any NGO? ☐

5.8. Is any of your HH involve in the following cases? (1.yes, 2.no) Involves in local politics

Public representative at UP ☐ Elected representative at any committee/association ☐ Takes part to settle local disputes/shalish ☐ Involves in local politics ☐

Section 6: Food Intake and Cost of Food

6.1 Food intake

6.1 Food intake	Last week	2 weeks before last	3 weeks before last	4 weeks before last
Month (Code: 1.Boishak, 2.Joistho, 3.Ashar, 4.Srabon, 5.Bhadro, 6.Ashwin, 7.Kartik, 8.Agrohayon, 9.Poush, 10.Magh, 11.Falgun, 12. Choitra)				
No. Meal taken/day (code: 1.less than twice, 2.twice, 3.thrice but insufficient, 4. thrice and sufficient)				
Any natural disaster during the week? (code: 1.yes, 2.no)				

6.2 Annual demad of rice are met from what sources? 1. Own production _____ % 2. Purchase _____ % 3. Others _____ %

6.3 No. Meal taken/day in the months of an average year? (code: 1.less than twice, 2.twice, 3.thrice but insufficient, 4. thrice and sufficient)

Boishak [ ] distho [ ] Ashar [ ] Srabon [ ] Bhadro [ ] Ashwin [ ] Kartik [ ] Agrohayon [ ] Poush [ ] Magh [ ] Falgun [ ] Choitra [ ]

6.4 Cost of Food

(The data should be taken of last week. If there were invitations in the given week then give the data of the previous week) Number of household members taken food during the week: ..... Persons

Code	Food Items	Unit	Amount consumed duringthe week	Market price (Tk/unit)	Cost (Tk/equivalent)*
1	2	3	4	5	6
1.	Fine rice	Kg			
2.	Coarse rice	Kg			
3.	Flour	Kg			
4.	Puffed rice	Kg			
5.	Lentils	Kg			
6.	Beef	Kg			
7.	Mutton	Kg			
8.	Duck meat	Kg			
9.	Chicken	Kg			
10.	Egg	No.			
11.	Fish	Kg			
12.	Vegetable	L/S			
13.	Fruits				

Code	Food Items	Unit	Amount consumed duringthe week	Market price (Tk/unit)	Cost (Tk/equivalent)*
1	2	3	4	5	6
14.	Tea/bisc uits				
15.	Spices				
16.	Oil	litre			
17.	Butter				
18.	Milk	litre			
19.	Milk products	Kg			
20.	Baby food				
21.	Molasses	Kg			
22.	Sugar	Kg			
23.	Betel nuts and leaf	L/S			
24.	Cigarette	L/S			
25.	Fuel wood	L/S			
26.	Other (specify				

Section 7: Cultivated land and harvested crop (applicable only for the crops mentioned wet season survey)

7.1.Does your family save rice seeds to grow next year? (1.yes, 2.no; 3. Not applicable)

7.2 Cultivation in own land

#	Crop (code)	Variety (code)	Land Size (dec.)	labourer required (man-days)		Wages of hired labourer (Tk./day)*
				Family members	Hired	
1	2	3	4	5	6	7
1.						
2.						
3.						

7.3 Share Crop-in

#	Crop (code)	Variety (code)	Land Size (dec.)	labourer required (man-days)		Wages of hired labourer (Tk./day)*
				Family members	Hired	
1	2	3	4	5	6	7
1.						
2.						
3.						

7.4 Cultivation in Mortgage-in land

#	# Mortgage	Land Size (dec.)	When was the land mortgaged in (Bangla calendar)		The mortgage was taken at least for what month?	Crop (code)	Variety (code)	labourer required (man-days)		Wages of hired labourer (Tk./day)*
			Month (code)	Year				Family members	Hired	
1	2	3	4	5	6	7	8	9	10	11
1 .				14						
2 .				14						
3 .				14						

7.5 Cultivation in Leased-in land

#	# Mortgage	Land Size (dec.)	When was the land mortgaged in (Bangla calendar)		The mortgage was taken at least for what month?	Crop (code)	Variety (code)	labourer required (man-days)		Wages of hired labourer (Tk./day)*
			Month (code)	Year				Family members	Hired	
1	2	3	4	5	6	7	8	9	10	11
1 .				14						
2 .				14						
3 .				14						

** The wages of hired labourer must include both cash and the cost of food (if any)*

Month Code: 1.Boishak, 2.Joistho, 3.Ashar, 4.Srabon, 5.Bhadro, 6.Ashwin, 7.Kartik, 8.Agrohayon, 9.Poush, 10.Magh, 11.Falgun, 12. Choitra)

7.6 Uses of fertilizer (applicable only of rice cultivation)

7.6.1. Cultivation in own land

Crop	Land Size (dec.)	Irrigation Type (code)	Use of pesticide	Fertilizer	Actual requirement (Kg)	Purchased (Kg)	Total cost (Tk)	Purchased from where? (code)|	Purchased from what distance (km)?	# attempts made to purchase
1	2	3	4	5	6	7	8	9	10	11
Last aman season				1. Urea (granular)						
				2. Urea (guti)						
				3. TSP						
				4. MoP						
				5. SSP						
				6. Organic						
				7. Others						
Year before last aman season				1. Urea (granular)						
				2. Urea (guti)						
				3. TSP						
				4. MoP						
				5. SSP						
				6. Organic						
				7. Others						
Last boro season				1. Urea (granular)						
				2. Urea (guti)						
				3. TSP						
				4. MoP						
				5. SSP						
				6. Organic						
				7. Others						
For land preparation of current boro season				1. Urea (granular)						
				2. Urea (guti)						
				3. TSP						
				4. MoP						
				5. SSP						
				6. Organic						
				7. Others						

7.6.2. Cultivation in other lands

Crop	Land Size (dec.)	Irrigation Type (code)	Use of pesticide	Fertilizer	Actual requirement (Kg)	Purchased (Kg)	Total cost (Tk)	Purchased from where? (code)	Purchased from what distance (km)?	# attempts made to purchase
1	2	3	4	5	6	7	8	9	10	11
Last aman season				1. Urea (granular)						
				2. Urea (guti)						
				3. TSP						
				4. MoP						
				5. SSP						
				6. Organic						
				7. Others						
Year before last aman season				1. Urea (granular)						
				2. Urea (guti)						
				3. TSP						
				4. MoP						
				5. SSP						
				6. Organic						
				7. Others						
Last boro season				1. Urea (granular)						
				2. Urea (guti)						
				3. TSP						
				4. MoP						
				5. SSP						
				6. Organic						
				7. Others						
For land preparation of current boro season				1. Urea (granular)						
				2. Urea (guti)						
				3. TSP						
				4. MoP						
				5. SSP						
				6. Organic						
				7. Others						

Code:

- Crop: 1. Rice-Aush, 2. Rice-Aman, 3. Rice-Boro, 4. Rice-Aromatic, 5. Wheat, 6. Maize/corn, 7. Onion, 8. Chili, 9. Garlic, 10. Ginger, 11. Other spices, 12. Cauliflower, 13. Cabbage, 14. Papaya, 15. Bean, 16. Tomato, 17. Bottle gird, 18. Sweet pumpkin, 19. Pointed gird, 20. Snake gird, 21. Other vegetables, 22. Leafy vegetables, 23. Potato, 24. Jute, 25. Tobacoo, 26. Sugarcane, 27. Betel leaf, 28. Lentils (Dal), 29. Mustard, 30. Sesame, 31. Mango, 32. Jackfruit, 33. Coconut, 34. Betelnut, 35. Other plant-based crops (specify), 36. Fish, 37. Shrimp/prawn, 38. Crab, 39. Salt, 40. Others (specify)

- Variety (applicable only for rice): 101. Rajashail, 102. Kajalshail, 103. Latashail, 104. Lotashail, 105. Nazirshail, 201.Shadamota, 202. Notunmota, 203. Zaminimota, 204. Zhamlimota, 205. Kalamota, 206. Lalmota, 207. Chikondhan, 208. Guradhan, 301. Dingamoni, 302. Haida, 303. Ausha, 304. IRRI, 305. Vojon-IRRI, 306. Dudkalam, 307. Shakkorkona, 308. Kalizira, 309. Durgavogh, 310. Kalakura, 311. Chaplaish, 312. Ferandoli, 313. Hamida, 314. Lathipanja, 315. Birain, 316. Beti, 317. Kesrail, 318. Darshail, 319. Chinikani, 320. Gochi, 321. Baigunbichi, 322.ITCL-fine, 323. ITCL-corse, 324. Horkoch, 325. Khejurdana, 326. Kachura, 327. Haldibatali, 328. Derimuri, 329.Boyarboat, 330. Panboat, 331. Patnai, 333. Kalapaijam, 401. BR-10, BR-11, 402. BR-12, 403. BR-14, 404. BR-16, 405. BR-22, 406. BR-23, 407. BR-26, 408. BRRI-28, 409. BRRI-29, 410. BRRI-30, 411. BRRI-32, 412. BRRI-33, 413. BRRI-40, 414. BRRI-41, 415. BRRI-42, 416. BRRI-43, 417. BRRI-47, 418. BRRI-51, 419. BRRI-52, 420. BRRI-53, 421. BRRI-54, 501. BINA-7, 502. BINA-60, 601. Hybrid-1, 602. Hybrid-2, 603. Hybrid-3, 604. Hybrid-4, 701. Others (specify)

- Irrigation: 1. Deep tubewell; 2. Shallow tubewell; 3. LLP/surface irrigation by shallow engine; 4. Traddle pump; 5. Tara pump; 6. Primitive method; 7. Irrigation was not required, 8. Irrigation was required but did not irrigated, 9. Others (specify)

- Pesticide use: 1.yes; 2. No

- Fertilizer purchased from where?: 1. Dealer of own Union; 2. Dealer of nearby Union; 3. Local influential; 4. Open market

- Unit: 1. Number, 2. Mond, 3. Litre, 4. Bira

Annexure E

Background Detail of the Field Survey

Note on the Enumerators involved in Non-farm livelihood study

- As part of rapport building, the team introduced themselves to the UNO, UP chairman and UP members, and explained about the objective of the study. They frequently mentioned that the study is for a government project (CDMP). The strategy worked well, and they got great assistance from the local administration and local elites. In most of the cases, local elites promoted the team to the area and encouraged the community members to cooperate in the government study.
- For further convenience, in appropriate cases the team hired local guide to ensure backstop support.
- Following the establishment of acceptance of the enumerators to the community, enumerators reached to the target households according to the sampling made by the researchers. (Sampling were done following a detail census of the HHs of the target villages)
- To the individual HHs, the team members introduced themselves and explained about the objective of the study before interviewing them.

Wet Season

- The field data were collected during 15 July to 22 August 2011.
- Teams were formed with 4 members (including 1 supervisor) and 2 members (including 1 supervisor). A total of 5 teams were formed with 4 members, and 10 teams with 2 members. Team members were formed with both professional CNRS and non-CNRS personnel experienced in surveys and studies. The non-CNRS personnel have very good reputation to the institutions (i.e. BIDS) that conduct frequent surveys and studies.
- A total of 3 monitoring officers were involved in the field who made frequent field visits from one team to another to eliminate inconsistency of data capturing
- A team of 6 members were involved in Dhaka for data checking, coding, and to provide feed-back to the field teams.

	CNRS	Non-CNRS	Total	Masters	Experience
Supervisor	12	2	14	14	5 to 9
Enumerator	6	21	27	27	3 to 10
Monitoring Officer	2	1	3	3	7 to 8
Total	20	24	44	44	

Dry Season

- The field data were collected during 17 January to 26 February 2012.
- A total of 6 teams were formed with 4 members (including 1 supervisor). Since the professional CNRS survey personnel were busy with another studies therefore team members were mostly formed with non-CNRS personnel who had earned very good reputation in the field.
- A total of 2 monitoring officers were involved in the field who made frequent field visits from one team to another to eliminate inconsistency of data capturing
- A team of 5 members were involved in Dhaka for data checking, coding, and to provide feed-back to the field teams.

