

**CGIAR Research Program on  
Climate Change, Agriculture and Food Security (CCAFS)**

**Summary of Baseline  
Household Survey Results:  
Bagerhat, Bangladesh**

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**Prepared by: Bangladesh Centre for Advances Studies (BCAS),  
Dhaka**



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## Abstract

CCAFS carried out household baseline surveys in all its benchmark sites in 2010/2011. This report presents the main results of the analysis of the survey carried out in early 2011 in 7 villages with 140 households in the Bagerhat site located in the Morrelganj upazila of Bangladesh. The survey was conducted using the standardized CCAFS household baseline tool.

The results show that almost all households produce small livestock and livestock products and approximately two-thirds of households produce food crops. More than half produce fish and nearly half produce vegetables. Most of the households producing these products also consume them, with a smaller proportion selling such products. Almost all households also consume food crops and fruit from off-farm sources. Both men and women take responsibility for on-farm work, while men complete 95% of the agricultural workload off-farm. The three most important crops in Bagerhat were reported to be rice, leafy vegetables and potatoes. Nearly three-quarters of households reported using fertilizers in the past 12 months. There is a wide range of food security situations in Bagerhat. Forty percent of households reported being food secure all year round, while a fifth of households reported more than 6 hungry months per year.

The survey asked households about the farming practice changes they had made in the past 10 years. The rate of introduction of new crops and new varieties was high in Bagerhat. Most of the changes made were due to weather and climate related reasons, notably increased levels of salinity and more frequent floods in the area. Three-quarters of households in Bagerhat receive climate and weather related information, with the most popular source being television. Males receive this information, especially regarding pest and disease outbreaks and the start of the rains, more often than females.

Households were also asked about asset ownership from a standardized list. Nearly three-quarters of households reporting owning a cell phone, and almost two-thirds possess a fishing net. Ownership levels of other assets were relatively low.

## Keywords

Bangladesh; baseline; survey; household; livelihoods; agricultural production

## About the authors

The **Bangladesh Centre for Advanced Studies (BCAS)** is an independent, non-profit, non-government, policy, research and implementation institute working on sustainable development at local, national, regional and global levels. It was established in 1986 and over 25 years and has grown to become a leading research institute in the non-government sector in Bangladesh and South Asia.

BCAS encourages multidisciplinary and interdisciplinary approaches to programs and projects by working within four broad themes: 1) Environment-development integration; 2) Good governance and people's participation; 3) Poverty alleviation and sustainable livelihoods; and 4) Economic growth and public-private partnership. BCAS has over one hundred full-time and some part-time staff working in different capacities, with a large group of senior professionals and scientists, and many mid-level professionals and researchers.

# Contents

<b>1.0</b>	<b>Introduction .....</b>	<b>5</b>
1.1	Household Types and Respondents .....	5
<b>2.0</b>	<b>Household Demographics .....</b>	<b>6</b>
2.1	Family size .....	7
2.2	Education levels .....	8
<b>3.0</b>	<b>Sources of Livelihoods .....</b>	<b>8</b>
3.1	On-Farm Livelihood Sources .....	8
3.2	Off-Farm Livelihood Sources .....	10
3.3	Diversification Indices .....	10
3.4	Who Does Most of the Work for On- and Off-Farm Products? .....	11
3.5	Sources of cash income .....	12
3.6	Discussion .....	13
<b>4.0</b>	<b>Crop, Farm Animals/Fish, Tree and Soil, Land Water Management Changes .....</b>	<b>13</b>
4.1	Crop-Related Changes .....	13
4.2	Reasons for Crop-Related Changes .....	15
4.3	Livestock-Related Changes .....	16
4.4	Adaptability/Innovation Index .....	18
4.5	Mitigation Indices .....	18
4.6	Discussion .....	19
<b>5.0</b>	<b>Food Security .....</b>	<b>19</b>
5.1	Food Security Index .....	21
5.2	Discussion .....	21
<b>6.0</b>	<b>Land and Water .....</b>	<b>22</b>
6.1	Water for Agriculture .....	22
6.2	Land Use .....	22
6.3	Use of Communal land .....	22
6.4	Hired machinery or labour .....	23
6.5	Discussion .....	23
<b>7.0</b>	<b>Inputs and Credit .....</b>	<b>23</b>
7.1	Fertilizer Use .....	23
7.2	Discussion .....	24
<b>8.0</b>	<b>Climate &amp; Weather Information .....</b>	<b>24</b>
8.1	Who Is Receiving Information? .....	24
8.2	Types of weather-related information .....	25
8.3	Discussion .....	27
<b>9.0</b>	<b>Community Groups .....</b>	<b>27</b>
9.1	Climate Related Crises .....	27
<b>10.0</b>	<b>Assets .....</b>	<b>27</b>
10.1	Asset Indicator .....	28
10.2	Discussion .....	28
	<b>Appendix 1: List of Villages .....</b>	<b>29</b>

## 1.0 Introduction

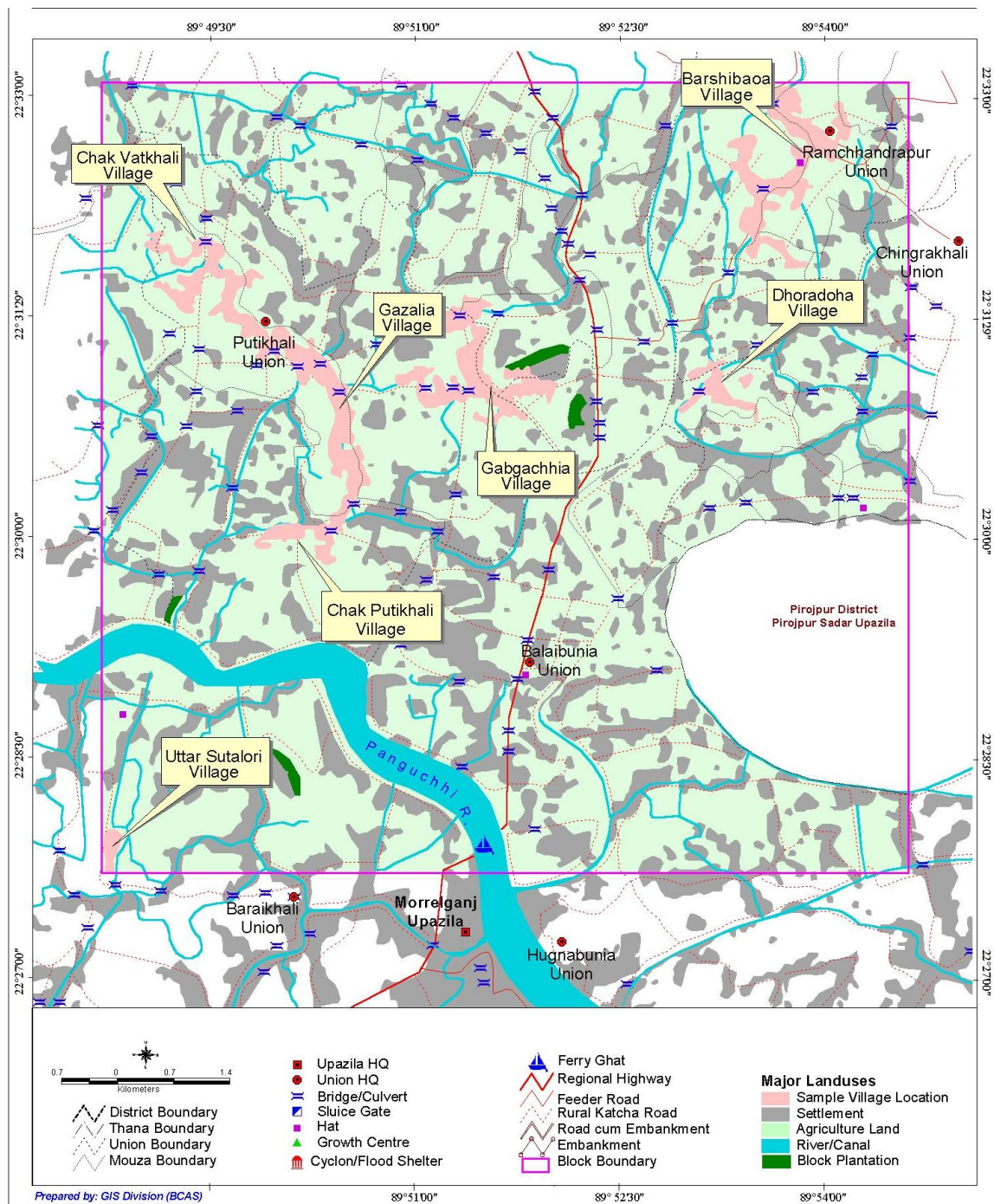
This baseline study was carried out under the Climate Change, Agriculture and Food Security (CCAFS) research program of CGIAR. The Bangladesh Centre for Advanced Studies (BCAS) undertook the baseline study in the Bangladesh site of Bagerhat in collaboration with the International Water Management Institute (IWMI). The study site was selected in consultation with IWMI. The survey aims to gather baseline information at the household-level about some basic indicators of welfare, information sources, livelihood/agriculture/natural resource management strategies, needs and uses of climate and agricultural-related information and current risk management, mitigation and adaptation practices. The objective is to capture some of the diversity in the landscape, across communities and households. We are aiming for sufficient precision in some of these indicators to capture changes that occur. Study site, blocks, village selection as well as household samples were drawn following the methodology and sampling framework suggested in the CCAFS Baseline Survey Manual (available at <http://ccaafs.cgiar.org/resources/baseline-surveys>). The household questionnaire was translated into the local language (Bengali), and the field enumerators and supervisors were trained for a week in December 2010. The questionnaires were field tested to assess the appropriateness of the language and develop the necessary skill of the enumerators. The study team members and the supervisors monitored the field survey activities and checked the quality of data regularly.

