Midline Household Survey Results
Bagerhat, Bangladesh

Authors:
Md. Emdad Hossain
Harun Or Rashid
Roopali Aggarwal
Mansi Nagpal
Arun Khatri-Chhetri

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

Md. Emdad Hossain, Harun Or Rashid, Roopali Aggarwal, Mansi Nagpal and Arun Khatri-Chhetri

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About the authors

Md. Emdad Hossain is a Senior Programme Manager at WorldFish.

Harun Or Rashid is a Project Officer at WorldFish.

Roopali Aggarwal is an Assistant Research Associate at CCAFS South Asia.

Mansi Nagpal is a Consultant (Project Scientist) at CCAFS South Asia.

Arun Khatri-Chhetri is former Science Officer at CCAFS South Asia.

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1. Introduction

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is a major research partnership working in five regions, namely South Asia, South-East Asia, East Africa, West Africa, and Latin America. Starting in 2011, baseline studies were carried out in 21 research sites across 17 countries within these five regions. The studies were conducted using standardized baseline tools in each site which included a quantitative household survey, a qualitative village study and an organizational study.

Seven years after the baselines were conducted in South Asia, CCAFS conducted the midline studies, which compared results with the baseline findings in order to track the performance of the Climate Smart Villages (CSV) and measure their impact on beneficiaries. With a few improvements, the same standardized tools were used to carry out the midline studies to ensure comparability with the data collected previously.

In 2011, CCAFS conducted one of the baseline studies in Bangladesh which included a household survey, a qualitative village study, and an organizational study at one of the CCAFS sites, namely in the Bagerhat district in Khulna. BISA-WorldFish conducted this midline study which was composed of three different components: a Household Midline Survey (HMS), a Village Midline Survey (VMS), and an Organizational Midline Study (OMS).

The CGIAR Research Program on Climate Change, Agriculture and Food Security, with the collaboration of WorldFish Bangladesh, carried out the household midline surveys in 2019 in the Morrelganj Upazila area of the Bagherhat district, Khulna division. A total of 140 household surveys were administered in 7 villages, namely Gabgachhia, Chak Vatkhali, Uttar Sutalori, Chak Putikhali, Dharadoha, Gazalia and Borshibaoa. The survey was conducted using the open data kit (ODK) on Android devices, in this case smartphones and tablets. The household questionnaire was translated into the local language, Bangla, and the field enumerators were trained for a week in July 2019. The questionnaires were then field- tested to assess the adequacy of the language used and to further develop the capacities of the enumerators. The regional team leader and the on-site team leader monitored the field survey activities and checked the quality of data regularly.

The midline survey gathered information at the household-level on agricultural practices, changes made on those over time and in particular since the baseline, sources of weather, climate and agriculture related information, livelihood/agriculture/natural resource management strategies pursued and the current risk management, mitigation and adaptation practices adopted. The survey also collected information on each household's demography and characteristics, including asset ownership and livelihood type.

Details on the team members involved in this study, including the field enumerators who collected the data, are provided in the Appendix.

1.1. Household respondents and type

The survey revisited the same 140 households which were surveyed for the baseline in Bagerhat district. Both male and female respondents were interviewed for the midline survey. Women were 47.86% of the surveyed respondents while 52.14% were men. Out of the 140 households surveyed, 54 respondents were the head of household, 48 were the spouse of the household head, 20 were either the son or daughter in law, 8 were the parents, 7 were the children and one each were the brother/sister, grandchild and other. More than 96% of the households surveyed were male-headed with the remaining 3.57% being headed by women (Figure 1). Moreover, the majority of the households surveyed were Muslim, namely 139 households with only household being of the Hindu religion.