	CNRS	Non-CNRS	Total	Masters	Experience
Supervisor		6	6	6	6 to 9
Enumerator		18	18	18	5 to 10
Monitoring Officer	2		2	2	7 to 8
Total	2	24	26	26	

Annexure F

Additional Tables

Table 5-15: Poverty status of rural households by district

Districts	Wet season				Dry season			
	Extreme poor	Moderate poor	Non poor	Total	Extreme poor	Moderate poor	Non poor	Total
Satkhira	58 (45)	31 (24.22)	39 (30.47)	128 (100)	44 (34.38)	30 (23.44)	54 (42.19)	128 (100)
Khulna	21 (16.54)	36 (28.35)	70 (55.12)	127 (100)	38 (29.92)	37 (29.13)	52 (40.94)	127 (100)
Bagerhat	41 (32.03)	26 (20.31)	61 (47.66)	128 (100)	51 (39.84)	25 (19.53)	52 (40.63)	128 (100)
Barguna	41 (32.03)	9 (7.03)	78 (60.94)	128 (100)	23 (17.97)	15 (11.72)	90 (70.31)	128 (100)
Patuakhali	25 (19.53)	12 (9.38)	91 (71.09)	128 (100)	18 (14.06)	11 (8.59)	99 (77.34)	128 (100)
Noakhali	45 (35.16)	15 (11.72)	68 (53.13)	128 (100)	71 (55.47)	20 (15.63)	37 (28.91)	128 (100)
Cox's Bazar	34 (26.56)	16 (12.5)	78 (60.94)	128 (100)	32 (25)	21 (16.41)	75 (58.59)	128 (100)
Jessore	11 (8.59)	16 (12.5)	101 (78.91)	128 (100)	10 (7.81)	11 (8.59)	107 (83.59)	128 (100)
Gaibandha	65 (50.78)	19 (14.84)	44 (34.38)	128 (100)	45 (35.43)	25 (19.69)	57 (44.88)	127 (100)
Sirajganj	19 (14.84)	21 (16.41)	88 (68.75)	128 (100)	40 (31.25)	22 (17.19)	66 (51.56)	128 (100)
Faridpur	38 (29.92)	10 (7.87)	79 (62.20)	127 (100)	36 (28.35)	17 (13.39)	74 (58.27)	127 (100)
Kurigram	41 (32.03)	44 (34.38)	43 (33.59)	128 (100)	44 (34.38)	35 (27.34)	49 (38.28)	128 (100)
Jamalpur	34 (26.56)	32 (25.00)	62 (48.44)	128 (100)	48 (37.5)	29 (22.66)	51 (39.84)	128 (100)
Munshiganj	25 (19.53)	12 (9.38)	91 (71.09)	128 (100)	25 (19.53)	11 (8.59)	92 (71.88)	128 (100)
Sunamganj	27 (21.09)	3 (2.34)	98 (76.56)	128 (100)	19 (14.84)	6 (4.69)	103 (80.47)	128 (100)
Moulvibazar	36 (28.13)	8 (6.25)	84 (65.63)	128 (100)	34 (26.56)	6 (4.69)	88 (68.75)	128 (100)
Sherpur	8 (6.25)	10 (7.81)	110 (85.94)	128 (100)	5 (3.91)	9 (7.03)	114 (89.06)	128 (100)
Sylhet	19 (14.84)	8 (6.25)	101 (78.91)	128 (100)	26 (20.31)	6 (4.69)	96 (75)	128 (100)
Naogaon	14 (10.94)	13 (10.16)	101 (78.91)	128 (100)	22 (17.19)	18 (14.06)	88 (68.75)	128 (100)
Nilphamari	38 (29.69)	28 (21.88)	62 (48.44)	128 (100)	33 (25.78)	13 (10.16)	82 (64.06)	128 (100)

Table 5-16: Poverty status of rural households by district and upazila

District	Upazilas	Wet season				Dry season			
		Extreme poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Satkhira	Shyamnagar	20	20	24	64	17	17	30	64
		31.25	31.25	37.5	100	26.56	26.56	46.88	100
	Assasuni	38	11	15	64	27	13	24	64
		59.38	17.19	23.44	100	42.19	20.31	37.5	100
Khulna	Dacope	10	15	39	64	13	19	32	64
		15.63	23.44	60.94	100	20.31	29.69	50	100
	Koyra	11	21	31	63	25	18	20	63
		17.46	33.33	49.21	100	39.68	28.57	31.75	100
Bagerhat	Sarankhola	21	15	28	64	19	19	26	64
		32.81	23.44	43.75	100	29.69	29.69	40.63	100
	Morrelganj	20	11	33	64	32	6	26	64
		31.25	17.19	51.56	100	50	9.38	40.63	100
Barguna	Barguna Sadar	18	5	41	64	7	5	52	64
		28.13	7.81	64.06	100	10.94	7.81	81.25	100
	Amtali	23	4	37	64	16	10	38	64
		35.94	6.25	57.81	100	25	15.63	59.38	100
Patuakhali	Galachipa	14	7	43	64	10	7	47	64
		21.88	10.94	67.19	100	15.63	10.94	73.44	100
	Bauphal	11	5	48	64	8	4	52	64
		17.19	7.81	75	100	12.5	6.25	81.25	100
Noakhali	Hatia	23	8	33	64	37	13	14	64
		35.94	12.5	51.56	100	57.81	20.31	21.88	100
	Companiganj	22	7	35	64	34	7	23	64
		34.38	10.94	54.69	100	53.13	10.94	35.94	100
Cox's Bazar	Chakaria	24	11	29	64	23	8	33	64
		37.5	17.19	45.31	100	35.94	12.5	51.56	100
	Ukhia	10	5	49	64	9	13	42	64
		15.63	7.81	76.56	100	14.06	20.31	65.63	100
Jessore	Avaynagar	5	5	54	64	3	5	56	64
		7.81	7.81	84.38	100	4.69	7.81	87.5	100
	Keshabpur	6	11	47	64	7	6	51	64
		9.38	17.19	73.44	100	10.94	9.38	79.69	100
Gaibandha	Fulchari	33	10	21	64	28	10	26	64
		51.56	15.63	32.81	100	43.75	15.63	40.63	100
	Saghata	32	9	23	64	17	15	31	63
		50	14.06	35.94	100	26.98	23.81	49.21	100
Sirajganj	Shirajganj Sadar	10	14	40	64	22	14	28	64
		15.63	21.88	62.5	100	34.38	21.88	43.75	100
	Chauhali	9	7	48	64	18	8	38	64
		14.06	10.94	75	100	28.13	12.5	59.38	100
Faridpur	Faridpur Sadar	12	6	46	64	14	8	42	64
		18.75	9.38	71.88	100	21.88	12.5	65.63	100
	Char Bhadrasan	26	4	33	63	22	9	32	63
		41.27	6.35	52.39	100	34.92	14.29	50.79	100
Kurigram	Kurigram Sadar	20	22	22	64	24	18	22	64
		31.25	34.38	34.38	100	37.5	28.13	34.38	100
	Raumari	21	22	21	64	20	17	27	64
		32.81	34.38	32.81	100	31.25	26.56	42.19	100

District	Upazilas	Wet season				Dry season			
		Extreme poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Jamalpur	Dewanganj	25	15	24	64	30	13	21	64
		39.06	23.44	37.50	100	46.88	20.31	32.81	100
	Madarganj	9	17	38	64	18	16	30	64
		14.06	26.56	59.38	100	28.13	25	46.88	100
Munshiganj	Lohajang	10	5	49	64	11	4	49	64
		15.63	7.81	76.56	100	17.19	6.25	76.56	100
	Munshiganj Sadar	15	7	42	64	14	7	43	64
		23.44	10.94	65.63	100	21.88	10.94	67.19	100
Sunamganj	Tahirpur	10	1	53	64	10	3	51	64
		15.63	1.56	82.81	100	15.63	4.69	79.69	100
	Dharampasa	17	2	45	64	9	3	52	64
		26.56	3.13	70.31	100	14.06	4.69	81.25	100
Moulvibazar	Barlekha	18	3	43	64	19	5	40	64
		28.13	4.69	67.19	100	29.69	7.81	62.5	100
	Rajnagar	18	5	41	64	15	1	48	64
		28.13	7.81	64.06	100	23.44	1.56	75	100
Sherpur	Jhenaigati	5	5	54	64	1	5	58	64
		7.81	7.81	84.38	100	1.56	7.81	90.63	100
	Nalitabari	3	5	56	64	4	4	56	64
		4.69	7.81	87.5	100	6.25	6.25	87.5	100
Sylhet	Companiganj	5	2	57	64	7	4	53	64
		7.81	3.13	89.06	100	10.94	6.25	82.81	100
	Jaintiapur	14	6	44	64	19	2	43	64
		21.88	9.38	68.75	100	29.69	3.13	67.19	100
Naogaon	Sapahar	8	6	50	64	8	11	45	64
		12.5	9.38	78.13	100	12.5	17.19	70.31	100
	Porsha	6	7	51	64	14	7	43	64
		9.38	10.94	79.69	100	21.88	10.94	67.19	100
Nilphamary	Dimla	25	19	20	64	23	5	36	64
		39.06	29.69	31.25	100	35.94	7.81	56.25	100
	Domar	13	9	42	64	10	8	46	64
		20.31	14.06	65.63	100	15.63	12.5	71.88	100

** Row %.*

Table 5-22: Livelihoods by DPA

All livelihoods	Wet season (Taka)					Dry Season (Taka)				
	Salinity	Flood	F. Flood	Drought	All Areas	Salinity	Flood	F. Flood	Drought	All Areas
Self-Employed Agri	1,919 (61.72)	1,050 (57.31)	946 (63.49)	566 (65.51)	4,481 (61.43)	1518 (54.9)	712 (47.12)	560 (48.70)	363 (54.18)	3,153 (51.72)
Self-Employed Non-Agri	444 (14.28)	281 (15.34)	165 (11.07)	121 (14.00)	1011 (13.86)	458 (16.56)	285 (18.86)	168 (14.61)	123 (18.36)	1,034 (16.96)
Agri Labour	347 (11.16)	269 (14.68)	197 (13.22)	107 (12.38)	920 (12.61)	357 (12.91)	276 (18.27)	224 (19.48)	108 (16.12)	965 (15.83)
Non-Agri Labour	308 (9.91)	163 (8.90)	157 (10.54)	45 (5.21)	673 (9.23)	336 (12.15)	169 (11.18)	172 (14.96)	46 (6.87)	723 (11.86)
Services	91 (2.93)	69 (3.77)	25 (1.68)	25 (1.68)	210 (2.88)	96 (3.47)	69 (4.57)	26 (2.26)	30 (4.48)	221 (3.63)
Total	3,109 (100.00)	1,832	1,490 (100.00)	864 (100.00)	7,295 (100.00)	2,765 (100.00)	1,511 (100.00)	1,150 (100.00)	670 (100.00)	6,096 (100.00)

() indicated %

Table 5-24: Self-employed livelihoods in the non-agriculture sector (all areas)

Main occupation	Wet Season				Dry Season			
	Extreme poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Rickshaw/van/nosimon	64 (40.00)	37 (34.91)	85 (20.00)	186 (26.92)	69 (39.43)	36(34.95)	77 (18.64)	182 (26.34)
Fish/milk/agri commodity trader	21 (13.13)	15 (14.15)	94 (21.12)	130 (18.81)	21 (13.13)	15 (14.15)	94 (21.96)	130 (18.73)
Grocery shop owner	6 (3.75)	6 (5.66)	45 (10.59)	57 (8.25)	5 (2.86)	4 (3.88)	46 (11.14)	55 (7.96)
Rickshaw/van maker	3 (1.88)	0 (0.00)	3 (0.71)	6 (0.87)	3 (1.71)	0 (0.00)	3 (0.73)	6 (0.87)
Agri-machinery maker	1 (0.63)	0 (0.00)	1 (0.24)	2 (0.29)	2 (1.14)	0 (0.00)	2 (0.48)	4 (0.58)
Electronics equipment	2 (1.25)	1 (0.94)	12 (2.82)	15 (2.17)	4 (2.29)	2 (1.94)	9 (2.18)	15 (2.17)
Key maker	0 (0.00)	0 (0.00)	1 (0.24)	1 (0.14)	0 (0.00)	0 (0.00)	1 (0.24)	1 (0.14)
Tailoring	5 (3.13)	12 (11.32)	32 (7.53)	49 (7.09)	10 (5.71)	13 (12.62)	22 (5.33)	45 (6.51)
Hair dresser	6 (3.75)	3 (2.83)	1 (0.24)	10 (1.45)	5 (2.86)	0 (0.00)	6 (1.45)	11 (1.59)
Cook (decorator)	1 (0.63)	2 (1.89)	2 (0.24)	5 (0.72)	1 (0.57)	1 (0.97)	0 (0.00)	2 (0.29)
Boatman	1 (0.63)	0 (0.00)	1 (0.24)	2 (0.29)	1 (0.57)	0 (0.00)	1 (0.24)	2 (0.29)
Rice mill owner	0 (0.00)	0 (0.00)	2 (0.47)	2 (0.29)	0 (0.00)	0 (0.00)	2 (0.43)	2 (0.43)
Muri/chira producer	0 (0.00)	0 (0.00)	4 (0.94)	4 (0.58)	0 (0.00)	1 (0.97)	4 (0.97)	5 (0.72)
Restaurant/sweetmeat	1 (0.63)	0 (0.00)	3 (0.71)	4 (0.58)	2 (1.14)	0 (0.00)	3 (0.73)	5 (0.72)
Tea stall owner	12 (7.50)	3 (2.83)	16 (3.76)	31 (4.49)	13 (7.43)	6 (5.83)	10 (2.42)	29 (4.20)
Tea hawker	2 (1.25)	1 (0.94)	0 (0.00)	3 (0.43)	2 (1.14)	1 (0.24)	0 (0.00)	3 (0.43)
Small cottage industry	8 (5.00)	0 (0.00)	4 (0.94)	12 (1.74)	6 (3.43)	3 (2.91)	6 (1.43)	15 (2.17)
Constructor	0 (0.00)	0 (0.00)	5 (1.18)	5 (0.72)	0 (0.00)	0 (0.00)	5 (1.21)	5 (0.72)
Sawmill owner	0 (0.00)	0 (0.00)	1 (0.24)	1 (0.14)	0 (0.00)	0 (0.00)	1 (0.24)	1 (0.14)
Goldsmith	3 (1.88)	1 (0.94)	3 (0.71)	7 (1.01)	2 (1.14)	1 (0.97)	4 (0.97)	7 (1.01)