This report is based on the information collected through the household survey conducted in Morrelganj Upazila (sub-district) in Bagerhat district in South Bangladesh. Please see the locations of the study villages in the block map (Figure 1). The field survey was conducted in the middle of January 2011. The survey team was led by Md. Monowarul Islam, Senior Researcher of BCAS, and he was assisted by Md. Billal Hossain, Research Officer of BCAS. The Field Researchers/Surveyors were Md. Sohel Sheikh, Md. Moinuddin, Md. Rashed, and Md. Monir Ahmed. The following map shows the block with the locations of the randomly selected study villages. The field team was supervised by Mr. Golam Jilani, Sr. Programme manager of BCAS, and Md. Belayet Hossain, GIS expert of BCAS. Ms. Olena Reza, Sociologist of BCAS, also provided management and quality monitoring support for the field survey in Bagerhat.

### 1.1 Household Types and Respondents

The household surveyors interviewed both male and female respondents. Sixty-nine percent of respondents were males and 31% were females. Ninety-eight percent of the surveyed households are headed by male members while only 2% are female-headed households. The majority of inhabitants are Muslims (98%) and the rest (2%) are Hindus by religion. However, in cultural and ethnic identity, they all are Bengali.

**Figure 1. Map of the Bagerhat site and sampled villages**

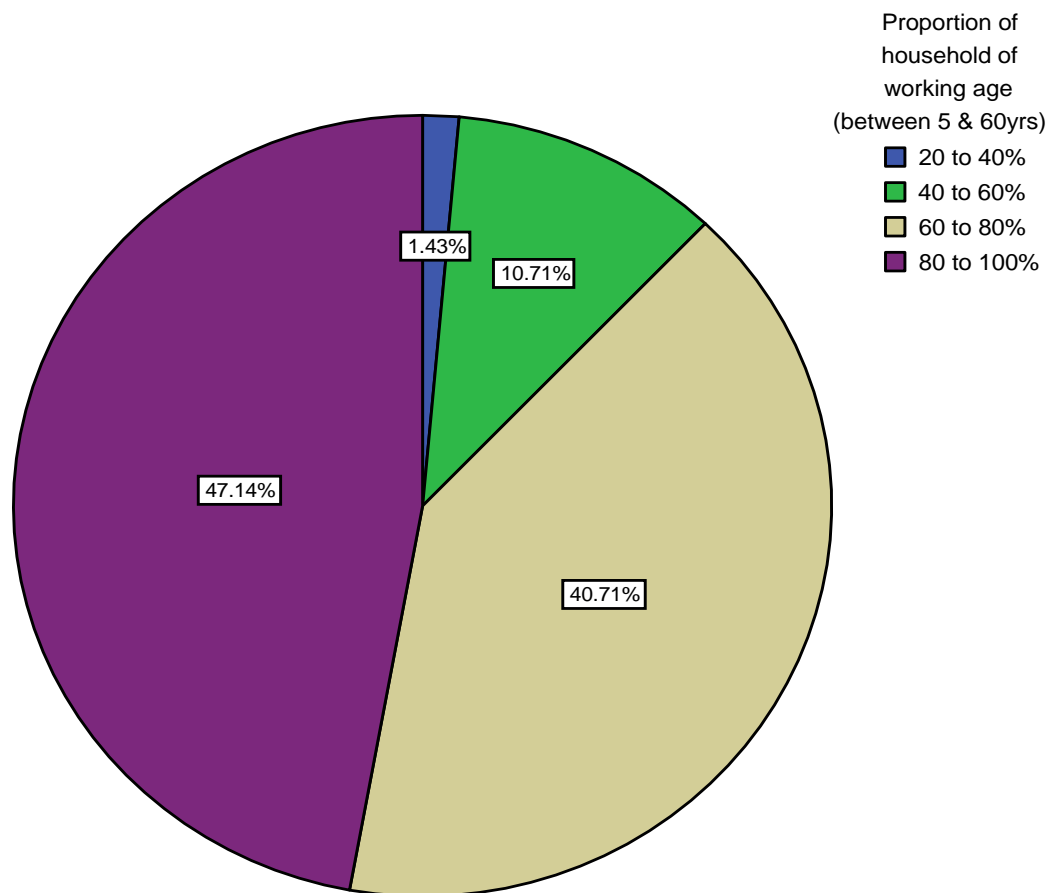


## 2.0 Household Demographics

Sixty-two percent of households do not have any children less than 5 years of age, while 31% of households have one child less than 5 years old. Another 7% of households have 2 or more children under the age of 5 years. The survey data also shows that 58% of households do not have any elderly members (i.e. over 60 years). Thirty-six percent of households have one elderly person and only 6% of households have two elderly people. Figure 2.1 below shows the percentage of working age

adults (those between 5 and 60 years of age) within the surveyed households. The majority (88%) of households have more workers than non-workers in the household.

**Figure 2.1 Proportion of the household that is of working age**



## 2.1 Family Size

The average household size in the surveyed population is approximately 5 members. A majority of households (74%) have medium size families with 4-6 members while 11% of them have small families (1-3 members) and another 15% have comparatively large families having 7 or more members. Table 2.1 presents the percentage distribution of the surveyed households by size.

**Table 2.1 Percentage Distribution of Households by Family Size**

Range of family members	Number of HHs	Percent of HHs
1-3 members (Small family)	15	11
4-6 members (Medium family)	104	74
7+ members (Large family)	21	15
Total	140	100



## 2.2 Education Levels

Of the households surveyed, 97% have someone who obtained some level of education while members of 3% of households do not have any formal education among the surveyed population. Among the educated members, 17% achieved primary education, 51% reached secondary and 29% obtained post-secondary as the highest level education (Table 2.2).