Figure 1. Distribution of the household heads by sex.
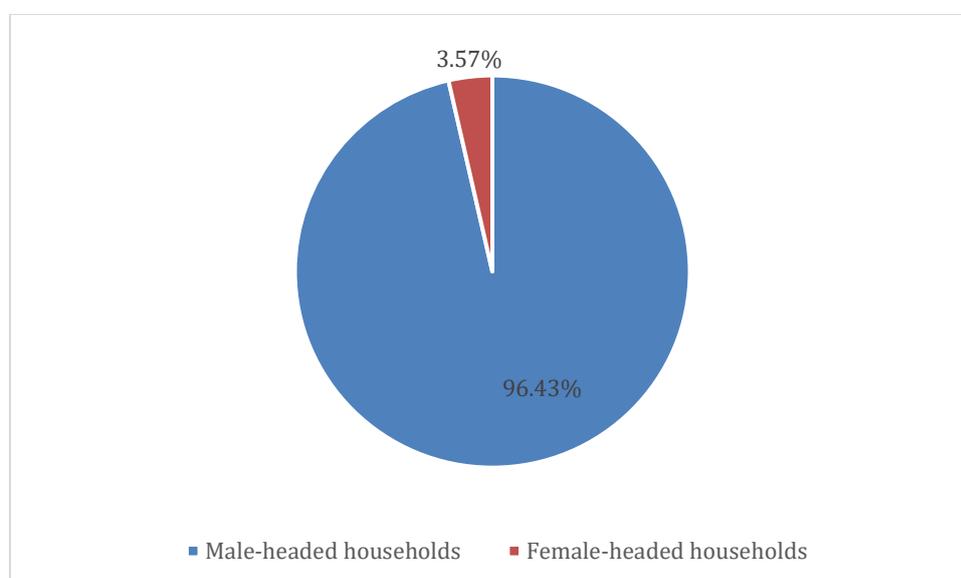
2. Household demographics

In the survey, 62.86%, that is 88 households out of 140, reported not having any child below the age of 5 years while 30.71%, 43 households, reported one child below the age of 5 years. Another 6.43%, 9 households, had 2 or more children under the age of 5 years as reported in Table 1.

Table 1. Number of children below the age of 5 years.

No. of children below the age of 5 years	Number of Households	Percentage of households
None	88	62.86
One child	43	30.71
2 or more children	9	6.43

Moreover, 45% of households (63 hhs out of 140) reported not having any elderly member, defined as over 69 years of age, while 42.86% of households (60 hhs out of 140) had one elderly resident, 11.43% of households (16 hhs out of 140)had two elderly residents and 1 household had three elderly residents.

Finally, households were also asked on the number of adults within the household who are in the working age group. Almost 40% of the households surveyed reported 4 adults in household in the working-age group while 25% reported more than four adults in the working age group. 18.57% had 3 adults in this category and 11.43% reported 2 adults of working age. However, 2.14% of households had no adults in the working age group and 3.57% of households had only one adult.

Figure 2. Percentage distribution of households by number of working age adults in the household.
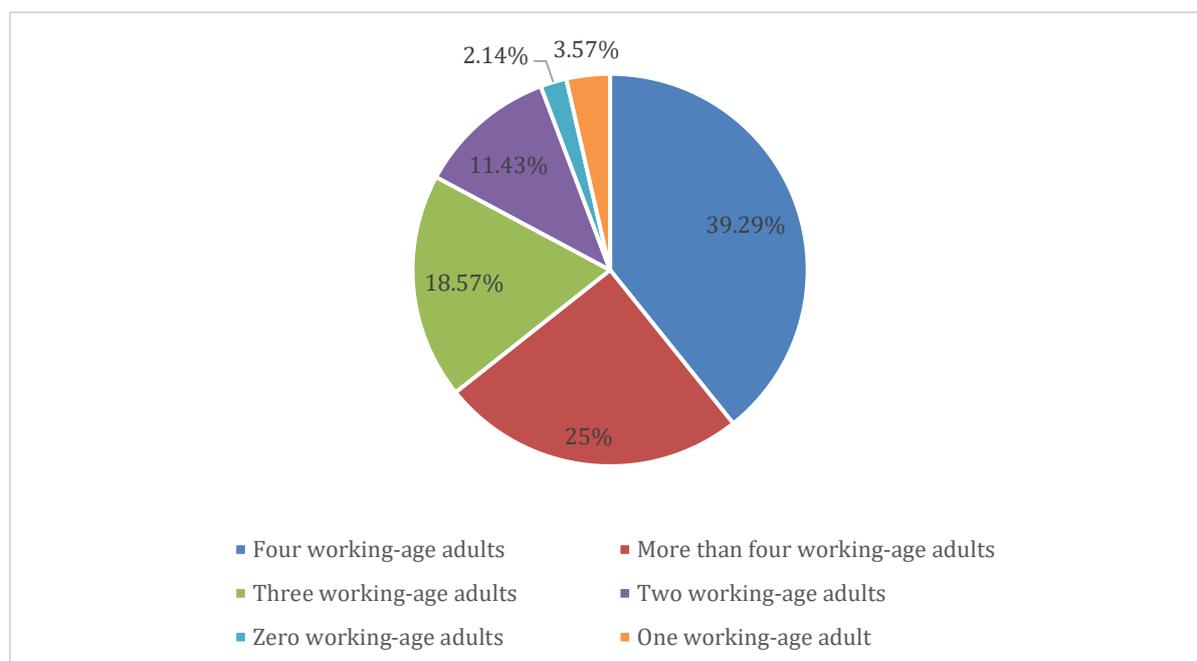
2.1. Household size