Main Occupation	Wet season				Dry season			
	Extreme poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Cloth store owner	0 (0.00)	0 (0.00)	8 (1.88)	8 (1.16)	0 (0.00)	0 (0.00)	9 (2.18)	9 (1.3 0)
Electronics shop owner	0 (0.00)	0 (0.00)	3 (0.71)	3 (0.43)	0 (0.00)	0 (0.00)	3 (0.70)	3 (0.43)
Utensils store owner	0 (0.00)	0 (0.00)	2 (0.47)	2 (0.29)	0 (0.00)	0 (0.00)	2 (0.47)	2 (0.29)
Hardware shop owner	0 (0.00)	0 (0.00)	2 (0.47)	2 (0.29)	0 (0.00)	0 (0.00)	2 (0.47)	2 (0.29)
Cement/rod shop owner	0 (0.00)	0 (0.00)	1 (0.24)	1 (0.14)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Transport business	0 (0.00)	2 (1.89)	6 (1.41)	8 (1.16)	0 (0.00)	2 (1.89)	6 (1.40)	8 (1.16)
Sharee/lungi hawker	0 (0.00)	0 (0.00)	1 (0.24)	1 (0.14)	0 (0.00)	1 (0.97)	0 (0.00)	1 (0.14)
Laundry	1 (0.63)	0 (0.00)	0 (0.00)	1 (0.14)	0 (0.00)	1 (0.97)	1 (0.24)	2 (0.29)
Timber/wood trader	0 (0.00)	1 (0.94)	6 (1.41)	7 (1.01)	0 (0.00)	1 (0.57)	7 (1.69)	8 (1.16)
Firewood trader	0 (0.00)	0 (0.00)	1 (0.24)	1 (0.14)	0 (0.00)	0 (0.00)	1 (0.23)	1 (0.14)
Pharmacy	0 (0.00)	1 (0.94)	6 (1.41)	7 (1.01)	0 (0.00)	0 (0.00)	8 (1.94)	8 (1.16)
Export-import	0	0	1	1	0	0	1	1
Band/ribbon/cloth hawker	1 (0.63)	1 (0.94)	4 (0.94)	6 (0.87)	1 (0.57)	2 (1.94)	3 (0.73)	6 (0.87)
Fruit shop owner	0 (0.00)	1 (0.94)	5 (1.18)	6 (0.87)	0 (0.00)	1 (0.97)	5 (1.21)	6 (0.87)
Leather/hide trader	0 (0.00)	0 (0.00)	1 (0.24)	1 (0.14)	0 (0.00)	0 (0.00)	1 (0.4	1 (0.14)
Recycling materials	2 (1.25)	1 (0.94)	1 (0.24)	4 (0.58)	3 (1.71)	0 (0.00)	1 (0.24)	4 (0.58)
Baker/confectionery	2 (1.25)	2 (1.89)	1 (0.24)	5 (0.72)	0 (0.00)	1 (0.97)	4 (0.97)	5 (0.72)
Stationery store	1 (0.63)	2 (1.89)	13 (3.06)	16 (2.32)	2 (1.14)	1 (0.97)	13 (3.15)	16 (2.32)
Flexi load trading	0 (0.00)	0 (0.00)	1 (0.24)	1 (0.14)	0 (0.00)	0 (0.00)	1 (0.24)	1 (0.14)
Other business	13 (8.13)	12 (11.32)	27 (6.12)	51 (7.38)	12 (6.86)	7 (6.80)	23 (5.57)	42 (6.08)
Private tutor	3 (1.88)	1 (0.94)	17 (4.00)	21 (3.04)	4 (2.29)	2 (1.94)	19 (4.60)	25 (3.62)
Kabiraj	0 (0.00)	1 (0.94)	1 (0.24)	2 (0.29)	0 (0.00)	0 (0.00)	3 (0.73)	3 (0.43)
Homeo doctor	0 (0.00)	0 (0.00)	3 (0.71)	3 (0.43)	0 (0.00)	0 (0.00)	4 (0.97)	4 (0.58)
Total	160 (100.00)	106 (100.00)	425 (100.00	691 (100.00)	175 (100.00)	103 (100.00)	413 (100.00	691 (100.00)

**Column %s are in ().*

Table 5-28: Self-employed livelihoods in the non-agriculture sector (salinity-prone area)

Main Occupation	Wet season				Dry season			
	Extreme poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Rickshaw/van/nosimon	30 (37.97)	16 (32.65)	41 (22.65)	87 (28.16)	29 (34.52)	23 (38.98)	33 (20.75)	85 (28.15)
Fish/milk/agri commodity trading	10 (12.66)	6 (12.24)	37 (20.44)	53 (17.15)	8 (9.52)	7 (11.86)	37 (23.27)	52 (17.22)
Rickshaw/ van maker	2 (2.53)	0 (0.00)	0 (0.00)	2 (0.65)		0 (0.00)	0 (0.00)	2 (0.66)
Agri -machinery maker	1 (1.27)	0 (0.00)	1 (0.55)	2 (0.65)	2 (2.38)	0 (0.00)	1 (0.63)	3 (0.99)
Electronics equipment	1 (1.27)	1 (2.04)	6 (3.31)	8 (2.59)	1 (1.19)	1 (1.69)	4 (2.52)	6 (1.99)
Tailoring	3 (3.80)	9 (18.37)	11 (6.08)	23 (7.44)	6 (7.14)	9 (15.25)	5 (3.14)	
Hair dresser	4 5.06)	0 (0.00)	0 (0.00)	4 (1.29)	4 (4.76)	0 (0.00)	0 (0.00)	4 (1.32)
Cook (decorator)	0 (0.00)	1 (2.04)	0 (0.00)	1 (0.32)	-	-	-	-
Boatman	1 (1.27)	0 (0.00)	0 (0.00)	1 (0.32)	1 (1.19)	0 (0.00)	0 (0.00)	1 (0.33)
Rice mill owner	-	-	-	-	0 (0.00)	0 (0.00)	1 (1.69)	1 (0.33)
Muri/chira producer	-	-	-	-	0 (0.00)	1 (1.69)	0 (0.00)	1 (0.33)
Worker-others	1 (1.27)	0 (0.00)	0 (0.00)	1 (0.34)	-	-	-	-
Grocery shop owner	3 (3.80)	3 (6.12)	19 (10.50)	25 (8.09)	2 (2.38)	2 (3.39)	19 (11.95)	23 (7.62)
Restaurant/sweetmeat/	0 (0.00)	0 (0.00)	2 (1.10)	2 (0.65)	0 (0.00)	0 (0.00)	2 (1.26)	2 (0.66)
Tea stall owner	8 (10.13)	3 (6.12)		21 (6.80)	10 (11.90)	4 (6.78)	5 (3.14)	19 (6.29)
Small cottage industry	5 (6.33)	0 (0.00)	0 (0.00)	5 (1.62)	5 (5.95)	2 (3.39)	0 (0.00)	7 (2.32)
Contractor	0 (0.00)	0 (0.00)	2 (1.10)	2 (0.65)	0 (0.00)	0 (0.00)	2 (1.26)	2 (0.66)
Gold smith	3 (3.80)	1 (2.04)	3 (1.66)	7 (2.27)	2 (2.38)	1 (1.69)	4 (2.52)	7 (2.32)
Cloth store owner	0 (0.00)	0 (0.00)	4 (2.21)	4 (1.29)	0 (0.00)	0 (0.00)	5 (3.14)	5 (1.66)
Electronics shop owner	0 (0.00)	0 (0.00)	1 (0.55)	1 (0.32)	2 (2.38)	0 (0.00)	1 (0.63)	3 (0.99)
Utensils store owner	0 (0.00)	0 (0.00)	1 (0.55)	1 (0.32)	0 (0.00)	0 (0.00)	1 (0.63)	1 (0.33)
Hardware shop owner	0 (0.00)	0 (0.00)	1 (0.55)	1 (0.32)	0 (0.00)	0 (0.00)	1 (0.63)	1 (0.33)
Transport business	0 (0.00)	0 (0.00)	1 (0.55)	1 (0.32)	0 (0.00)	0 (0.00)	1 (0.63)	1 (0.33)
Laundry	1 (1.27)	0 (0.00)	0 (0.00)	1 (0.32)	0 (0.00)	1 (1.69)	0 (0.00)	1 (0.33)
Timber/wood trader	0 (0.00)	0 (0.00)	4 (2.21)	4 (1.29)	0 (0.00)	0 (0.00)	4 (2.52)	4 (1.32)
Firewood trader	0 (0.00)	0 (0.00)	1 (0.55)	1 (0.32)	0 (0.00)	0 (0.00)	1 (0.55)	1 (0.33)
Pharmacy	0 (0.00)	0 (0.00)	3 (1.66)	3 (0.97)	0 (0.00)	0 (0.00)	3 (1.89)	3 (0.99)
Fruit shop owner	0 (0.00)	1 (2.04)	1 (0.55)	2 (0.65)	0 (0.00)	1 (1.69)	1 (0.63)	2 (0.66)

Main occupation	Wet Season				Dry Season			
	Extreme poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Baker/ confectionery	1 (1.27)	(0.00)	1 (0.55)	2 (0.65)	0 (0.00)	1 (1.69)	1 (0.63)	2 (0.66)
Stationery store	0 (0.00)	2 (4.08)	5 (2.76)	7 (2.27)	0 (0.00)	2 (2.38)	5 (3.14)	7 (2.32)
Other business	5 (6.33)	4 (8.16)	14 (7.73)	23 (7.44)	6 (7.14)	3 (5.08)	11 (6.92)	20 (6.62)
Private tutor	0 (0.00)	1 (2.04)	11 (6.08)	12 (3.88)	2 (2.38)	1 (1.69)	11 (6.92)	14 (4.64)
Kabiraj	0 (0.00)	1 (2.04)	0 (0.00)	1 (0.32)	0 (0.00)	0 (0.00)	1 (0.63)	1 (0.33)
Homeo doctor	0 (0.00)	0 (0.00)	1 (0.55)	1 (0.32)	0 (0.00)	0 (0.00)	1 (0.63)	1 (0.33)
Total	79 (100.0)	49 (100.0)	181 (100.0)	309 (100.0)	84 (100.0)	59 (100.0)	159 (100.0)	302 (100.0)

Figures in () are column %s

Table 5-29: Wage-based livelihoods in the non-agricultural sector (salinity prone area)

Main occupation	Wet season				Dry season			
	Extreme poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Earth worker (general)	23 (45.10)	13 (43.33)	18 (24.66)	54 (35.06)	22 (36.67)	12 (42.86)	22 (29.73)	56 (34.57)
Earth worker (food/pay)	1 (1.96)	5 (16.67)	1 (1.37)	7 (4.55)	6 (10.00)	2 (7.14)	0 (0.00)	8 (4.94)
Earth worker (40/100days)	-	-	-	-	0 (0.00)	0 (0.00)	1 (1.35)	1 (0.62)
Worker-transport	5 (9.80)	3 (10.00)	10 (13.70)	18 (11.69)	5 (8.33)	3 (10.71)	10 (13.15)	18 (11.11)
Coal/sand/ Stone mining	1 (1.96)	0 (0.00)	2 (2.74)	3 (1.95)	0 (0.00)	1 (3.57)	3 (4.05)	4 (2.47)
Chaial (works with cane and bamboo)	0 (0.00)	0 (0.00)	1 (1.37)	1 (0.65)	0 (0.00)	0 (0.00)	1 (1.35)	1 (0.62)
Worker-brickfield	0 (0.00)	1 (3.33)	1 (1.37)	2 (1.30)	1 (1.67)	1 (3.57)	1 (1.35)	3 (1.85)
Worker-construction	15 (29.41)	6 (20.00)	19 (26.03)	40 (25.97)	17 (28.33)	5 (17.86)	16 (21.62)	38 (23.46)
Worker-mill/workshop	3 (5.88)	1 (3.33)	13 (17.81)	17 (11.04)	4 (6.67)	0 (0.00)	12 (16.22)	16 (9.88)
Worker-others	3 (5.88)	1 3.33)	8 (10.96)	12 (7.79)	5 (8.33)	4 (14.29)	8 (10.81)	17 (10.49)
Total	51 (100.00)	30 (100.00)	73 (100.0)	154 (100.0)	60 (100.0)	28 (100.0)	74 (100.0)	162 (100.0)

Figures in () are column %s

Table 5-32: Self-employed livelihoods in the non-farm sector (flood area)