**Table 2.2 Levels of education**

Highest level of education of any resident household member	Number of HHs	Percent of HHs
No formal education	4	3
Primary	24	17
Secondary	72	51
Post-secondary	40	29
Total	140	100

## 3.0 Sources of Livelihoods

### 3.1 On-Farm Livelihood Sources

The households in the surveyed villages earn their livelihoods from diversified sources. They produce food crops, cash crops, fruits, vegetables, livestock and poultry, fish, timber and fuel wood. Table 3.1 shows the diversity of household production, consumption and selling of main items of agricultural products in Bagerhat. Sixty-five percent of households produce food and cereal crops while 66% of them also process food crops for consumption and sometimes for selling of the food items. Seventy-one percent of surveyed households produce fruits, and 49% produce vegetables. A majority of the households produce small livestock and poultry (like goats, duck and chicken) and livestock products (91% and 88% respectively). Eighty-four percent of them produce fuel wood for household consumption. They also produce fish (57%) as well as collect honey (1% of households).

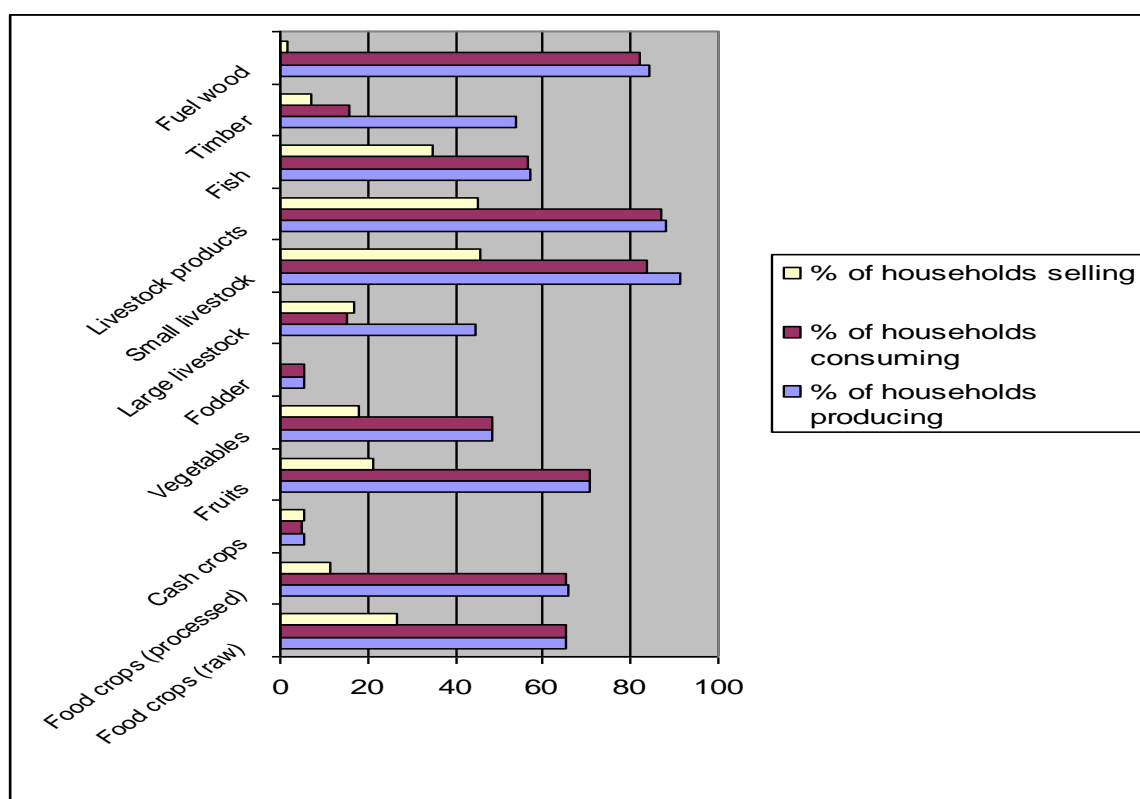
The survey results show that the households consume different types of items from their own farm products. Sixty-five percent of households consume processed food from their own farm while also another 65% of them consume raw foods from their own farms. Eighty-two percent of households use fuel wood from their own farm followed by livestock products (87%) and small livestock and poultry (84%). Seventy-one percent of households consume fruits and 49% consume vegetables from their own farms followed by 56% of households consuming fish from their own sources.

Table 3.1 also presents the patterns of selling farm products. Twenty-six percent of the surveyed households sell raw food crops like rice while a significant portion of them sell small livestock (46%) and livestock products (45%) which include eggs, meat and milk. Eighteen percent of them sell vegetables and 21% of them sell fruits from their own farms. Thirty-five percent of them sell fish from their own ponds.

**Table 3.1 Percentage of households producing, consuming and selling various agricultural products from their own farm**

Product	Percent of households producing	Percent of households consuming	Percent of households selling
Food crops (raw)	65	65	26
Food crops (processed)	66	65	11
Cash crops	6	5	6
Fruits	71	71	21
Vegetables	49	49	18
Fodder	6	6	-
Large livestock	44	15	17
Small livestock	91	84	46
Livestock products	88	87	45
Fish	57	56	35
Timber	54	16	7
Fuel wood	84	82	14
Honey	1	1	-

**Figure 3.1 Own-farm diversity in products produced, consumed and sold**



### 3.2 Off-Farm Livelihood Sources

People in the surveyed villages also collect fruit, fodder, fuel wood and fish from off-farm sources for their household consumption as well as for sale. Table 3.2 shows that 62% of them collect fuel wood from forest and community sources while 45% of them collect fodder for their cattle from common property resources. Ninety-six percent of households collect food crops/fruits from off-farm sources mainly for household consumption.

Eighty-five percent of households collected fish from open water fisheries (canal and rivers) mainly for consumption while 18% of them also sold fish which they collected from off-farm sources.

**Table 3.2 Agricultural products coming from off-farm sources/areas and consumed by households**

Product coming from off-farm sources	Percent of households consuming	Percent of households selling
Food crops/ Fruits	96	1
Fodder	45	-
Fish	85	18
Other (timber, fuel wood, charcoal, honey, manure, etc.)	62	1

### 3.3 Diversification Indices

A production diversification index was created by adding up the total number of agricultural products produced on-farm:

- 1 = 1-4 products (low production diversification)
- 2 = 5-8 products (intermediate production diversification)
- 3 = more than 8 products (high production diversification)

On the selling/commercialization side, the total numbers of agricultural products produced on their own farms, with some of the products sold were added up:

- 0 = no products sold (no commercialization)
- 1 = 1-2 products sold (low commercialization)
- 2 = 3-5 products sold (intermediate commercialization)
- 3 = more than 5 products sold (high commercialization)

The results of these diversification indices for surveyed households in Bagerhat are shown in Table 3.3. There is a moderate to high level of production diversity in Bagerhat. The data shows that there are 49% of households who produce 5-8 items having moderate production diversification. Another 35% of households have high crop diversification. However, 16% of households have low production diversification in the locality.

There are 26% of households who do not sell any of their products. There are 31% and 36% of households who obtained low level and intermediate commercialization of their products, respectively. Only 8% of surveyed household sell 6 or more products and thus were categorized as having a high level of commercialization in the locality.