The average household size reported is of 4.85 household members, with a minimum of one household member and a maximum of 11 members. According to the parameters set during the baseline, a household with up to 4 members is considered a small household; usually comprising of a husband, a wife, and their two children. During the midline survey, it was found that there are 41.43% of the respondents who fitted in the small household category (1 to 4 family members) while 56.43% of the respondents were from medium size households (5 to 8 family members). Only 2.14% of households were in the large category (9 to 12 members) while there were no very large family within the sample as reported in Table 2.

Table 2. Distribution of households by size in Bagerhat.

Household size	Number of households	Percentage distribution
1 to 4 (small family size)	58	41.43
5 to 8 (medium family size)	79	56.43
9 to 12 (large family size)	3	2.14
More than 12 (very large family size)	0	0

2.2. Education levels

Among the surveyed households, 136 households, that is 97.14% of the households, reported a household member who had obtained some level of education while 2.86% of households did not encompass any member in the household with formal education. Among the households reporting having at least one formally educated member, 15% of households encompassed a member with primary education, 47.14% with a secondary degree, and 35% with post-secondary education. See Table 3 for more the breakdown.

Table 3. Highest levels of education reached within the household.

Highest level of education of any resident household member	Number of households	Percentage distribution
No formal education	4	2.86
Primary	21	15.0
Secondary/High School	66	47.14
Post-Secondary	49	35

3. Sources of livelihood

3.1. On-farm livelihood sources

The households' livelihoods in the surveyed villages are diversified. Most households produce food crops and cash crops, including fruits and vegetables, as well as own some livestock, poultry or fish and produce some timber. Table 4 provides more details on the patterns of household production, consumption and selling of the main agricultural products at midline, comparing them with what was reported at the time of the baseline household survey in Bagerhat.

75% of households reported producing food crops (raw) compared to 65% during the baseline survey. About 67% of the surveyed households reported producing fruits while 70% reported producing vegetables. During the baseline survey, 71% of households had reported producing fruits and 49% of households had reported the production of vegetables. Moreover, the surveyed households reported a decrease in their livestock production compared to the baseline survey, with 75% of households owning small livestock and poultry (such as goats, duck and chicken) and 36,43% owning large livestock (cattle or buffalo) compared to 91% and 44% reported respectively at the time of the baseline. Similarly, a decrease is also noted in the production of livestock products, namely milk and eggs, with 11% of the surveyed households at midline reporting it while 88% of households had

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reported it at baseline. Production and keeping of fish and other aquatic animals have, however, increased with 75% of households reporting it at midline compared to 57% at baseline.