Main occupation	Wey Season				Dry Season			
	Extreme poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Rickshaw/van/ nosimon	22 (46.81)	17 (42.50)	24 (21.82)	63 (31.98)	34 (51.52)	8 (34.78)	21 (18.75)	63 (31.34)
Fish/milk/agri commodity trading	4 (8.51)	6 (15.00)	21 (19.09)	31 (15.74)	8 (12.12)	2 (8.70)	23 (20.54)	33 (16.42)
Rickshaw/van maker	0 (0.00)	0 (0.00)	2 (1.82)	2 (1.02)	0 (0.00)	0 (0.00)	2 (1.79)	2 (1.00)
Agri-machinery maker	-	-	-	-	0 (0.00)	0 (0.00)	1 (0.89)	1 (0.50)
Electronics equipment	0 (0.00)	0 (0.00)	2 (1.82)	2 (1.02)	1 (1.52)	1 (4.35)	1 (0.89)	3 (1.49)
Tailoring	1 (2.13)	3 (7.50)	12 (10.91)	16 (8.12)	3 (4.55)	3 (13.04)	8 (7.14)	14 (6.97)
Hair dresser	1 (2.13)	0 (0.00)	0 (0.00)	1 (0.51)	0 (0.00)	0 (0.00)	2 (1.79)	2 (1.00)
Cook (decorator)	1 (2.13)	1 (2.50)	0 (0.00)	2 (1.02)	1 (1.52)	1 (4.35)	0 (0.00)	2 (1.00)
Rice mill owner	0 (0.00)	0 (0.00)	1 (0.91)	1 (0.51)	0 (0.00)	0 (0.00)	1 (0.89)	1 (0.50)
Grocery shop owner	2 (4.26)	3 (7.50)	12 (10.91)	17 (8.63)	2 (3.03)	1 (4.35)	14 (12.50)	17 (8.46)
Restaurant/ sweetmeat shop	1 (4.26)	0 (0.00)	0 (0.00)	1 (0.51)	2 (3.03)	0 (0.00)	0 (0.00)	2 (1.00)
Tea stall owner	2 (4.26)	0 (0.00)	4 (3.64)	6 (3.05)	2 (3.03)	2 (8.70)	3 (2.68)	7 (3.48)
Tea hawker	0 (0.00)	1 (2.50)	0 (0.00)	1 (0.51)	0 (0.00)	0 (0.00)	1 (0.89)	1 (0.50)
Small cottage industry	1 (2.13)	0 (0.00)	1 (0.91)	2 (1.02)	1 (1.52)	0 (0.00)	1 (0.89)	2 (1.00)
Contractor	0 (0.00)	0 (0.00)	2 (1.82)	2 (1.02)	0 (0.00)	0 (0.00)	2 (1.79)	2 (1.00)
Cloth store owner	0 (0.00)	0 (0.00)	3 (2.73)	3 (1.52)	0 (0.00)	0 (0.00)	4 (3.57)	4 (1.99)
Hardware shop owner	0 (0.00)	0 (0.00)	1 (0.91)	1 (0.51)	0 (0.00)	0 (0.00)	1 (0.91)	1 (0.50)
Cement/rod shop owner	0 (0.00)	0 (0.00)	1 (0.91)	1 (0.51)	-	-	-	-
Transport business	0 (0.00)	1 (2.50)	2 (1.82)	3 (1.52)	0 (0.00)	0 (0.00)	2 (1.79)	2 (1.00)
Timber/wood trader	0 (0.00)	1 (2.50)	2 (1.82)	3 (1.52)	0 (0.00)	1 (4.35)	2 (1.79)	3 (1.49)
Pharmacy	0 (0.00)	1 (2.50)	1 (0.91)	2 (1.01)	0 (0.00)	0 (0.00)	2 (1.79)	2 (1.00)
Band/ribbon/ cloth haw	1 (2.13)	0 (0.00)	2 (1.82)	3 (1.52)	1 (1.52)	0 (0.00)	2 (1.79)	3 (1.49)
Fruit shop owner	0 (0.00)	0 (0.00)	2 (1.82)	2 (1.02)	0 (0.00)	0 (0.00)	2 (1.79)	2 (1.00)
Recycling materials	1 (2.13)	1 (2.50)	1 (0.91)	3 (1.52)	2 (3.03)	0 (0.00)	1 (0.89)	3 (1.49)
Stationery store	0 (0.00)	0 (0.00)	3 (2.73)	3 (1.52)	0 (0.00)	0 (0.00)	3 (2.68)	3 (1.49)
Other business	7 (14.89)	5 (12.50)	5 (4.55)	17 (8.63)	4 (6.06)	4 (17.39)	9 (8.04)	17 (8.46)
Private tutor	3 (6.38)	0 (0.00)	4 (3.64)	7 (3.55)	2 (3.03)	1 (4.35)	4 (3.57)	7 (3.48)
Homeo doctor	0 (0.00)	0 (0.00)	2 (1.82)	1 (1.02)	0 (0.00)	0 (0.00)	2 (1.79)	1 (1.00)
Total	47 (100)	40 (100)	110 (100)	197 (100)	66 (100)	23 (100)	112 (100)	201 (100)

Figures in () are column %s

Table 5-33: Wage-based livelihoods in the non-agricultural sector (flood area)

Main occupation	Wet Season				Dry Season			
	Extreme poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Worker-construction	15 (44.12)	9 (52.94)	25 (41.67)	49 (44.14)	16 (48.48)	17 (53.13)	15 (31.91)	48 (42.86)
Worker transport	4 (11.76)	3 (17.65)	16 (26.67)	23 (20.72)	2 (6.06)	6 (18.75)	14 (29.79)	22 (19.64)
Earth worker (general)	6 (17.65)	3 (17.65)	7 (11.67)	16 (14.41)	8 (24.24)	1 (3.13)	6 (12.77)	15 (13.39)
Earth worker (food/pay	1 (2.94)	0 (0.00)	1 (1.67)	2 (1.80)	1 (3.03)	1 (3.13)	0 (0.00)	2 (1.79)
Earth worker (40/100)	2 (5.88)	0 (0.00)	0 (0.00)	2 (1.80)	2 (6.06)	0 (0.00)	0 (0.00)	2 (1.79)
Coal/sand/stone mining	0 (0.00)	0 (0.00)	1 (1.67)	1 (0.90)	0 (0.00)	1 (3.13)	0 (0.00)	1 (0.89)
Chaial (works with cane and bamboo)	0 (0.00)	0 (0.00)	1 (1.67)	1 (0.90)	0 (0.00)	0 (0.00)	1 (2.13)	1 (0.89)
Worker-brickfield	1 (2.94)	1 (5.88)	1 (1.67)	3 (2.70)	2 (6.06)	2 (6.25)	0 (0.00)	4 (3.57)
Worker-rice mill	0 (0.00)	0 (0.00)	1 (1.67)	1 (0.90)	1 (3.03)	0 (0.00)	5 (10.64)	6 (5.36)
Worker - mill/workshop	1 (2.94)	0 (0.00)	5 (8.33)	6 (5.41)	1 (2.94)	0 (0.00)	5 (8.20)	6 (5.36)
Worker fish drying	-	-	-	-	0 (0.00)	0 (0.00)	1 (2.13)	1 (0.89)
Worker-others	4 (11.76)	1 (5.88)	2 (3.33)	7 (6.31)	1 (3.03)	4 (12.50)	5 (10.64)	10 (8.93)
Total	34 (100)	17 (100.)	60 (100)	111 (100)	33 (100)	32 (100)	47 (100)	112 (100)

Figures in () are column %s

Table 5-36: Self-employed livelihoods in the non-agricultural sector (flash-flood area)

Main occupation	Wet season			Dry season			
	Extreme poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Fish/milk/agri commodity trading	6 (31.58)	31 (34.07)	37 (33.64)	6 (46.15)	5 (45.45)	29 (33.72)	40 (36.36)
Rickshaw/van/ nosimon	6 (31.58)	13 (14.29)	19 (17.27)	3 (23.08)	2 (18.18)	12 (13.95)	17 (15.45)
Rickshaw/ van maker	1 (5.26)	1 (1.10)	2 (1.82)	1 (7.69)	0 (0.00)	1 (1.16)	2 (1.82)
Electronics equipment	0 (0.00)	3 (3.30)	3 (2.73)	0 (0.00)	0 (0.00)	4 (4.65)	4 (6.64)
tailoring	0 (0.00)	5 (5.49)	5 (4.55)	0 (0.00)	1 (9.09)	5 (5.81)	6 (5.45)
Cook (decorator)	0 (0.00)	2 (2.20)	2 (1.82)				
Boatman	0 (0.00)	1 (1.10)	1 (0.91)	0 (0.00)	0 (0.00)	1 (1.16)	1 (0.91)
Rice mill owner	0 (0.00)	1 (1.10)	1 (0.91)	0 (0.00)	0 (0.00)	1 (1.16)	1 (0.91)
Muri/chira producer	0 (0.00)	2 (2.20)	2 (1.82)	0 (0.00)	0 (0.00)	2 (2.33)	2 (1.82)
Grocery shop owner	0 (0.00)	9 (9.89)	9 (8.18)	0 (0.00)	0 (0.00)	10 (10.75)	10 (9.09)
Restaurant/sweetmeat	0 (0.00)	1 (1.10)	1 (0.91)	0 (0.00)	0 (0.00)	1 (1.16)	1 (0.91)
Tea stall owner	1 (5.26)	1 (1.10)	2 (1.82)	0 (0.00)	0 (0.00)	1 (1.16)	1 (0.91)
Tea hawker	1 (5.26)	0 (0.00)	1 (0.91)	1 (7.69)	0 (0.00)	0 (0.00)	1 (0.91)
Small cottage industry	2 (10.53)	1 (1.10)	3 (2.73)	0 (0.00)	1 (9.09)	3 (4.49)	4 (3.64)
Contractor	0 (0.00)	1 (1.10)	1 (0.91)	0 (0.00)	0 (0.00)	1 (1.16)	1 (0.91)
Cloth Store owner	0 (0.00)	1 (1.10)	1 (0.91)	-	-	-	-
Electronics shop owner	0 (0.00)	2 (2.20)	2 (1.82)	-	-	-	-
Utensils store owner	0 (0.00)	1 (1.10)	1 (0.91)	0 (0.00)	0 (0.00)	1 (1.16)	1 (0.91)
Transport business	0 (0.00)	1 (1.10)	1 (0.91)	0 (0.00)	0 (0.00)	2 (2.33)	2 (1.82)
Export-import	0 (0.00)	1 (1.10)	1 (0.91)	0 (0.00)	0 (0.00)	1 (1.16)	1 (0.91)

Table 5-39: Poverty status and livelihoods (drought area)

Main occupation	Wet Season			Dry Season			
	Extreme poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Fruit shop owner	0 (0.00)	1 (1.10)	1 (0.91)	0 (0.00)	0 (0.00)	1 (1.16)	1 (0.91)
Leather/hide trader	0 (0.00)	1 (1.10)	1 (0.91)	0 (0.00)	0 (0.00)	1 (1.16)	1 (0.91)
Recycling materials	1 (5.26)	0 (0.00)	1 (0.91)	1 (7.69)	0 (0.00)	0 (0.00)	1 (0.91)
Stationery store	1 (5.26)	4 (4.40)	5 (4.55)	0 (0.00)	1 (9.09)	4 (4.65)	5 (4.55)
Flexi load trading	0 (0.00)	1 (1.10)	1 (0.91)	0 (0.00)	0 (0.00)	1 (1.16)	1 (0.91)
Other business	0 (0.00)	4 (4.40)	4 (3.64)	0 (0.00)	0 (0.00)	2 (2.33)	2 (1.82)
Private tutor	0 (0.00)	1 (1.10)	1 (0.91)	0 (0.00)	0 (0.00)	2 (2.33)	2 (1.82)
Kabiraj	0 (0.00)	1 (1.10)	1 (0.91)	0 (0.00)	0 (0.00)	1 (1.16)	1 (0.91)
Homeo doctor	-	-	-	0 (0.00)	0 (0.00)	1 (1.16)	1 (0.91)
Total	19	91	110	13	11	86	110

Table 5-40: Self-employed livelihoods in the non-agricultural sector (drought area)

Main Occupation	Wet season				Dry season			
	Extreme poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Rickshaw/van/ nosimon	6 (40.00)	4 (23.53)	7 (16.28)	17 (22.67)	3 (25.00)	3 (30.00)	11 (19.64)	17 (21.79)
Electronics equipment	1 (6.67)	0 (0.00)	1 (2.33)	2 (2.67)	2 (16.67)	0 (0.00)	0 (0.00)	2 (2.56)
Key maker	0 (0.00)	0 (0.00)	1 (2.33)	1 (1.33)	0 (0.00)	0 (0.00)	1 (1.79)	1 (1.28)
Tailoring	1 (6.67)	0 (0.00)	4 (9.30)	5 (6.67)	1 (8.33)	0 (0.00)	4 (7.14)	5 (6.41)
Hair dresser	1 (6.67)	3 (17.65)	1 (2.33)	5 (6.77)	1 (8.33)	0 (0.00)	4 7.14)	5 (6.41)
Muri/chira producer	0 (0.00)	0 (0.00)	2 (4.65)	2 (2.67)	0 (0.00)	0 (0.00)	2 (3.57)	2 (2.56)
Grocery shop owner	1 (6.67)	0 (0.00)	5 (11.63)	6 (8.00)	0 (0.00)	0 (0.00)	5 (8.93)	5 (6.41)
Tea stall owner	1 (6.67)	0 (0.00)	1 (2.33)	2 (2.67)	1 (8.33)	0 (0.00)	1 (1.79)	2 (2.56)
Tea hawker	1 (6.67)	0 (0.00)	0 (0.00)	1 (1.33)	1 (8.33)	0 (0.00)	0 (0.00)	1 (1.28)
Small cottage industry	0 (0.00)	0 (0.00)	2 (4.65)	2 (2.67)	0 (0.00)	0 (0.00)	2 (3.57)	2 (2.56)
Sawmill owner	0 (0.00)	0 (0.00)	1 (2.33)	1 (1.33)	0 (0.00)	0 (0.00)	1 (1.79)	1 (1.28)
Transport business	0 (0.00)	1 (5.88)	2 (4.65)	3 (4.00)	0 (0.00)	1 (10.00)	2 (3.57)	3 (3.85)
Sharee/lungi hawker	0 (0.00)	0 (0.00)	1 (2.33)	1 (1.33)	0 (0.00)	1 (10.00)	0 (0.00)	1 (1.28)
Laundry	-	-	-	-	0 (0.00)	0 (0.00)	1 (1.79)	1 (1.28)
Timber/wood trader	-	-	-	-	0 (0.00)	0 (0.00)	1 (1.79)	1 (1.28)
Pharmacy	0 (0.00)	0 (0.00)	2 (4.65)	2 (2.67)	0 (0.00)	0 (0.00)	3 (5.36)	3 (3.85)
Band/ribbon /cloth hawker	0 (0.00)	1 (5.88)	2 (4.65)	3 (4.00)	0 (0.00)	2 (20.00)	1 (1.79)	3 (3.85)
Fruit shop owner	0 (0.00)	0 (0.00)	1 (2.33)	1 (1.33)	0 (0.00)	0 (0.00)	1 (1.79)	1 (1.28)
Baker/ confectioner y	1 (6.67)	2 (11.76)	0 (0.00)	3 (4.00)	0 (0.00)	0 0.00)	3 (5.36)	3 (3.85)
Stationery store	0 (0.00)	0 (0.00)	1 (2.33)	1 (1.33)	0 (0.00)	0 (0.00)	1 (1.79)	1 (1.28)
Fish/milk/agri commodity trading	1 (6.67)	3 (17.65)	5 (11.63)	9 (12.00)	1 (8.33)	3 (17.65)	5 (11.63)	9 (12.00)
Other business	1 (6.67)	3 (17.65)	3 (6.98)	7 (9.33)	1 (6.67)	3 (30.00)	8 (14.29)	12 (15.38)
Private tutor	0 (0.00)	0 (0.00)	1 (2.33)	1 (1.33)	0 (0.00)	0 (0.00)	2 (3.57)	2 (2.56)
Kabiraj	-	-	-	-	0 (0.00)	0 (0.00)	1 (1.79)	1 (1.28)
Total	15	17 (100.00)	43 (100.00)	75 (100.00)	12 (100.00)	10 (100.00)	56 (100.00)	78 (100.00)