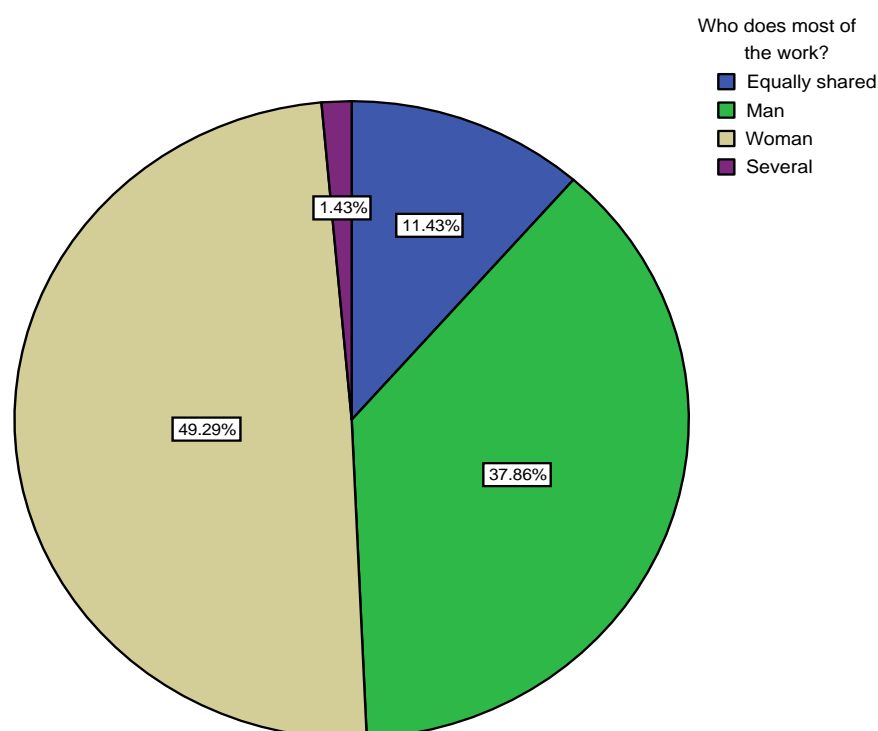
**Table 3.3 Production and commercialization diversification indices**

<b>Production Diversification:</b>	<b>% of households</b>
1-4 products (low production diversification)	16
5-8 products (intermediate production diversification)	49
9 or more products (high production diversification)	35
<b>Selling/Commercialization Diversification:</b>	
No products sold (no commercialization)	26
1-2 products sold (low commercialization)	31
3-5 products sold (intermediate commercialization)	36
6 or more products sold (high commercialization)	8

### 3.4 Who Does Most of the Work for On- and Off-Farm Products?

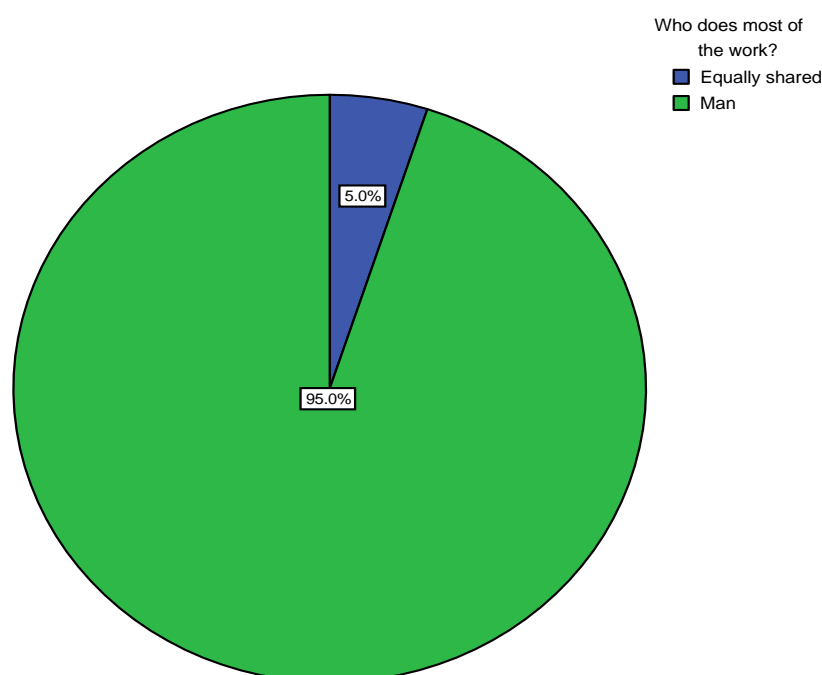
In Bangladesh, both men and women are involved in on-farm and off-farm activities. In 11% of households, both males and females share responsibilities in on-farm activities. Figure 3.2 also shows that 38% of men and 49% of women are involved in on-farm activities. There are another 1% of cases where several members including men, women and children are involved in on-farm activities.

**Figure 3.2 Agricultural workload on-farm by gender/sex**



Men take greater responsibilities in off-farm activities in Bagerhat. The survey data shows that the majority of the households (95%) have men who are involved in off-farm jobs. In only 5% of cases, they share work together (Figure 3.3).

**Figure 3.3 Agricultural workload off-farm by gender/sex**



### 3.5 Sources of cash income

There are diverse cash income sources in the study villages, and include employment in on-farm and off-farm activities; business; payment from government projects; loans from informal and formal sources, and remittances. Fifty-six percent of households earn cash income from employment on someone else's farm while 17% receive cash income from off-farm employment. Small business and trade is also a source of income for 35% of households in the study villages (Table 3.4).

A number of respondents also get cash from informal loans or credit sources (74%) and formal institutions (30%). Eleven percent of households earn cash income from renting out their land in the study villages. Forty-one percent of surveyed households received payments and benefits from government projects.

**Table 3.4 Sources of cash income other than from own farm**

Source of Cash Income	% of households
Informal loan or credit	74
Employment on someone else's farm	56
Payments from gov't or other projects/programs	41
Small business	35
Loan or credit from a formal institution	30
Other off-farm employment	17
Renting out your own land	11
Remittances/gifts	2
Payments for environmental services	1
No other source of cash	1

### 3.6 Discussion

Households in Bagerhat derive their livelihoods from a variety of sources. Agricultural activities are a large component of livelihoods in the area, along with off-farm activities such as small businesses. A large portion of respondent households (84%) have achieved a moderate or high level of production diversification, although commercialization of this production is not as substantial. Since most of the farmers in Bagerhat possess small land holdings, commercialization is difficult to follow and in most cases mechanization is not economically feasible in smaller parcels. Growing a wide range of crops provides risk management in the case of hazards such as cyclones and floods. Women are mainly responsible for work on the farm, while men take most of the responsibility for off-farm work. Other sources of income come from informal loans or credit, payments from government of other projects, and small businesses. Since formal sources of credit such as banks require collateral and often they have complex documentation systems for availing loans, informal sources still predominate in this area.

## 4.0 Crop, Farm Animals/Fish, Tree and Soil, Land Water Management Changes

### 4.1 Crop-Related Changes

Households were asked what their 3 most important crops are (from an overall livelihoods perspective). In Bagerhat, 70% of the surveyed households reported that they had 3 main crops and another 8% of households listed two main crops and 12% of households listed only one crop. The three main crops include rice, leafy vegetables and potatoes.

The households were then asked about what changes they had made to their farming system/practices over the last 10 years, and for which crops. Looking at the proportion of households who have made changes to one or more of their most important crops, we found that all households have made at least one change to at least one of their main crops. The results show that the majority of households (over 70%) made changes to 3 crops, and another 31% of households had made changes to 3 or more crops in the last 10 years.

#### Adopters of new crops/varieties

We looked into more detail at the type of farming practice changes households had made. The rate of introduction of new crops and new varieties was high in Bagerhat. With respect to how many households in the last 10 years had introduced new crops or new varieties, we found that 74% of the households had incorporated three or more new crops or varieties into their farming systems over the last decade while 17% had introduced one or two new crops or varieties and 9% of households had not introduced any new crops or varieties (See Table 4.1).

**Table 4.1 Adoption of new crops/varieties over the last 10 years**

Change in Practice	% of households
No introduction of new crops or varieties	9
Have introduced 1 or 2 new crops and/or new varieties	17
Have introduced 3 or more new crops and/or varieties	74

### **Cropping related changes**

With respect to cropping-related changes, we examined whether households had made one or more of the following changes over the last 10 years:

- Introduced intercropping
- Earlier land preparation
- Earlier planting
- Later planting
- Expanded area
- Reduced area
- Started using pesticides/herbicides
- Integrated pest management
- Integrated crop management

The results showed that 64% of households had made cropping related changes in the last decade. Forty-eight percent made 1-2 of the above listed cropping related changes while 16% of the households made 3 or more than 3 cropping related changes in the last 10 years.