The survey results also show that the surveyed households consume different types of products from their own farm. 75% of households consume raw food crops from their own farm compared to the baseline findings which reported 65% of households doing so. 75% of households reported consuming fish and 73.57% consume small livestock related products from their own farms followed by 70% of households reporting the consumption of vegetables, 67.86% states consuming fruits, 11.43% consuming livestock products and finally, 6.43% reported consuming large livestock from their own farm.

Table 4 also details on the patterns of farm products sales among the surveyed households. About 38% of the surveyed households sell raw food crops such as rice while a significant portion of them sell small livestock (56.43%) and large livestock (35.71%). About 16% of the surveyed households reported selling vegetables and 15.71% of them report the sale of fruits from their own farms. Moreover, 34.29% of households reported selling fish from their own ponds while 10.71% reported selling timber and 8.57% reported the sale of livestock products.

Table 4. Percentage of households producing, consuming and selling various agricultural products on-farm.

Products	% of households producing (midline)	% of households consuming (midline)	% of households selling (midline)	% of households producing (baseline)	% of households consuming (baseline)	% of households selling (baseline)
Food crop (raw)	75.00	75.00	38.57	65	65	26
Other/cash crop (Rubber, sugar cane, etc.)	1.43	1.43	1.43	6	5	6
Fruit	67.86	67.86	15.71	71	71	21
Vegetables	70.00	70.00	16.43	49	49	18
Fodder	0.71	0.71	0.00	6	6	-
Large livestock (cattle, buffalo)	36.43	6.43	35.71	44	15	17
Small livestock (sheep, goats, pigs, chickens, donkeys)	75.00	73.57	56.43	91	84	46
Livestock products (milk, eggs, etc.)	11.43	11.43	8.57	88	87	45

Fish and other aquatic animals	75.00	75.00	34.29	57	56	35
Timber	10.71	5.71	10.71	54	16	7
Manure/compost	0.71	0.71	0.00	-	-	-

As shown in Figure 3 below, the majority of the households, namely 62.14%, that is 87 households out of 140, produced 4 to 6 products on the farm while 28.57% produced 2 to 3 products. All households produced either one or more than one crops or farm products on farm. However, 3% produced only one product last year while 6.43% reported the production of 7 to 9 crops or farm related products.

Figure 3. Percentage distribution of the household per the number of farm products produced during the year.
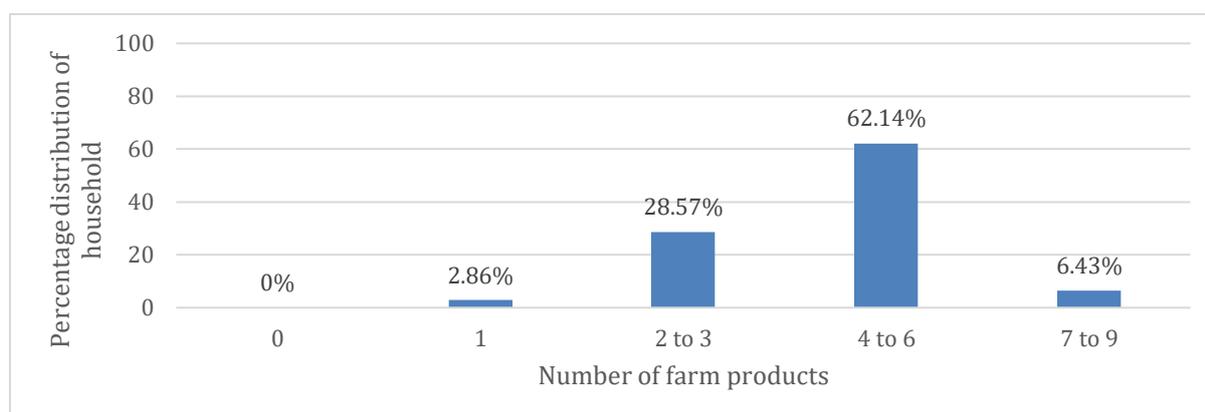
3.2. Off-farm livelihood sources