Figures in () are column %

Table 5-41: Wage-based livelihoods in the non-agricultural sector (drought area)

Main occupation	Wet Season				Dry Season			
	Extreme poor	Moderate poor	Non-poor	Total	Extreme poor	Moderate poor	Non-poor	Total
Earth worker (food/pay)	-	-	-	-	1 (14.29)	0 (0.00)	0 (0.00)	1 (3.70)
Earth worker (40/100)	1 (20.00)	0 (0.00)	0 (0.00)	1 (3.85)	1 (14.29)	0 (0.00)	0 (0.00)	1 (3.70)
Worker-transport	0 (0.00)	0 (0.00)	2 (10.00)	2 (7.69)	0 (0.00)	0 (0.00)	2 (11.11)	2 (7.41)
Worker-rice mill	0 (0.00)	0 (0.00)	2 (10.00)	2 (7.69)	1 (14.29)	0 (0.00)	1 (1.56)	2 (7.41)
Worker-construction	4 (80.00)	1 (100.00)	13 (65.00)	18 (69.23)	4 (57.14)	2 (100.00)	12 (66.67)	18 (66.67)
Worker-others	0 (0.00)	0 (0.00)	3 (15.00)	3 (11.54)	0 (0.00))	0 (0.00)	3 (16.67)	3 (11.11)
Total	5 (100.0)	1 (100.00)	20 (100.00)	26 (100.0)	7 (100.00)	2 (100.00)	18 (100.00)	27 (100.00)

** Figures in () are column %s*

Table 6-3: Self-employment in non-agricultural taken up by the migrants by DPA (%)

Occupation	Salinity	Flood	Flash flood	Drought	All areas
Rickshaw/van/ nosimon	29.39 (15.15)	33.33 (34.33)	17.27 (47.37)	22.97 (100)	27.80 (37.88)
Rickshaw/ van maker	0.68 (0.00)	1.06 (4.48)	1.82 (0.00)	0.00 (0.00)	0.90 (2.27)
Agri-machinery maker	0.68 (0.00)	0.00 (0.00)	0.00 (5.26)	0.00 (0.00)	0.30 (.76)
Electronics equipment	2.70 (12.12)	1.06 (14.93)	2.73 (15.79)	2.70 (0.00)	2.24 (12.88)
Key maker	0.00 (3.03)	0.00 (0.00)	0.00 (0.00)	1.35 (0.00)	0.15 (0.76)
Tailoring	7.77 (6.06)	8.47 (7.46)	5.45 (10.53)	6.76 (0.00)	7.47 (6.82)
Hair dresser	1.35 (0.00)	0.53 (0.00)	0.00 (0.00)	6.76 (0.00)	1.49 (0.00)
Cook (decorator)	0.34 (9.09)	1.06 (0.00)	1.82 (5.26)	0.00 (0.00)	0.75 (3.03)
Boatman	0.34 (0.00)	0.00 (0.00)	0.91 (0.00)	0.00 (0.00)	0.30 (0.00)
Rice mill owner	0.00 (0.00)	0.53 (0.00)	0.91 (0.00)	0.00 (0.00)	0.30 (0.00)
Muri/chira producer	0.00 (0.00)	0.00 (0.00)	1.82 (0.00)	2.70 (0.00)	0.60 (0.00)
Grocery shop owner	8.45 (9.09)	8.99 (4.48)	9.09 (0.00)	8.11 (0.00)	8.67 (4.55)
Restaurant/sweet meat	0.68 (0.00)	1.06 (1.49)	0.91 (0.00)	0.00 (0.00)	0.75 (0.76)
Tea Stall owner	7.09 (0.00)	3.17 (0.00)	1.82 (0.00)	2.70 (0.00)	4.63 (0.00)
Tea hawker	0.00 (0.00)	0.53 (0.00)	0.91 (0.00)	1.35 (0.00)	0.45 (0.00)
Small cottage industry	1.69 (0.00)	1.06 (0.00)	2.73 (0.00)	2.70 (0.00)	1.79 (0.00)

Occupation	Salinity	Flood	Flash flood	Drought	All Areas
Contractor	0.68 (0.00)	1.06 (1.49)	0.91 (5.26)	0.00 (0.00)	0.75 (1.52)
Sawmill owner	0.00 (6.06)	0.00 (2.99)	0.00 (0.00)	1.35 (0.00)	0.15 (3.03)
Gold smith	2.36 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	1.05 (0.00)
Cloth store owner	1.35 (0.00)	1.59 (4.48)	0.91 (0.00)	0.00 (0.00)	1.20 (2.27)
Electronics shop owner	0.34 (6.06)	0.00 (1.49)	1.82 (0.00)	0.00 (0.00)	0.45 (2.27)
Utensils store owner	0.34 (0.00)	0.00 (0.00)	0.91 (0.00)	0.00 (0.00)	0.30 (0.00)
Hardware shop owner	0.34 (6.06)	0.53 (0.00)	0.00 (0.00)	0.00 (0.00)	0.30 (1.52)
Cement/rod shop owner	0.00 (0.00)	0.53 (0.00)	0.00 (0.00)	0.00 (0.00)	0.15 (0.00)
Transport business	0.34 (0.00)	1.59 (0.00)	0.91 (0.00)	4.05 (0.00)	1.20 (0.00)
Sharee/lungi hawker	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	1.35 (0.00)	0.15 (0.00)
Laundry	0.34 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.15 (0.00)
Sawmill owner	0.34 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.15 (0.00)
Timber/wood trader	1.35 (0.00)	1.59 0.00)	0.00 (0.00)	0.00 (0.00)	1.05 (0.00)
Firewood trader	0.34 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.15 (0.00)
Pharmacy	1.01 (0.00)	1.06 (0.00)	0.00 (0.00)	2.70 (0.00)	1.05 (0.00)
Export-import	0.00 (0.00)	0.00 (0.00)	0.91 (0.00)	0.00 (0.00)	0.15 (0.00)
Band/ribbon/cloth hawker	0.00 (0.00)	1.59 (1.49)	0.00 (0.00)	4.05 (0.00)	0.90 (0.76)
Fruit shop owner	0.68 (0.00)	1.06 (0.00)	0.91 (0.00)	1.35 (0.00)	0.90 (0.00)
Leather/hide trader	0.00 (0.00)	0.00 (1.49)	0.91 (0.00)	0.00 (0.00)	0.15 0.76)
Recycling materials	0.00 (0.00)	1.59 (0.00)	0.91 (0.00)	0.00 (0.00)	0.60 (0.00)
Baker/ confectionery	0.68 0.00)	0.00 (0.00)	0.00 (0.00)	4.05 (0.00)	0.75 (0.00)
Stationery store	2.36 (3.03)	1.59 (0.00)	4.55 (0.00)	1.35 (0.00)	2.39 (0.76)
fish/milk/agri commodity trading	17.91 (0.00)	16.40 (2.99)	33.64 (10.53)	12.16 (0.00)	19.43 (3.03)
Flexiload trading	0.00 (0.00)	0.00 (0.00)	0.91 (0.00)	0.00 (0.00)	0.15 (0.00)
Brickfield owner	0.00 (6.06)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (1.52)
Flower trader	0.00 (0.00)	0.00 (1.49)	0.00 (0.00)	0.00 (0.00)	0.00 (0.76)
Other business	8.11 (18.18)	8.99 (14.93)	3.64 (0.00)	9.46 (0.00)	7.77 (12.12)

** Figures in () are those found at the destination of migration*

Table 6-4: Labour in non-agricultural undertaken by the migrants by DPA (%)

Occupation	Salinity area	Flood area	Flash flood area	Drought area	All areas
Worker-construction	26.14 (29.46)	44.14 (45.22)	11.01 (53.85)	69.23 (50.00)	29.82 (40.30)
Worker-mill/workshop	11.11 (30.23)	5.41 (31.85)	7.34 (23.08)	0.00 (20.00)	7.77 (29.85)
Earth worker (g eneral)	34.64 (9.30)	13.51 (11.46)	9.17 (15.38)	0.00 (10.00)	19.55 (11.04)
Earth worker (food/pay)	4.58 (0.00)	1.80 (0.00)	0.00 (0.00)	0.00 (0.00)	2.26 (0.00)
Earth worker (40/100)	0.00 (0.00)	1.80 (0.00)	0.00 (0.00)	3.85 (0.00)	0.75 (0.00)
Worker-transport	11.76 (4.65)	20.72 (5.73)	4.59 (0.00)	7.69 (0.00)	12.03 (4.48)
Coal/sand/stone mining	1.96 (2.33)	0.90 (1.27)	56.88 (0.00)	0.00 (10.00)	16.54 (1.79)
Chaial (works with cane and bamboo)	0.65 (0.00)	0.90 (0.00)	1.83 (0.00)	0.00 (0.00)	1.00 (0.00)
Worker-brickfield	1.31 (17.83)	2.70 (2.55)	0.92 (5.13)	0.00 (0.00)	1.50 (8.66)
Worker-rice mill	0.00 (0.00)	0.90 (0.64)	0.00 (0.00)	7.69 (0.00)	0.75 (0.30)
Worker-others	7.84 (6.20)	7.21 (1.27)	8.26 (2.56)	11.54 (10.00)	8.02 (3.58)

** Figures in () are those found at the destination of migration*

Table 8-6: Average annual household income (taka) of self-employed in non-agricultural

Main occupation	Salinity area	Flood area	Flash flood area	Drought area	All areas
Rickshaw/van/nosimon	843,023 (19,292)	78,474 (20,245)	88,935 (19,861)	61,365 (142,774)	80,110 (19,171)
Rickshaw/van maker	127,800 (14,200)	100,315 (25,079)	100,400 (25,100)	-	107,207 (22,364)
Agri-machinery maker	98,650 (15,294)	-	-	-	98,650 (15,294)
Electronics equipment	127,954 (15,994)	-	-	-	127,954 (15,994)
Key maker	-	-	-	121,325 (20,221)	121,325 (20,221)
Tailoring	116,163 (21,275)	70,073 (18,800)	43,900 (21,950)	97,850 (19,570)	98,913 (20,532)
Hair dresser	50,080 (9,005)	105,500 (26,375)	-	86,808 (15,295)	73,738 (14,182)
Cook (decorator)	126,810 (31,702)	38,100 (7,620)	190,725 (34,486)	-	136,590 (27,074)
Boatman	11,520 (2,880)	-	152,950 (25,492)	-	82,235 (14,186)
Rice mill owner	-	60,000 (30,000)	216,450 (36,075)	-	138,225 (33,037)
Muri/chira producer	-	-	28,990 (28,990)	-	28,990 (28,990)
Grocery shop owner	113,984 (23,660)	140,713 (26,377)	71,987 (28,853)	156,442 (49,295)	124,542 (28,285)
Restaurant/sweetmeat shop owner	117,120 (19,520)	85,154 (106,445)	173,400 (28,900)		125,225 (19,688)

Main occupation	Salinity area	Flood area	Flash flood area	Drought area	All areas
Tea stall owner	88,845 (21,465)	71,046 (14,934)	53,620 (12,197)	144,915 (25,652)	86,695 (19,519)
Tea hawker	-	145,200 (24,200)	43,500 (7,250)	103,601 (17,267)	97,434 (16,239)
Small cottage industry	-	47,250 (23,625)	-	24,600 (12,300)	35,925 (17,962)
Contractor	182,500 (60,833)	126,050 (18,007)	-	-	154,275 (39,420)
Saw mill owner	82,780 (20,695)	-	-	256,200 (51,240)	169,490 (35,967)
Gold smith	81,000 (27,000)	-	-	-	81,000 (27,000)
Cloth store owner	73,647 (21,042)	111,490 (26,159)	-	-	96,353 (24,112)
Utensils store owner	-		316,000 (35,111)	-	316,000 (35,111)
Hardware shop owner	-	288,000 (36,000)	-	-	288,000 (36,000)
Cement/rod shop owner	-	108,000 (21,600)	-	-	108,000 (21,600)
Transport business	67,150 (13,430)	68,900 (38,825)	-	173,550 (42,425)	110,410 (35,186)
Sharee/lungi hawker	-	-	-	46,674 (11,668)	46,674 (11,668)
Laundry	89,400 (12,771)	-	-	-	89,400 (12,771)
Timber/wood trader	92,890 (17,542)	184,119 (43,783)	-	-	138,505 (30,662)
Firewood trader	167,660 (33,532)	-	-	-	167,660 (33,532)
Phar macy	423,867 (75,420)	155,726 (38,931)	-	116,700 (38,900)	283,292 (57,170)
Export-import	-		71,400 (14,280)	-	71,400 (14,280)
Band/ribbon/cloth hawker	-	37,615 (14,042)	-	100,110 (20,022)	68,862 (17,032)
Fruit shop owner	92,300 (20,310)	174,156 (21,76 9)	-	118,150 (23,630)	119,226 (21,505)
Leather/hide trader	-	-	369,600 (73,920)	-	369,600 (73,920)
Recycling materials	-	131,093 (25,781)	57,200 (11,440)	-	112,620 (22,196)
Baker/confectionery	-	-	-	83,978 (17,861)	83,978 (17,861)
Stationery store	102,741 (19,058)	60,700 (14,500)	76,010 (17,338)	169,600 (42,400)	89,025 (19,570)
Fish/milk/agri commodity trader	123,512 (23,637)	161,908 (31,855)	111,312 (19,033)	163,426 (34,293)	133,117 (25,322)
Other business	169,186 (34,004)	168,987 (29,931)	192,985 (31,292)	113,590 (18,075)	158,930 (29,524)
Total	110,453 (22,856)	110,730 (24,525)	110,252 (21,905)	108,775 (23,931)	110,302 (23,366)

Note: Figures in parentheses indicate per capita income.