### **Water management related changes**

For the water management-related changes, the following changes in practice were considered:

- Started irrigating
- Introduced micro-catchments
- Introduced improved irrigation
- Introduced improved drainage

The survey found that 84% of households did not make any change in water management while 16% had made one of the above mentioned water management-related changes.

### **Soil management related changes**

For the soil management related changes, we considered the following behavioural changes:

- Stopped burning
- Introduced crop cover
- Introduced ridges or bunds
- Introduced mulching
- Introduced terraces
- Introduced stone lines
- Introduced contour ploughing
- Introduced rotations
- Started using or using more mineral/chemical fertiliser
- Started using manure/compost

The results show 64% of households had introduced soil management changes in Bagerhat while 36% did not make any change in the last 10 years in relation to soil management practices. Eighteen

percent of households reported that they made two or more than two changes in soil management while 46% of them introduced one change on soil management practices.

### **Tree/agroforestry management related changes**

The results show that 59% of households have made some changes in tree/agroforestry management related practices in the last decade while 41% of the households reported that they did not make any significant changes in tree and agro-forestry management in the last 10 years.

### **Other changes**

The survey also looked into whether the surveyed households had made any other changes to crops not specified in the questionnaire. The findings show that no households reported making any additional changes.

## **4.2 Reasons for Crop-Related Changes**

We looked into the reasons households had made the specified changes. The results have been presented in Table 4.2. We grouped the reasons into the following areas: *Markets, Climate, Land, Labour, and Pest & Diseases*. The results show that 41% of households have made changes to their farming practices due to market-related reasons while 91% of households made changes because of climate and weather factors. Land and labour-related constraints were also important drivers of change for the surveyed households (78% and 8% respectively). Pest and disease incidence also influenced decisions to bring about changes in cropping patterns for 48% of the surveyed households in Bagerhat.

**Table 4.2 Reasons for changing cropping practices, by category**

<b>Reason for changing cropping practices, related to:</b>	<b>% of households citing</b>
Markets	41
Weather/climate	91
Land	78
Labour	8
Pests/diseases	48

### **Climate-related reasons**

We looked at the climate-related reasons households gave to explain their changes in farming practices. Table 4.3 presents the percentage distribution of climate factors behind the changes in cropping practices in Bagerhat. Various climate-related factors were mentioned by the farming households, but the key dominant factors mentioned were higher salinity (86%), more frequent floods (76%), more frequent cyclones (41%) and higher tidal surges (23%).



**Table 4.3 Weather/Climate-related reasons for changes in cropping practices**

<b>Weather/Climate-related Reason</b>	<b>% of the households that cited at least one weather-related reason</b>
Higher salinity	86
More frequent floods	67
More frequent cyclones	41
Higher tides (sea level has risen)	23
More frequent droughts	6
Less overall rainfall	3
Later start of rains	2
More erratic rainfall	2
Earlier start of rains	1

### 4.3 Livestock-Related Changes

The results show that majority households (94%) have animals and poultry in Bagerhat and only 6% of them reported that they did not have any animals. Five percent of households have one type of animal, 21% of them have two types of animals and 68% of them have three types of animals and poultry.

With respect to changes over the last 10 years, we see that the majority of households (74%) have 2 or 3 animal types and they have only changed one type of animal in the past 10 years (Table 4.4).

**Table 4.4 Changes in animal types in last 10 years**

<b>Changes</b>	<b>% of the households</b>
No animals listed currently and/or 10 years ago	6
Only one animal type listed and is the same as 10 years ago	5
2-3 animal types listed and at most 1 is different from 10 years ago	74
2-3 animal types listed and 2 or 3 are different from 10 years ago	14

### Adopters of new animal types/breeds

The results suggest that 94% of households introduced new types of animal or new breeds, and only 6% did not introduce new animals or new breeds. Twenty-four percent of households adopted one or two new animals or new breeds while 70% of them introduced 3 or more new animals in the last 10 years in Bagerhat.

### Herd related changes

For herd related changes the following indicators were considered:

- Reduction in herd size
- Increase in herd size
- Change in herd composition

Sixty-four percent of households reported herd-related changes over the past 10 years in the locality and 36% of them did not make significant changes in their herd composition.

### **Animal management related changes**

For animal management related changes we consider the following changes:

- Stall keeping introduced
- Fencing introduced
- Cut and carry introduced

In Bagerhat, 91% of households did not make any animal management related changes in the past decade. Nine percent of them made one type of animal management related change.

### **Feed related changes**

For feed related changes we consider the following:

- Growing fodder crops
- Improved pastures
- Fodder storage

Seventy-nine percent of the surveyed households did not make any feed-related changes in the last 10 years. There is little scope for growing fodder and improving pasture land due to increasing salinity in the locality. Some cattle feed related changes were made by 21% of households in Bagerhat.

### **Reasons for changes to livestock rearing practices**

Pests and diseases, market forces, and climate factors were major reasons behind the changes in livestock management and practices in the locality. The majority of the respondents have identified pests/diseases (80%) and climate related reasons (73%). Market-related reasons were cited by 41% of surveyed households. Table 4.5 presents the major causes of the changes in relation to livestock management.

**Table 4.5 Reasons for changing livestock practices, by category**

<b>Reason for changing livestock practices, related to:</b>	<b>% of households citing</b>
Markets	41
Weather/climate	73
Labour	5
Pests/diseases	80

## 4.4 Adaptability/Innovation Index

An adaptability/innovation index was defined as the following:

- 0 = zero or one change made in farming practices over last 10 years (low level)
- 1 = 2-10 changes made in farming practices (intermediate level)
- 2 = 11 or more changes made in farming practices (high level)

Bagerhat shows a medium to higher level of adaptability according to this index. Seventy-four percent of households made intermediate level changes (i.e., they made 2-10 changes) in their farming practices and 23% of households made 11 or more changes, categorizing them as highly adaptable/innovative. Only 3% of households were at a low level of adaptation and innovation in farming practices in the last 10 years. Either they made no change or made one change. Table 4.6 presents the levels of changes in farming practices in Bagerhat.

**Table 4.6 Adaptability/Innovation index**

Number of changes made in farming practices in last 10 years:	% of households citing
Zero or One (low)	3
2-10 changes (intermediate)	74
11 or more changes (high)	23

## 4.5 Mitigation Indices

Several climate mitigation-related behavioural changes were used to create the following indices:

### **Tree management:**

This index shows whether a household has either protected or planted trees within the last year. Fifty-nine percent of households undertook tree management activities in the locality.

### **Soil amendments:**

This index shows if the household has used fertilizer in the last year, or has started using fertilizer or manure on at least one crop. Of the responding households, 67% undertook soil management activities.

### **Input intensification:**

Seven changes in agricultural practices/behaviour over the last 10 years were considered to create an index with 3 levels: a) no intensification (none of the following), b) low intensification (1-3 of the following) high intensification (4-7 of the following).

The changes are:

- Purchased fertilizer
- Started to irrigate
- Started using manure/compost
- Started using mineral/chemical fertilizers
- Started using pesticides/herbicides
- Started using integrated pest management techniques
- Planted higher yielding varieties

This index shows the level of input use in farming practices. Forty-six percent of households had intensified their input at a low level and 24% of households use a higher level of inputs in their farming practices. Thirty percent of households did not make any of the 7 considered changes toward intensification.

### Productivity Index

This index shows if a household has reported achieving a better yield from any crop, or that their land is more productive for any crop over the last 10 years – such households are classified as showing an "increase in productivity". About 39% households have reported that their farm productivity increased at a certain level in the last 10 years.

Table 4.7 shows the multiple mitigation indices.