In Bagerhat, crop failures and low productivity in agriculture are common due to low and erratic rainfall combined with higher temperatures among other climatic effects. The households surveyed reported having changed their cropping practices accordingly. Moreover, with increasing remittances, see Table 7, more households are able to collect food crops and other products from off-farm sources. 80% of the households surveyed reported the collection of food grains while 80.71% collected fruits from the market and community sources and 82.86% of the households surveyed collected animals and animal products. Moreover, 89.29% of households reported collecting fish and aquatic animals from outside. In most of the cases, the number of households which reported depending on off-farm sources has increased in the midline survey compared to the findings from the baseline. However, for fodder, dependency has decreased at the time of the midline survey with only 2.14% procuring it

through off-farm sources compared to 32.14% at the time of the baseline. See Table 5 for more details.

Table 5. Agricultural products coming from off-farm source.

Products coming from off-farm sources	Number of HH (midline)	% of HH (midline)	Number of HH (baseline)	% of HH (baseline)
Food Crops	112	80.00	96	68.57
Fruits	113	80.71	-	-
Fodder	3	2.14	45	32.14
Fish	125	89.29	85	60.71
Timber	3	2.14	-	-
Animal and animal products	116	82.86	-	-
Honey	7	5.00	-	-
Manure	3	2.14	-	-

3.3. Diversification indices

A production diversification index was created during the baseline by adding up the total number of agricultural products produced on-farm. This gives the following categories:

  1 = 1-4 product(s) (low production diversification)

  2 = 5-8 products (intermediate production diversification)

  3 = >8 products (high production diversification)

Similarly, a commercialization index was made by the total numbers of agricultural products produced on their own farms which were sold to calculate commercialization index:

  0 = no products sold (no commercialization)

  1 = 1-2 products sold (low commercialization)

  2 = 3-5 products sold (intermediate commercialization)

  3 = >5 products sold (high commercialization)

The results of these diversification indices for the 140 surveyed households in Bagerhat are detailed in Table 6. The findings point out that no household were producing more than 8 items (high level of diversification). 42.14% of the households surveyed reported producing 5 to 8 products (intermediate

level of diversification) while 57.86% of the households produce 1 to 4 products on-farm (low diversification).

Among the 140 households surveyed, 42.86% of households reported selling 1 to 2 products, whereas 38.57% of households stated selling 3 to 5 products. Only 2.86% of the households surveyed reported the sale of more than 5 products in the market. This implies that most of the farm production is to some extent commercially oriented and aims to diversify. Moreover, households having higher production diversification also tend to have higher commercialization diversification.

Table 6. Production and Commercialization Diversification Indices.

	No. of households	% of households
Production Diversification		
1-4 products (low production diversification)	81	57.86
5-8 products (intermediate production diversification)	59	42.14
>8 products (high production diversification)	0	0.00
Selling/Commercialization Diversification		
No products sold (no commercialization)	22	15.71
1-2 products sold (low commercialization)	60	42.86
3-5 products sold (intermediate commercialization)	54	38.57
>5 products sold (high commercialization)	4	2.86

3.4   Participation in on farm and off farm activities in the households

The labor associated with both farm and off farm activities are shared among household members, including with grown-up children. For the on- farm activities, men were reported as the ones responsible for farm activities for 42% of the surveyed households whereas women were responsible for farm activities in 23.83% of the households. 33.72% of the households stated that the workload is shared by several family members.