Table 9-1: Natural disasters and poverty (all areas)

Pattern of natural disaster	Extreme poor (avg)			Moderate poor (avg)			Non-poor			All (avg)			Disaster in 5 years	
	3 Months	5 Years	10 Years	3 Months	5 Years	10 Years	3 Months	5 Years	10 Years	3 Months	5 Years	10 Years	N	%
1. Flood	0.18	2.82	5.50	0.16	2.75	5.30	0.06	2.33	4.69	0.11	2.52	5.00	1,643	64.23
2. Flash-flood	0.13	1.75	3.58	0.31	2.13	4.28	0.13	2.15	4.20	0.14	2.08	4.09	500	19.55
3. Cyclone/tornado	0.15	2.26	3.83	0.25	2.25	3.81	0.33	2.78	4.77	0.27	2.56	4.37	1,395	54.53
4. Storm surge	0.07	2.29	3.19	0.01	2.10	2.66	0.03	2.39	3.17	0.04	2.31	3.09	698	27.29
5. Extreme high tide	0.42	6.38		0.43	6.1	11.2	0.62	5.00	9.77	0.54	5.54	10.65	275	10.75
6. Damage to embankment	0.01	2.26	3.60	-	1.84	2.92	0.01	2.32	3.74	0.01	2.22	3.56	287	11.22
7. Salinity water intrusion	0.14	8.0	9.08	0.05	3.62	5.79	0.13	4.80	8.26	0.12	4.67	8.06	561	21.93
8. Drought	0.44	3.74	6.77	0.49	3.08	5.76	0.57	3.96	7.61	0.53	3.75	7.12	401	15.68
9. River bank erosion	0.06	1.57	3.76	0.17	1.90	4.00	0.09	1.79	3.99	0.10	1.75	3.92	177	6.92
10. Water logging	0.68	4.19	7.83	0.35	3.10	5.76	0.33	3.48	6.95	0.43	3.60	6.97	827	32.33
11. Cold wave	0.67	3.67	7.00	0.75	4.00	7.25	-	5.00	9.00	0.63	4.00	7.38	8	0.31
12. Hail storm	-	-	-	-	-	-	0.06	2.31	2.69	0.06	2.31	2.69	16	0.63
13. Other	1.00	3.00	6.00	0.50	1.50	4.00	0.67	2.67	4.67	0.67	2.33	4.67	6	0.23

Table 9-2: Natural disasters and poverty (salinity area)

Pattern of natural disaster	Extreme Poor			Moderate poor			Non-poor			All		
	3 Months	5 Years	10 Years	3 Months	5 Years	10 Years	3 Months	5 Years	10 Years	3 Months	5 Years	10 Years
1. Flood	0.47	3.41	6.22	0.30	2.84	5.10	0.11	2.32	4.46	0.23	2.69	5.03
2. Cyclone/tornado	0.08	2.21	3.50	0.04	2.11	3.01	0.09	2.28	3.35	0.08	2.23	3.34
3. Storm surge	0.07	2.29	3.19	0.01	2.10	2.66	0.03	2.39	3.17	0.04	2.31	3.09
4. Extreme high tide	0.42	6.38	12.13	0.43	6.1	11. 2	0.62	5.01	9.78	0.54	5.55	10.65
5. Damage to embankment	0.01	2.26	3.60	-	1.84	2.92	0.01	2.33	3.75	0.01	2.22	3.56
6. Salinity water intrusion	0.14	5.08	9.08	0.05	3.62	5.79	0.13	4.80	8.26	0.12	4.67	8.06
7. Drought	-	5.79	10.14	-	4.00	6.83	0.78	8.08	13.78	0.50	7.07	12.13
8. River bank erosion	-	1.50	3.70	-	2.14	5.00	0.00	2.25	4.17	0.00	1.97	4.21
9. Water logging	0.73	4.23	7.84	0.38	3.01	5.41	0.37	3.38	6.80	0.47	3.55	6.85
10. Hail storm	-	-	-	-	-	-	-	2	3	-	2	3
11. Other	1.00	3.00	6.00	-	2.00	7.00	-	-	-	0.5	2.5	6.5

Table 9-3: Natural disasters and poverty (flood area)

Pattern of natural disaster	Extreme poor			Moderate poor			Non-poor			All		
	3 Months	5 Years	10 Years	3 Months	5 Years	10 Years	3 Months	5 Years	10 Years	3 Month	5 Years	10 Years
1. Flood	0.07	3.00	45.9	0.12	2.91	5.77	0.05	2.92	5.96	0.07	2.94	5.92
2. Cyclone/tornado	0.27	2.31	0.27	0.51	2.47	5.29	0.38	2.90	5.58	0.38	2.64	5.29
3. Drought	0.54	3.00	0.54	0.64	3.26	6.17	0.42	3.03	6.09	0.50	3.09	6.03
4. River bank erosion	0.07	1.59	3.77	0.20	1.86	3.80	0.11	1.70	3.92	0.12	1.70	3.85
5. Water logging	0.23	3.77	7.68	0.17	3.65	7.65	0.14	3.89	7.56	0.16	3.82	7.60
6. Cold wave	0.67	3.67	7.00	0.75	4.00	7.25	-	5	9	0.63	4	7.38
7. Hail storm	-	-	-	-	-	-	-	1	0.44	-	1	0.44
8. Other	-	-	-	-	-	-	-	0.5	1.00	-	1.00	0.44

Table 9-4: Natural disasters and poverty (flash-flood area)

Pattern of natural disaster	Extreme poor			Moderate poor			Non-poor			All		
	3 Months	5 Years	10 Years	3 Months	5 Years	10 Years	3 Months	5 Years	10 Years	3 Months	5 Years	10 Years
1. Flood	0.01	1.23	2.91	0	.93	2.06	0.02	1.28	2.73	0.02	1.25	2.74
2. Flash-flood	0.13	1.75	3.58	0.31	2.14	4.28	0.13	2.15	4.20	0.14	2.08	4.09
3. Cyclone/tornado	0.7	2.2	4.91	1	1.73	3.27	0.95	3.79	7.32	0.94	3.52	6.84
4. Damage to embankment	-	-	-	-	-	-	-	-	3.00	-	-	3.00
5. Drought	-	-	-	-	1	1		0.50	0.50		0.67	0.67
6. River bank erosion	-	-	-	-	-	-		2.50	5.50		2.50	5.50
7. Water logging	-	-	-	-	-	-	0.20	5.00	9.20	0.20	5.00	9.20
8. Hail storm							0.25	4	6.5	0.25	4	6.5
9. Other	-	-	-	1	1	1	2	7	12	1.5	4.00	6.50

Table 9-5: Natural disasters and poverty (drought area)

Pattern of natural disaster	Extreme poor			Moderate poor			Non-poor			All		
	3 Months	5 Years	10 Years	3 Months	5 Years	10 Years	3 Months	5 Years	10 Years	3 Months	5 Years	10 Years
1. Flood	-	2.00	3.88	-	2.00	3.00	0.67	2.67	5.00	0.03	2.26	4.29
2. Cyclone/tornado	0.26	2.59	4.68	0.58	2.95	5.84	0.71	3.86	7.77	0.59	3.46	6.82
3. Drought	0.59	3.32	6.05	0.38	2.69	5.10	0.61	3.50	7.04	0.57	3.36	6.62
4. River bank erosion	-	-	-	-	-	-	-	1.00	3.00	-	1.00	3.00
5. Water logging	1.00	5.00	10.00	0.67	2.67	5.00	0.75	4.25	8.25	0.75	3.75	7.25
6. Hail storm							-	5	5	-	5	5

Table 9-8: Crops produced now and 10 years before

Crops	Salinity area	Flood area	Flash-flood area	Drought area	All areas
Rice-aus	27 (35)	60 (69)	4 (8)	14 (14)	105 (126)
Rice-aman	274 (302)	152 (152)	40 (72)	141 (140)	607 (667)
Rice-boro	136 (119)	158 (147)	315 (298)	57 (51)	666 (615)
Rice-aromatic	0 (0)	1 (0)	0 (0)	2 (2)	3 (2)
Wheat	0 (0)	9 (10)	0 (0)	10 (9)	19 (19)
Maize/corn	0 (0)	7 (6)	0 (0)	3 (0)	10 (6)
Onion	0 (0)	9 (7)	0 (0)	2 (2)	11 (9)
Chilli	4 (2)	5 (6)	1 (0)	9 (9)	19 (17)
Ginger	0 (0)	1 (0)	0 (0)	0 (0)	1 (0)
Other spices	1 (1)	0 (0)	0 (0)	1 (1)	2 (2)
Cabbage	2 (0)	0 (0)	0 (0)	0 (0)	2 (0)
Bottle gourd	0 (0)	0 (0)	0 (0)	1 (1)	1 (1)
Pointed gourd	0 (0)	1 (1)	0 (0)	0 (0)	1 (1)
Other vegetables	10 (10)	8 (5)	1 (0)	3 (2)	22 (17)
Leafy vegetables	0 (0)	1 (1)	0 (0)	0 (0)	1 (1)
Potato	2 (2)	24 (24)	0 (0)	11 (10)	37 (36)
Jute	2 (2)	67 (63)	0 (0)	0 (0)	69 (65)
Sugarcane	2 (2)	2 (2)	0 (0)	0 (0)	4 (4)
Betel leaf	18 (18)	0 (0)	0 (0)	0 (0)	18 (18)
Lentil (dal)	47 (44)	8 (6)	0 (0)	0 (0)	55 (50)
Mustard	1 (0)	27 (27)	0 (3)	1 (0)	29 (30)
Sesame	0 (0)	7 (6)	1 (0)	0 (0)	8 (6)
Mango	0 (0)	0 (0)	0 (0)	2 (1)	2 (1)
Other plant-based crop	0 (0)	2 (1)	0 (0)	1 (0)	3 (1)
Fish	22 (17)	0 (0)	0 (0)	1 (1)	23 (18)
Shrimp/prawn	19 (17)	0 (0)	0 (0)	0 (0)	19 (17)
Salt	5 (5)	0 (0)	0 (0)	0 (0)	5 (5)
Cauliflower	0 (1)	0 (0)	0 (0)	0 (0)	0 (1)
Tomato	0 (1)	0 (0)	0 (0)	0 (0)	0 (1)
Snake gourd	0 (1)	0 (0)	0 (0)	0 (0)	0 (1)
Tobacco	0 (0)	0 (0)	0 (0)	0 (1)	0 (1)
Others	6 (4)	5 (8)	0 (0)	1 (9)	12(21)

Figures in () are incidence of crops produced 10 years before

Table 10-1: Extent of damage on non-farm self-employed activities

Activity name	Not affected		Moderately affected		Highly affected	
	Number	Percentage*	Number	Percentage	Number	Percentage
Rickshaw/van/nosimon	31	3.03	57	5.57	14	1.37
Rickshaw/van maker	0	0.00	0	0.00	2	0.20
Agri-machinery maker	0	0.00	1	0.10	1	0.10
Electronics equipment	7	0.68	0	0.00	1	0.10
Tailoring	11	1.08	24	2.35	1	0.10
Hair dresser	2	0.20	2	0.20	0	0.00
Cook (decorator)	1	0.10	0	0.00	0	0.00
Boatman	0	0.00	0	0.00	1	0.10
Muri/chira producer	1	0.10	1	0.10	0	0.00
Grocery shop owner	11	1.08	11	1.08	7	0.68
Restaurant/sweetmeat/	2	0.20	0	0.00	0	0.00
Tea stall owner	10	0.98	6	0.59	7	0.68
Tea hawker	0	0.00	0	0.00	1	0.10
Small cottage industry	13	1.27	18	1.76	4	0.39
Contractor	1	0.10	0	0.00	0	0.00
Gold smith	5	0.49	2	0.20	0	0.00
Cloth store owner	0	0.00	2	0.20	2	0.20
Electronics shop owner	0	0.00	1	0.10	0	0.00
Utensils store owner	0	0.00	1	0.10	0	0.00
Hardware shop owner	0	0.00	1	0.10	0	0.00
Transport business	2	0.20	3	0.29	0	0.00
Laundry	0	0.00	1	0.10	0	0.00
Sawmill owner	0	0.00	0	0.00	1	0.10
Timber/wood trader	2	0.20	2	0.20	0	0.00
Firewood trader	1	0.10	0	0.00	0	0.00
Pharmacy	2	0.20	1	0.10	0	0.00
Band/ribbon/cloth hawker	1	0.10	1	0.10	1	0.10
Fruit shop owner	0	0.00	1	0.10	1	0.10
Baker/confectionery	2	0.20	0	0.00	0	0.00
Stationery store	1	0.10	5	0.49	0	0.00
Fish/milk/agri commodity business	18	1.76	30	2.93	12	1.17
Other business	12	1.17	15	1.47	3	0.29
Total	136	13.29	186	18.18	59	5.77