**Table 4.7 Mitigation-related indices**

Index	No (% of hh's)	Yes (% of hh's)
Tree management	41	59
Soil amendments	33	67
Increase in productivity	61	39
Input intensification	30	Low-46 High-24

## 4.6 Discussion

Farmers in Bagerhat show innovativeness in exploring different options in agriculture to adapt to changing circumstances, as evidenced by the numbers of changes they have made to agricultural practices in the past decade. Many of these changes are related to increased salinity as a result of higher tidal surges in the locality. Residents of the area believe that floods and droughts have both increased in frequency and intensity in the last 10 years. The two highly devastating cyclonic disasters (Sidr in 2007 and Aila in 2009) caused massive loss of properties in coastal areas of Bangladesh including Bagerhat and farmers started exploring options to adapt to such events although they have been experimenting continuously depending on the local situation and the needs. Farmers have been seeking saline tolerant seed varieties for rice and other important crops to help cope with the changes. As a result, we see high levels of adaptability but low levels of reported increases in productivity. The changes are not bringing improved production, and input intensification is also fairly low. Salinity, sea level rise, small size of the lands and periodic flooding, particularly during the monsoon season, provide limited room for productivity enhancement in coastal areas including Bagerhat regardless of adaptive options followed by the farmers. Therefore, adaptability in farming under such precarious situations is mainly to maintain the current level of subsistence.

## 5.0 Food Security

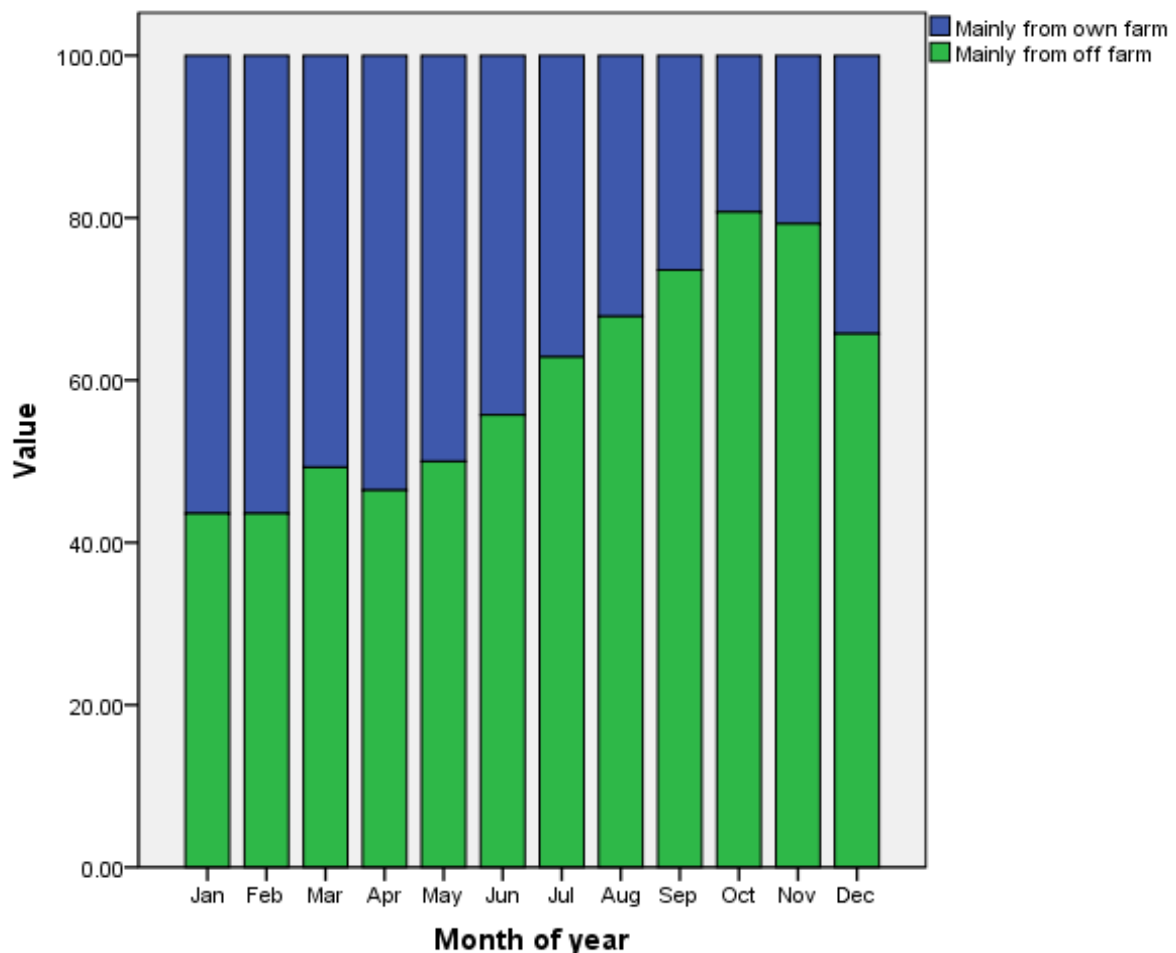
The monthly sources of food for the household were queried, i.e. whether it came mainly from their own farm or from off-farm sources for each month (in an average year). The survey found that 16% of households consume food from their own farms all months of the year while there are 34% who

consume food from off-farm sources throughout the year. This happens because there are households who do not have adequate land for food production in Bangladesh. Respondents were also asked during which months of the year they struggled to have enough food to feed their household, from any source. Figures 5.1 and 5.2 indicate the sources of food and the months when the majority of households suffer from food insecurity in Bagerhat.

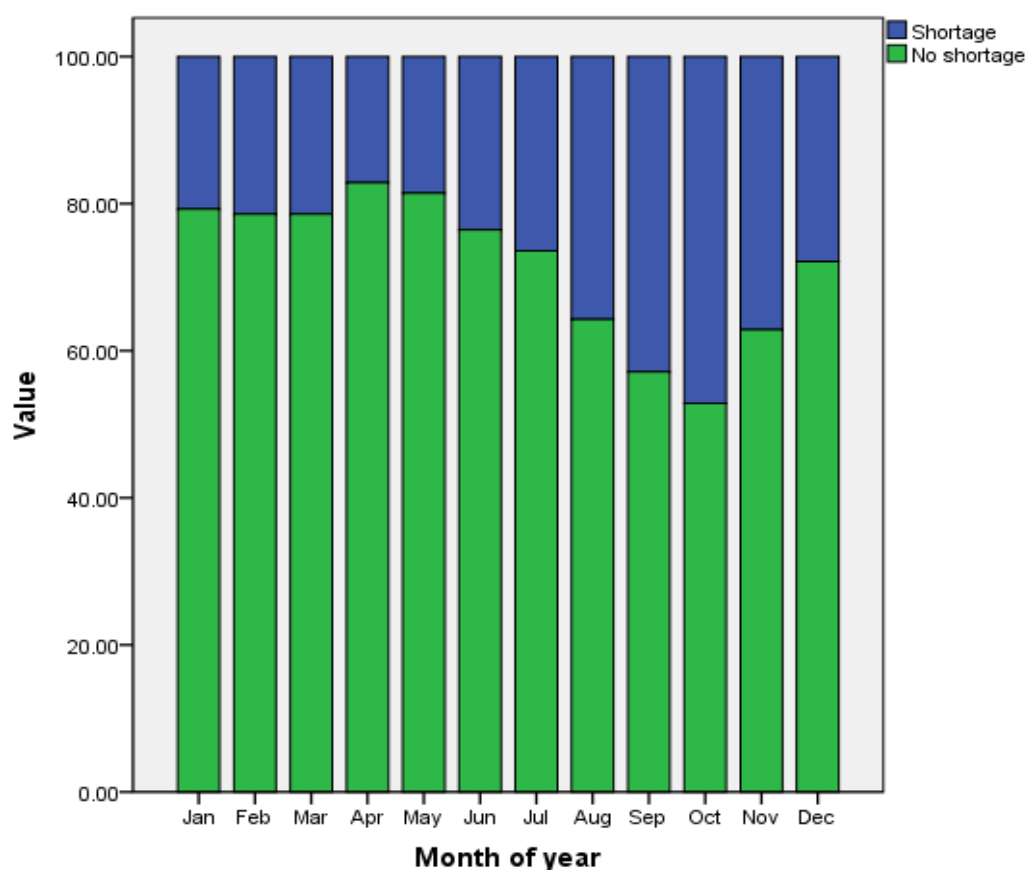
Figure 5.1 shows the percentage of households who consume food from their own sources in a year. It is clear that the majority of households in Bagerhat take food from their own sources for 6-8 months while a great majority take food from off-farm for four months during August to November. During this time, many of them depend on off-farm sources such the market, relatives, friends and public food.