Figure 4. Agriculture workload on farm by gender.
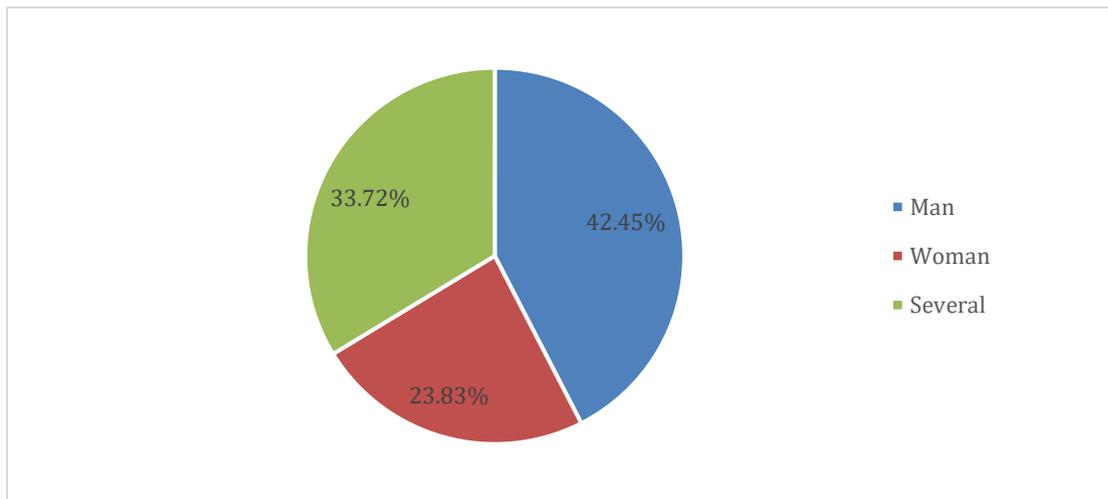
For the off-farm activities reported, a large portion of the associated labor was noted to be done by men (89.86%) with very few women involved in these activities as can be seen in Figure 5.

Figure 5. Agricultural workload off-farm by gender.
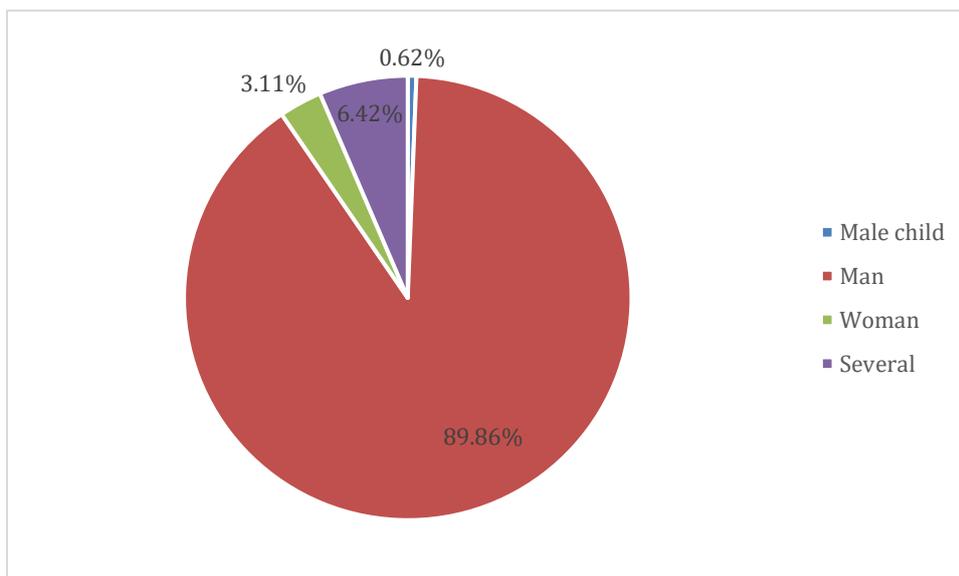
3.5 Sources of cash in the household

Sources of cash income are diversified in the villages surveyed and included employment in off-farm activities, employment on someone's else farm, business, remittances, and the renting out of farm equipment and land. 38.57% of households reported earning cash from employment on someone

else's farm compared to 56% during the baseline survey. Almost 10% of the households surveyed reported deriving income from remittances or gifts. Businesses, other than farm products, are also the source of income for 27.14% of households. Renting out one's own land as an income source accounts for 8.57% of the surveyed households. Renting out agricultural machinery like tractors, water pumps, combine harvesters and threshers has decreased, only 0.71%, as there has been increased acquisition of agricultural pieces of machinery. Another main source of cash income is paid employment which covered 22.14% of households compared with the findings from the baseline which reported 0.During the midline survey, households did not report any loan or credit as a source of cash income contrary to what was reported during the baseline survey with 30% of households having a loan or credit from a formal institute and 74% from an informal source.