**Percentage of all households belonging to the respective area.*

Table 10-2: Non-farm self-employed activities affected by natural disaster in salinity-prone area

Activity	Salinity		Drought		Water logging		River bank erosion		Unexpected tide		Flood		Advance flood		Others	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Rickshaw/van/nosimon	3	0.29	2	0.20	33	3.23	2	0.20	4	0.39	20	1.96	6	0.59	1	0.10
Rickshaw/ van Maker	0	0.00	0	0.00	0	0.00	0	0.00	0	0.0	2	0.20	0	0.00	0	0.00
Agri-machinery maker	0	0.00	0	0.00	1	0.10	0	0.00	1	0.10	0	0.00	0	0.00	0	0.00
Electronics equipment	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.10	0	0.00	0	0.00
Tailoring	1	0.10	1	0.10	13	1.27	0	0.00	2	0.20	5	0.49	3	0.29	0	0.00
Hair dresser	0	0.00	0	0.00	2	0.20	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Boatman	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.10	0	0.00
Muri/chira producer	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.10	0	0.00	0	0.00
Grocery shop owner	1	0.10	0	0.00	9	0.88	0	0.00	0	0.00	6	0.59	0	0.00	2	0.20
Tea stall owner	2	0.20	0	0.00	2	0.20	0	0.00	1	0.10	8	0.78	0	0.00	0	0.00
Tea hawker	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.10	0	0.00	0	0.00
Small cottage industry	0	0.00	1	0.10	2	0.20	0	0.00	10	0.98	6	0.59	3	0.29	0	0.00
Gold smith	0	0.00	0	0.00	2	0.20	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Cloth store owner	0	0.00	0	0.00	1	0.10	0	0.00	1	0.10	1	0.10	1	0.10	0	0.00
Electronics shop owner	0	0.00	0	0.00	1	0.10	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Utensils store owner	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.10	0	0.00	0	0.00
Hardware shop owner	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.10	0	0.00	0	0.00
Transport business	0	0.00	1	0.10	1	0.10	0	0.00	0	0.00	1	0.10	0	0.00	0	0.00
Laundry	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.10	0	0.00	0	0.00
Sawmill owner	0	0.00	0	0.00	1	0.10	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Timber/wood trader	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	0.20	0	0.00	0	0.00
Pharmacy	0	0.00	0	0.00	0	0.00	0	0.00	1	0.10	0	0.00	0	0.00	0	0.00
Band/ribbon/cloth hawker	0	0.00	0	0.00	0	0.0	0	0.00	1	0.10	1	0.10	0	0.00	0	0.00
Fruit shop owner	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	2	0.20	0	0.00	0	0.00
Stationery store	0	0.00	0	0.00	3	0.29	0	0.00	1	0.10	1	0.10	0	0.00	0	0.00
Fish/milk/agri commodity business	3	0.29	0	0.00	13	1.27	1	0.10	5	0.49	18	1.76	2	0.20	0	0.00
Other business	0	0.00	0	0.00	8	0.78	1	0.10	1	0.10	6	0.59	2	0.20	0	0.00
Total	10	0.98	5	0.49	92	8.99	4	0.39	28	2.74	85	8.31	18	1.76	3	0.29

Table 10-3: Extent of damage on non-farm self-employed activities by natural disaster for flood-prone area

Activity name	Not affected		Moderately affected		Highly affected	
	Number	Percentage*	Number	Percentage*	Number	Percentage*
Rickshaw/van/nosimon	19	2.48	43	5.61	20	2.61
Rickshaw/van maker	0	0.00	2	0.26	0	0.00
Electronics equipment	2	0.26	1	0.13	0	0.00
Tailoring	5	0.65	15	1.96	2	0.26
Hair dresser	0	0.00	0	0.00	1	0.13
Cook (decorator)	1	0.13	1	0.13	0	0.00
Rice mill owner	1	0.13	1	0.13	1	0.13
Grocery shop owner	5	0.65	10	1.30	2	0.26
Restaurant/sweetmeat	0	0.00	2	0.26	0	0.00
Tea stall owner	0	0.00	6	0.78	0	0.00
Tea hawker	0	0.00	0	0.00	1	0.13
Small cottage industry	3	0.39	0	0.00	0	0.00
Contractor	0	0.00	3	0.39	0	0.00
Cloth store owner	1	0.13	1	0.13	1	0.13
Electronics shop owner	0	0.00	1	0.13	0	0.00
Hardware shop owner	2	0.26	0	0.00	0	0.00
Transport business	1	0.13	4	0.52	1	0.13
Sharee/lungi hawker	0	0.00	2	0.26	0	0.00
Timber/wood trader	1	0.13	2	0.26	2	0.26
Firewood trader	3	0.39	0	0.00	1	0.13
Pharmacy	1	0.13	1	0.13	0	0.00
Band/ribbon/cloth hawker	0	0.00	2	0.26	0	0.00
Fruit shop owner	0	0.00	4	0.52	0	0.00
Recycling materials trading	0	0.00	2	0.26	1	0.13
Ice trading	0	0.00	0	0.00	1	0.13
Stationery store	2	0.26	1	0.13	0	0.00
Fish/milk/agri Commodity business	11	1.43	25	3.26	6	0.78
Flexi load trading	0	0.00	0	0.00	1	0.13
Other business	4	0.52	17	2.22	3	0.39
Total	62	8.08	146	19.04	44	5.74

**Percentage of all households belonging to the respective area.*

Table 10-4: Non-farm self-employed activities affected by natural disaster (flood-prone area)

Activities	Drought		Water logging		Erosion		Tide		Flood		Others	
	N	%	N	%	N	%	N	%	N	%	N	%
Rickshaw/van/nosimon	2	0.26	9	1.17	1	0.13	0	0.00	50	6.52	1	0.13
Rickshaw/ van maker	0	0.00	0	0.00	0	0.00	0	0.00	2	0.26	0	0.00
Electronics equipment	0	0.00	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
Tailoring	0	0.00	2	0.26	2	0.26	0	0.00	13	1.69	0	0.00
Hair dresser	0	0.00	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
Cook (decorator)	0	0.00	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
Rice mill owner	1	0.13	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00
Grocery shop owner	0	0.00	2	0.26	1	0.13	0	0.00	9	1.17	0	0.00
	0	0.00	0	0.00	0	0.00	0	0.00	2	0.26	0	0.00
Tea stall owner	0	0.00	0	0.00	0	0.00	0	0.00	4	0.52	2	0.26
Tea hawker	0	0.00	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
Contractor	0	0.00	0	0.00	0	0.0	0	0.00	3	0.39	0	0.00
Cloth store owner	0	0.00	0	0.00	1	0.13	0	0.00	1	0.13	0	0.00
Electronics shop owner	0	0.00	1	0.13	0	0.00	0	0.00	0	0.00	0	0.00
Transport business	0	0.00	0	0.00	1	0.13	0	0.00	4	0.52	0	0.00
Sharee/lungi hawker	0	0.00	0	0.00	0	0.00	0	0.00	2	0.26	0	0.00
Timber/wood trader	0	0.00	1	0.13	0	0.00	0	0.00	3	0.39	0	0.00
Firewood trader	0	0.00	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
Pharmacy	0	0.00	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
Band/ribbon/cloth hawker	0	0.00	0	0.00	0	0.00	0	0.00	2	0.26	0	0.00
Fruit shop owner	0	0.00	0	0.00	0	0.00	0	0.00	4	0.52	0	0.00
Recycling materials trading	0	0.00	1	0.13	0	0.00	0	0.00	2	0.26	0	0.00
Ice trading	0	0.00	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
Stationery store	0	0.00	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
Fish/milk/agri Commodity business	0	0.00	8	1.04	0	0.00	0	0.00	23	3.00	0	0.00
Flexi load trading	0	0.00	0	0.00	0	0.00	0	0.00	1	0.13	0	0.00
Other business	0	0.00	7	0.91	1	0.13	1	0.13	11	1.43	0	0.00
Total	3	0.39	32	4.17	7	0.91	1	0.13	144	18.77	3	0.39

**Percentage of all households belonging to the respective area.*

Table 10-5: Extent of damage on non-farm self-employed activities by natural disaster for flash-flood-prone area

Activity name	Not affected		Moderately affected		Highly affected	Activity name
	Number	Percentage*	Number	Percentage*	Number	Percentage*
Rickshaw/van/nosimon	3	0.59	19	3.71	5	0.98
Rickshaw/van Maker	0	0.00	2	0.39	0	0.00
Electronics equipment	3	0.59	0	0.00	0	0.00
Tailoring	2	0.39	5	0.98	0	0.00
Cook (decorator)	2	0.39	0	0.00	0	0.00
Bo atman	1	0.20	1	0.20	1	0.20
Rice mill owner	0	0.00	3	0.59	0	0.00
Muri/chira producer	0	0.00	1	0.20	1	0.20
Grocery shop owner	3	0.59	4	0.78	5	0.98
Restaurant/sweetmeat/	0	0.00	1	0.20	0	0.00
Tea stall owner	1	0.20	0	0.00	2	0.39
Tea hawker	0	0.00	1	0.20	0	0.00
Small cottage industry	1	0.20	5	0.98	0	0.00
Contractor	1	0.20	0	0.00	0	0.00
Cloth store owner	0	0.00	2	0.39	0	0.00
Electronics shop owner	2	0.39	0	0.00	0	0.00
Utensils store owner	0	0.00	1	0.20	0	0.00
Transport business	1	0.20	2	0.39	0	0.00
Export-import	0	0.00	1	0.20	0	0.00
Fruit shop owner	1	0.20	0	0.00	0	0.00
Leather/hide trader	1	0.20	0	0.00	0	0.00
Recycling materials trading	0	0.00	0	0.00	1	0.20
Ice trading	0	0.00	1	0.20	0	0.00
Stationery store	0	0.00	4	0.78	1	0.20
Fish/milk/agri commodity business	11	2.15	22	4.30	13	2.54
Flexi load trading	0	0.00	1	0.20	0	0.00
Other business	3	0.59	5	0.98	0	0.00
Total	36	7.03	81	15.82	29	5.66

**Percentage of all households belonging to the respective area.*

Table 10-6: Self-employed activities affected by natural disaster (flash-flood-prone area)

Activities	Salinity		Drought		Water		Tide		Flood		Advance flood	
	N	%	N	%	N	%	N	%	N	%	N	%
Rickshaw/van/nosimon	0	0.00	0	0.00	0	0.00	0	0.00	11	2.15	13	2.54
Rickshaw/ van maker	0	0.00	0	0.00	0	0.00	0	0.00	1	0.20	1	0.20
Tailoring	0	0.00	0	0.00	0		0	0.00	3	0.59	2	0.39
Boatman	1	0.20	0	0.00	0	0.00	0	0.00	1	0.20	0	0.00
Rice mill owner	0	0.00	0	0.00	0		0	0.00	3	0.59	0	0.00
Muri/chira producer	0	0.00	0	0.00	1	0.20	0	0.00	0	0.00	1	0.20
Grocery shop owner	0	0.00	0	0.00	0		1	0.20	5	0.98	3	0.59
Restaurant/sweetmeat	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.20
Tea stall owner	0	0.00	0	0.00	0	0.00	0	0.00	2	0.39	0	0.00
Tea hawker	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.20
Small cottage industry	0	0.00	0	0.00	0	0.00	0	0.00	2	0.39	3	0.59
Cloth store owner	0	0.00	0	0.00	0	0.00	0	0.00	1	0.20	1	0.20
Utensils store owner	0	0.00	0	0.00	0	0.00	0	0.00	1	0.20	0	0.00
Transport business	0	0.00	0	0.00	0	0.00	0	0.00	2	0.39	0	0.00
Export-import	0	0.00	0	0.0	0	0.00	0	0.00	0	0.00	1	0.20
Recycling materials trading	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.20
Ice trading	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.20
Stationery store	0	0.00	0	0.00	0	0.00	0	0.00	2	0.39	3	0.59
Fish/milk/agri commodity business	0	0.0	3	0.59	1	0.20	2	0.39	15	2.93	14	2.73
Flexi load trading	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.20
Other business	0	0.00	0	0.00	0	0.00	0	0.00	2	0.39	3	0.59
Total	1	0.20	3	0.59	2	0.39	3	0.59	51	9.96	50	9.77

**Percentage of all households belonging to the respective area.*

Table 10-7: Extent of damage on non-farm self-employed activities by natural disaster for drought-prone area