The survey data also shows that many households suffer from food shortages during July to November in this locality. Figure 5.2 shows a trend of food shortage in the study villages in Bagerhat. It is to be noted that about 80% of household do not have food shortages for 6-8 months.

**Figure 5.1 Main source of food for the household**



**Figure 5.2 Hunger/Food shortage months**



## 5.1 Food Security Index

The food security index we created is based upon the number of months that the household has difficulty getting food from any source (i.e. from their own farm or stores, gifts, purchases or transfers). For the surveyed households in Bagerhat, 40% of households do not have food insecurity and hunger, and 19% of them suffer from food insecurity and hunger for more than six months of the year.

**Table 5.1 Food Security Index**

Percent of surveyed households reporting:				
More than 6 hunger months/year	5-6 hunger months/	3-4 hunger months/	1-2 hunger months/	Food all year round/No hungry period
19	12	16	13	40

## 5.2 Discussion

The food security situation is quite polarized in Bagerhat. While there are 40% of households which are food secure all year long, a full 20% of households have more than 6 hunger months per year. Lower productivity of the crops, dominance of marginal farmers and fewer livelihood options compounded by several climatic issues such as salinity, flood inundation, cyclone etc are all contributing towards higher months of food insecurity.

## 6.0 Land and Water

### 6.1 Water for Agriculture

Farmers are engaged in various agricultural activities in Bagerhat though crop agriculture is sometimes constrained by salinity and other natural factors like cyclone and tidal surge. Forty-six percent of farmers surveyed use irrigated water for agriculture. Forty percent of households use water from ponds and 23% of them use water for agriculture through inlet and water gates. Six percent of households use pump water for agricultural activities (Table 6.1).

**Table 6.1 Water sources for agriculture on-farm**

On-farm agricultural water source	% of households
Irrigation	46
Dams or water ponds	40
Inlet/water gate	23
Boreholes	9
Water pumps	6

### 6.2 Land Use

The vast majority of households (89%) have less than one hectare of land, 11% of households have 1-5 hectares of land, and there are no households among those surveyed who have more than 5 hectares of land (Table 6.2). These figures include both land that is owned and land that is rented.

**Table 6.2 Total land size accessed by households**

Number of hectares of land owned and rented in	% of households
Less than one hectare	89
1-5 hectares	11
Over 5 hectares	-

### 6.3 Use of Communal land

In Bagerhat, people have limited access to communal lands. Thirty percent of households access communal land for different uses such as growing crops, aquaculture and tree plantation (Table 6.3).

**Table 6.3 Total Communal land accessed**

Communal land accessed	% of households
Communal land accessed	30
Does not use communal land	70

## 6.4 Hired machinery or labour

Animal drawn ploughs are not widely available in the locality. Sixty-four percent of surveyed households did not hire an animal drawn plough while 36% of households did this in the last 12 months. Forty-four percent of respondents hired tractors for tilling their agricultural land. Fifty-seven percent of households hired labour for their farm activities while the rest (20%) of households do not hire machinery or labour for their agricultural activities.

## 6.5 Discussion

Although agriculture is the mainstay of livelihoods for majority of the farmers in Bagerhat, more than 50% of the farm households don't have irrigated farms. Even those who have irrigation facility, they can just provide life-saving irrigation to the crops, particularly in rice- a major crop in Bagerhat. Almost 90% of the farmers are marginal and rest are smallholders. It is not economically feasible for the marginal and smallholder farmers to use/hire machinery for land preparation. Since agriculture in this area is still a labor intensive affair, almost a majority (57%) hired labour for farm activities as household farm labor is insufficient during the peak period of crop cultivation.

## 7.0 Inputs and Credit

The farmers use various agricultural inputs including improved seeds, chemical fertilizers, pesticides and veterinary medicines in Bagerhat. One third of farmers buy seeds from markets and sometimes from NGOs. Seventy-three percent of them purchase fertilizers from the market. Seventy-three percent and 80% of them, respectively, also buy pesticides and veterinary medicines from market. Only 7% of them take credit for agricultural activities (Table 7.1).

**Table 7.1 Purchased input use**

In the last year, did you purchase:	% of households
Veterinary medicine	80
Pesticides	73
Fertilizer	73
Seeds	33
Any credit for agricultural activities	7

### 7.1 Fertilizer Use

Of the households surveyed, 73% purchased fertilizers in the past 12 months. Urea was the most commonly used, having been used by 99% of all households applying fertilizer. DAP and NPK were used by 49% and 86% of households using fertilizer, respectively, while 22% of respondents applied a local mixture (Table 7.2).

Sixty-one percent of the households using fertilizer applied it to their most important crop, while 23% applied it to their second most important crop, and 17% applied fertilizer to their third most important food crop. Ninety percent of households using fertilizer applied it to rice, 21% to garlic, and 13% to pumpkin/squash/gourd (tables not shown).



**Table 7.2 Type of fertilizers used**

<b>Fertilizer type</b>	<b>% of fertilizer-using households</b>
Urea	99
DAP	49
NPK	86
Local mixture	22

## 7.2 Discussion

Farmers have to depend on the market for improved agro-inputs such as seeds, fertilizers and veterinary medicines. Out of the several fertilizers available, urea was used by the majority of the farmers (99%) in their key crops. The tendency of the farmers to apply balanced ratio of fertilizers such as NPK is also encouraging (almost 86% apply NPK). Farmers who have livestock also apply farm manure as a source of nutrient to the crops. Although earlier we show that pursuing credit is very important in this area, few farmers avail credit for purchasing agro-inputs. This is obvious because subsistence farmers need some credits for investing on health, housing and other basic necessities as the most important priority.

## 8.0 Climate & Weather Information

The survey data shows that 76% of respondents get climate and weather related information from various sources including television (80%), radio (33%), friends or neighbours (27%) and newspapers (14%) (Table 8.1). Males are the primary recipients of the information from the external sources in Bagerhat, but in recent times, women also get information on climate and weather from different sources.

**Table 8.1 Sources of information**

<b>Source of information on extreme events</b>	<b>% of Households</b>
Television	80
Radio	33
Friends, relatives or neighbours	27
Newspaper	14
Own observation	3
Teachers in local school	1

### 8.1 Who Is Receiving Information?

Both male and female members of the surveyed families get information on natural disasters and extreme events like cyclones and tidal surges. Regarding extreme events, 62% of the men have said

that they get this information, compared with just 1% of the women (Table 8.2). Thirty-seven percent of respondents reported that both male and females get information on extreme events.

Respondents also reported receiving information on rainfall and weather information for 2-3 days. A greater number of males, 94% and 75%, reported that they get information about pest or disease outbreaks and start of the rains respectively. In 42% of surveyed households both men and women receive information on weather for the next 2-3 days in Bagerhat.

**Table 8.2 Gender breakdown of different kinds of weather-related information**

Type of weather-related information	% of households reporting women are receiving this information	% of households reporting men are receiving this information	% of households reporting both (men and women) are receiving this information
Extreme events	1	62	37
Pest or disease outbreak	0	94	6
Start of the rains	0	75	25
Weather for the next 2-3 months	0	0	0
Weather for the next 2-3 days	1	56	42

## 8.2 Types of weather-related information

Next we examine the different types of weather-related information that households are using, who is receiving it, and if it is being used (and for what).