Activity name	Not affected		Moderately affected		Highly affected	
	Number	Percentage*	Number	Percentage*	Number	Percentage*
Rickshaw/van/nosimon	12	4.69	14	1.83	0	0.00
Agri-machinery maker	1	0.39	0	0.00	0	0.00
Electronics equipment	1	0.39	1	0.15	0	0.00
Key maker	0	0.00	1	0.39	0	0.00
Shoe maker	0	0.00	1	0.00	0	0.00
Tailoring	8	3.13	0	0.00	0	0.00
Hair dresser	0	0.00	5	0.00	0	0.00
Muri/chira producer	0	0.00	0	0.00	2	0.78
Grocery shop owner	6	2.34	0	0.92	0	0.00
Restaurant/sweetmeat	0	0.00	1	0.39	0	0.00
Tea stall owner	4	1.56	0	0.61	0	0.00
Tea hawker	1	0.39	0	0.00	0	0.00
Small cottage industry	2	0.78	0	0.31	0	0.00
Money lender	1	0.39	0	0.00	0	0.00
Sawmill owner	0	0.00	1	0.00	0	0.00
Transport business	1	0.39	2	0.78	0	0.00
Sharee/lungi hawker	1	0.39	0	0.15	0	0.00
Timber/wood trader	1	0.39	1	0.39	0	0.00
Firewood trader	1	0.39	0	0.15	0	0.00
Pharmacy	1	0.39	2	0.78	0	0. 00
Band/ribbon/cloth hawker	0	0.00	3	0.00	0	0.00
Fruit shop owner	1	0.39	2	0.78	0	0.00
Recycling materials trading	0	0.00	0	0.00	1	0.39
Baker/confectionery	2	0.78	1	0.39	0	0.00
Stationery store	1	0.39	0	0.15	0	0.00
Fish/milk/agri Commodity business	9	3.52	12	4.69	1	0.39
Other business	6	2.34	2	0.92	0	0.00
Total	60	23.44	49	9.16	4	1.56

**Percentage of all households belonging to the respective area.*

Table 10-8: Non-farm self-employed activities affected by natural disaster (drought-prone area)

Activities	Drought		Water logging		Flood	
	N	%	N	%	N	%
Rickshaw/van/nosimon	11	4.30	0	0.00	3	1.17
Electronics equipment	0	0.00	1	0.39	0	0.00
Key maker	1	0.39	0	0.00	0	0.00
Shoe maker	0	0.00	1	0.39	0	0.00
Hair dresser	0	0.00	1	0.39	4	1.56
Muri/chira producer	0	0.00	0	0.00	2	0.78
Restaurant/sweetmeat	1	0.39	0	0.00	0	0.00
Sawmill owner	0	0.00	0	0.00	1	0.39
Transport business	2	0.78	0	0.00	0	0.00
Timber/wood trader	1	0.39	0	0.00	0	0.00
Pharmacy	2	0.78	0	0.00	0	0.00
Band/ribbon/cloth hawker	2	0.78	0	00	1	0.39
Fruit shop owner	2	0.78	0	0.00	0	0.00
Recycling materials trading	1	0.39	0	0.00	0	0.00
Baker/confectionery	0	0.00	0	0.00	1	0.39
Fish/milk/agri commodity business	10	3.91	1	0.39	2	0.78
Other business	2	0.78	0	0.00	0	0.00
Total	35	13.67	4	1.56	14	5.47

**Percentage of all households belonging to the respective area.*

Table 10-9: Impact on main occupation due to natural disaster

Pattern of natural disaster	Salinity area				Flood area				Flash flood area				Drought area			
	Very little	Moderate	Remarkable damage	Totally affected	Very little	Moderate	Remarkable damage	Totally affected	Very	Moderate	Remarkable damage	Totally affected	Very little	Moderate	Remarkable damage	Totally affected
1. Flood		18.96	15.25	1.37		51.89	31.29	0.91	5.66	16.99	37.70	2.15	1.17	6.25	5.86	0.00
2. Flash flood	0.10	0.00	0.49	0.10	1.04	5.22	0.91	0.00	7.03	25.00	60.16	5.27	0.00	0.00	0.00	0.00
3. Cyclone/ tornado	8.50	13.69	42.13	22.29	4.82	16.82	6.52	0.00	0.98	6.25	20.12	0.59	22.66	22.27	13.28	0.00
4. Storm surge	3.91	8.41	36.75	19.16	0.26	0.26	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00
5. Extreme high tide	7.04	7.04	8.31	3.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6. Cross damn failure	3.62	5.28	11.73	7.33	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00
7. Salinity intrusion	23.17	12.02	17.60	2.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8. Drought	3.13	0.39	1.76	0.10	6.65	9.65	3.78	0.00	0.20	0.39	0.00	0.00	16.41	42.19	14.45	0.39
9. River bank erosion	0.68	0.20	1.86	0.10	2.48	5.74	7.43	3.26	0.00	0.00	0.39	0.00	0.00	0.39	0.00	0.00
	19.45	20.23	26.69	1.66	1.83	7.17	6.13	0.13	0.00	0.39	0.59	0.00	0.39	2.73	0.00	0.00
11. Other	0.10	0.00	0.20	0.00	0.26	1.43	0.78	0.00	0.00	0.20	0.78	0.20	0.00	0.00	0.78	0.00

**Percentage of all households belonging to the respective area.*

Table 10-11: Types of livelihood dropped by households

Activity dropped	Salinity prone		Flood prone		Flash flood prone		Drought prone	
	N	%	N	%	N	%	N	%
Cultivation	48	4.69	41	5.35	44	8.59	8	3.13
Poultry rearing	0	0.00	1	0.13	0	0.00	0	0.00
Livestock bathan	1	0.10	0	0.00	0	0.00	0	0.00
Fish culture-pond	1	0.10	0	0.00	0	0.00	0	0.00
Fish/prawn culture in gher	1	0.10	0	0.00	0	0.00	0	0.00
Salt-pan mining	1	0.10	0	0.00	0	0.00	0	0.00
Fisherman	10	0.98	2	0.26	16	3.13	0	0.00
Shrimp/prawn fry collector	3	0.29	0	0.00	0	0.00	0	0.00
Forest resource harvest	1	0.10	0	0.00	0	0.00	0	0.00
Agriculture worker	29	2.83	20	2.61	14	2.73	2	0.78
Gher/fish farm worker	1	0.10	0	0.00	0	0.00	0	0.00
Fishing worker	3	0.29	0	0.00	0	0.00	0	0.00
Salt pan worker	1	0.10	0	0.00	0	0.00	0	0.00
Earth worker (general)	2	0.20	1	0.13	2	0.39	0	0.00
Rickshaw/van/nosimon	10	0.98	9	1.17	0	0.00	3	1.17
Rickshaw/van maker	2	0.20	0	0.00	0	0.00	0	0.00
Worker-transport	1	0.10	3	0.39	0	0.00	0	0.00
Coal/sand/stone mining	1	0.10	0	0.00	3	0.59	0	0.00
Worker-construction	2	0.20	6	0.78	0	0.00	1	0.39
Worker-mill/workshop	2	0.20	1	0.13	0	0.00	0	0.00
Tailoring	0	0.00	0	0.00	1	0.20	0	0.00
Hair dresser	0	0.00	0	0.00	0	0.00	1	0.39
Cook (decorator)	0	0.00	0	0.00	1	0.20	0	0.00
Worker-others	2	0.20	0	0.00	0	0.00	0	0.00
Rice mill owner	1	0.10	0	0.00	0	0.00	0	0.00
Grocery shop owner	2	0.20	0	0.00	0	0.00	0	0.00
Restaurant/sweetmeat	0	0.00	1	0.13	0	0.00	0	0.00
Tea hawker	0	0.00	0	0.00	0	0.00	2	0.78
Small cottage industry	0	0.00	0	0.00	1	0.20	0	0.00
Contractor	0	0.00	1	0.13	0	0.00	0	0.00
Cloth store owner	0	0.00	2	0.26	0	0.00	0	0.00
Transport business	1	0.10	0	0.00	0	0.00	0	0.00
Band/ribbon/cloth hawker	0	0.00	1	0.13	0	0.00	1	0.39
Ice trading	1	0.10	0	0.00	0	0.00	0	0.00
Fish/milk/agri commodity trader	3	0.29	11	1.43	2	0.39	0	0.00
Other business	1	0.10	3	0.39	0	0.00	0	0.00
Private service	6	0.59	1	0.13	2	0.39	1	0.39
NGO worker	2	0.20	1	0.13	0	0.00	2	0.78
Private tutor	0	0.00	1	0.13	1	0.20	0	0.00
Housewife	0	0.00	2	0.26	1	0.20	0	0.00
Student	1	0.10	0	0.00	1	0.20	0	0.00
Unemployed	0	0.00	0	0.00	8	1.56	0	0.00
Migration	4	0.39	7	0.91	1	0.20	0	0.00
Others	1	0.10	1	0.13	0	0.00	0	0.00
Total	145	14.17	116	15.12	98	19.14	21	8.20

**Percentage of all households belonging to the respective area.*

Table 10-12: Types of livelihood taken by households

Activity taken	Salinity prone		Flood prone		Flash flood prone		Drought prone	
	N	%	N	%		N	%	N
Cultivation	4	0.39	11	1.4 3	2	0.39	1	0.39
Livestock rearing	1	0.10	0	0.00	0	0.00	0	0.00
Fish culture-pond	1	0.10	0	0.00	0	0.00	1	0.39
Fish/prawn culture in gher	2	0.20	0	0.00	0	0.00	0	0.00
Fisherman	14	1.37	0	0.00	4	0.78	0	0.00
Shrimp/prawn fry collector	2	0.20	0	0.00	0	0.00	0	0.00
Agriculture worker	9	0.88	10	1.30	3	0.59	1	0.39
Livestock rearing worker	0	0.00	0	0.00	0	0.00	1	0.39
Gher/fish farm worker	1	0.10	0	0.00	0	0.00	0	0.00
Fishing worker	3	0.29	0	0.00	1	0.20	0	0.00
Earth worker (general)	6	0.59	2	0.26	1	0.20	0	0.00
Earth worker (food/pay)	2	0.20	0	0.00	0	0.00	0	0.00
Rickshaw/van/nosimon	15	1.47	9	1.17	7	1.37	2	0.78
Rickshaw/van maker	0	0.00	3	0.39	0	0.00	0	0.00
Electronics equipment	0	0.00	0	0.00	2	0.39	0	0.00
Worker-transport	3	0.29	5	0.65	0	0.00	0	0.00
Coal/sand/stone mining	0	0.00	2	0.26	6	1.17	0	0.00
Chaial (works with cane/bamboo)	0	0.00	0	0.00	1	0.20	0	0.00
Worker-brickfield	1	0.10	0	0.00	1	0.20	0	0.00
Worker-rice mill	0	0.00	0	0.00	0	0.00	1	0.39
Worker-construction	7	0.68	7	0.91	4	0.78	2	0.78
Worker-mill/workshop	3	0.29	4	0.52	7	1.37	0	0.00
Tailoring	1	0.10	0	0.00	1	0.20	1	0.39
Hair dresser	0	0.00	1	0.13	0	0.00	0	0.00
Domestic/household assistant	2	0.20	0	0.00	0	0.00	0	0.00
Cook (decorator)	0	0.00	1	0.13	1	0.20	0	0.00
Boatman	0	0.00	0	0.00	1	0.20	0	0.00
Worker-others	2	0.20	0	0.00	2	0.39	0	0.00

Activity taken	Salinity prone		Flood prone		Flash flood prone		Drought prone	
	N	%	N	%		N	%	N
Rice mill owner	0	0.00	0	0.00	2	0.39	0	0.00
Muri/chira producer	0	0.00	0	0.00	0	0.00	1	0.39
Grocery shop owner	5	0.49	3	0.39	3	0.59	0	0.00
Restaurant/sweetmeat	1	0.10	0	0.00	0	0.00	0	0.00
Tea stall owner	2	0.20	1	0.13	0	0.00	2	0.78
Small cottage industry	0	0.00	1	0.13	0	0.00	0	0.00
Contractor	1	0.10	0	0.00	0	0.00	0	0.00
Electronics shop Owner	0	0.00	0	0.00	1	0.20	0	0.00
Transport business	0	0.00	0	0.00	1	0.20	0	0.00
Timber/wood trader	1	0.10	0	00	0	0.00	1	0.39
Pharmacy	1	0.10	0	0.00	0	0.00	0	0.00
Band/ribbon/cloth Haw	1	0.10	0	0.00	0	0.00	0	0.00
Fruit shop owner	1	0.10	0	0.00	0	0.00	0	0.00
Recycling materials trading	0	0.00	1	0.13	1	0.20	0	0.00
Stationery store	3	0.29	2	0.26	1	0.20	0	0.00
Fish/milk/agri commodity trader	6	0.59	4	0.52	4	0.78	2	0.78
Other business	2	0.20	5	0.65	2	0.39	0	0.00
Private service	11	1.08	18	2.35	1	0.20	0	0.00
Teacher	1	0.10	1	0.13	0	0.00	0	0.00
Private tutor	0	0.00	0	0.00	1	0.20	0	0.00
Retired	1	0.10	0	0.00	1	0.20	0	0.00
Unemployed	0	0.00	0	0.00	1	0.20	0	0.00
Begger	1	0.10	0	0.00	2	0.39	1	0.39
Homeo doctor	0	0.00	1	0.13	0	0.00	0	0.00
Migration	28	2.74	21	2.74	32	6.25	4	1.56
Stipend	0	0.00	1	0.13	0	0.00	0	0.00
Others	0	0.00	2	0.26	1	0.20	0	0.00
Total	**145**	**14.17**	**116**	**15.12**	**98**	**19.14**	**21**	**8.20**

**Percentage of all households belonging to the respective area.*

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