### Forecast of extreme events

People in Bagerhat get information about extreme events from various sources including radio, television, friends, relatives and newspapers. People's own observations and traditional knowledge are also sources of extreme event information. More than half of the households reported that they get information from television while 21% get weather information on extreme events from radio. Seventeen percent of them get this information from friends, relatives and neighbours. Nine percent of them also get information from the newspapers (Table 8.3).

**Table 8.3 Sources of information about extreme events**

Source of information on extreme events	Number of responses	Percent of responses
Television	71	51
Radio	29	21
Friends, relatives or neighbours	24	17
Newspaper	12	9
Own observations	3	2
Teachers in local schools	1	1

### Forecast of pest or disease outbreak

The survey data show that a majority of households (75%) got information about pest or disease outbreak from television while few of them (10%) got this information from radio and friends.

**Table 8.4 Sources of information about pest or disease outbreak**

Source of information on extreme events	Number of responses	Percent of responses
Radio	2	10
Television	15	75
Friends, relatives or neighbours	2	10
Own observations	1	5

### Forecast of the start of the rains

The farmers and community people sometimes get predictions about the timing of rain, which is very important for planning agricultural activities and planting seedlings. Television and radio are the most prevalent sources for the prediction (Table 8.5), and these sources get information from the government meteorological department and local meteorological office. However, people also use their own observation and traditional knowledge for predicting timing of rain in the locality.

**Table 8.5 Sources of information on the predicted timing of the start of the rains**

Source of information on start of the rains	Number of responses	Percent of responses
Television	15	83
Radio	2	11
Own observations	1	6

### Weather forecast for the next 2-3 months

No households reported receiving weather forecasts for the next 2-3 months in Bagerhat.

### Forecast for next 2-3 days

Just over half of the respondents reported receiving weather forecasts for the next 2-3 days. Of the households who received this information, 79% got it from television, 39% from radio, and 25% from friends/relatives/neighbours (Table 8.6). As seen in Table 8.2, men received this information 56% of the time. One third of those who received the information said it included advice, but none of those were able to use the advice (table not shown).

**Table 8.6 Sources of information on the forecast for the next 2-3 days**

Source of information on forecast for next 2-3 days	Number of responses	Percent of responses
Television	57	79
Radio	28	39
Own observations	18	25

## 8.3 Discussion

It appears that television is gaining popularity in rural Bangladesh. Many people report receiving weather forecasts through this medium. Men receive information on weather forecasts more often than women, although as we saw earlier women do more on-farm work than men. However, social structure is such that decisions related to on-farm and off-farm activities are being made by men and hence they have greater access to information. Similarly, as women are mostly engaged in farm work plus loaded with household chores, they do not have spare time to access such information.

## 9.0 Community Groups

A large majority, 94%, of the surveyed households reported that they were not members of any groups. Four percent were members of local saving or credit groups and only 1% each belonged to fish pond and water catchment groups.

### 9.1 Climate Related Crises

We looked at whether households have faced a climate related crisis in the last 5 years and whether or not they received help. For those who received help we inquired as to the source of this help. All of the households surveyed reported that they had faced a climate-related crisis in the past 5 years. Two thirds of the households received assistance in coping with the crisis. For those who received help the vast majority (90%) received it from government agencies with 39% receiving help from NGOs and 31% from friends/relatives/neighbours.

### 9.2 Discussion

It is striking that all households reported being affected by a climate related crisis in the past 5 years. While the government provided assistance to many of those households, one third did not receive any help, suggesting that there is more to be done in helping protect people when disaster hits. Because only 5% of the households are part of a group, savings and credit institutions, NGOs or CBOs have not yet penetrated in the community.

## 10.0 Assets

Households were asked about what assets they had, from a set list. The assets they were asked about include the following:

*Energy:* generator (electric or diesel), solar panel, biogas digester, battery (large, e.g. car battery for power)

*Information:* radio, television, cell phone, internet access, computer

*Production means:* tractor, mechanical plough, thresher, mill, fishing net

*Transport:* bicycle, motorbike, boat, car or truck

*Luxury items:* fridge, air conditioning, fan, bank account, improved stove

## 10.1 Asset Indicator

The total numbers of assets in all categories were added up and the following asset index created:

- 0 = no assets (basic level)
- 1 = 1-3 assets (intermediate level)
- 2 = 4 or more assets (high level)

The results of the analysis for Bagerhat show that only 9% of households have none of the assets about which the study inquired. A good majority (69%) of the surveyed households have an intermediate level of asset base (between 1 and 3 of these assets) and another 21% of them have a comparatively higher assets base owning 4 or more of these assets (Table 10.1).

**Table 10.1 Asset indicator**

Number of queried assets	% of households
None (basic level)	10
1-3 (intermediate level)	69
4 or more	21

The most commonly owned assets were cell phones (72% of respondents) and fishing nets (64%). One quarter of respondents own a television, 23% possess an electrical fan, 21% own a bicycle, and 20% own a radio (Table 10.2).

**Table 10.2 Asset ownership**

Asset/utilities	% of households
Cell phone	72
Radio	20
Bank account	20
Electrical fan	23
Improved stove	1
Television	25
Bicycle	21
Mechanical plough	7
Boat	9
Fishing nets	64
Refrigerator	3

## 10.2 Discussion

Cell phones and fishing nets are owned by the majority of households in Bagerhat. Since fisheries is one of the important sources of livelihoods, those who own a fish pond or those who catch fish from the communal pond/river/stream, own fishing nets. However, in terms of energy and luxury assets the farmers seem to be poor.

## Appendix 1: List of Villages

Upazila: Morelganj, District: Bagerhat

Sl. No.	Village	Mouza	Union	Upazila	Households
1.	Balaibunia	Balaibunia	Balabusia	Morelganj	122
2.	Banshbaria	"	"	"	250
3.	Ambaria	"	"	"	287
4.	Dona	"	"	"	631
5.	Jamua (Patabari)	"	"	"	301
6.	Chulombaria	"	"	"	111
7.	Kalaikabari	"	"	"	494
8.	Shamikhali	"	"	"	245
9.	Kismat Jamua	Kismat Jamua	"	"	369
10.	Kuhardaha Nahalpur	Kuhardaha Nahalpur	"	"	450
11.	Rajair	Rajair	"	"	357
12.	Fakirertakia	Fakiretana	Barakhali	"	1335
13.	Uttar Sotalari	Uttar Sotalari	"	"	2346
14.	Chhota Jamua	Chhota Jamua	Chingakhali	"	78
15.	Dharadoha	Dharadoha	"	"	186
16.	Dhebruarapar	Dheburpar	"	"	78
17.	Jamua	Jamua	"	"	178
18.	Kachikata	Kachikata	"	"	186
19.	Alti Burujbaria	Alti Burujbria	Dalbag Nyahan		619
20.	Betkhasi	Betkhasi	"	"	619
21.	Gabgachhia	Gabgachhia	"		267
22.	Gazirghat	Gazirghat	"		441
23.	Joka	Joka	"		408
24.	Khalkulai	Khalkulai	"		580
25.	Kismat Maddhyapur	Kismat Maddhyapur	"		19
26.	Gaubari	Gaubari			418
27.	Kalikabari	Kalikabari			576
28.	Chakvatkhali	Chakvatkhali	Putikhali		486
29.	Gazalia	Gazalia	Putikhali	Moreaany	816
30.	Putikhali	Putikhali	"	"	1282
31.	Barshibaoa	Barshibaoa	Ramchandrapur	"	413
32.	Dumuria	Dumuria	"	"	96
33.	Kantabunia	Kantabunia	"	"	453
34.	Chak Putikhali	Chak Putikhali	"	"	1391