Table 7. Sources of cash income other than from own farm.

Source of Income	Number of households (midline)	% of households (midline)	% of households (baseline)
Employment on someone else's farm	54	38.57	56
Other paid employment (e.g. Salary)	31	22.14	0
Business (other than farm products)	38	27.14	35
Remittances or gifts	13	9.29	2
Payments for environmental services	0	0.00	1
Other payment from projects/government, including benefits in kind (e.g. pensions, aid, subsidies, etc.)	0	0.00	41
Loan/credit from a bank or other formal institution (microfinance, projects/programs, registered group)	0	0.00	30
Loan/credit from an informal source (moneylender, relative, etc.)	0	0.00	74
Renting out your farm machinery (e.g. tractor, thresher, pump, etc.) or	1	0.71	0
Renting out your own land	12	8.57	11

In terms of the number of off-farm income sources, 7.14% of the households reported having none, 80% reported one source, 12.14% reported 2 sources and 0.71% reported 3 sources.

Figure 6. Percentage distribution of household according to number of off-farm income sources.
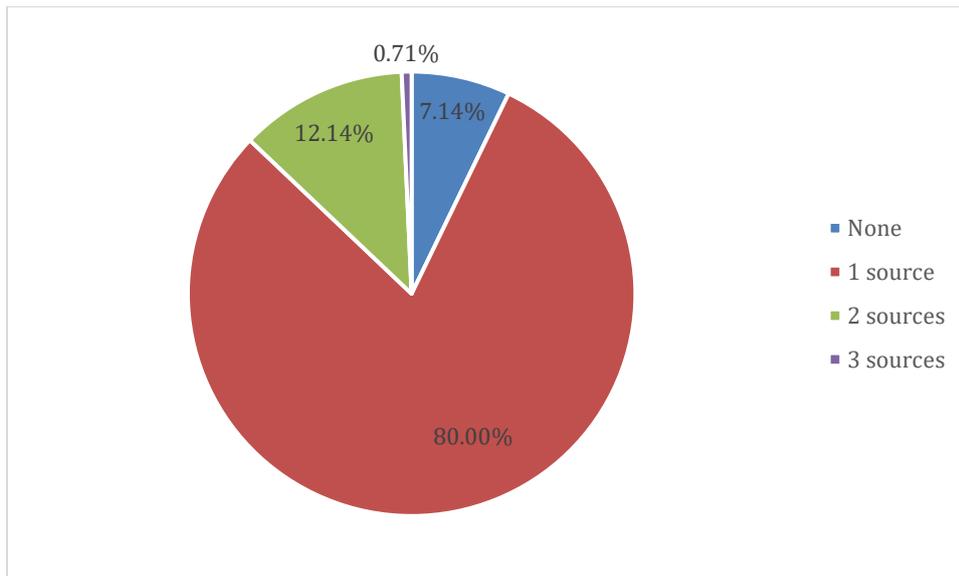
3.6. Discussion

Changes in climate and weather patterns in the Bagerhat area have led to low crop productivity. Accordingly, households have changed their farming practices following low and erratic rainfall patterns including delayed starts of the rainy season, higher temperature, higher salinity, strong winds etc. Among these climatic shocks, less overall rainfall is reported to have affected the most the households surveyed. More than 40% of the surveyed households have changed their agricultural practices. In recent years, households have diversified into other activities such as small livestock rearing, fish culture and the planting of fruit trees. A high number of farmers still rely on raw food crops with a limited number of households selling crops.

The households surveyed reported rearing sheep, goats, cows and chickens in order to increase sources of income from on-farm activities. The fruits and vegetables were produced mainly for household consumption and partially for commercialization purposes. Very few farmers sold their products in the market with 42% selling 1-2 produced items. Off-farm sources provide opportunities for the villagers with 89 % of the households surveyed mentioned that they catch fish from wild water sources.

In the case of the off- farm activities, a large portion of the activities are being done by men, 89.86%, and the involvement of women in off-farm activities is only reported by 3.11% of households. A

good number of households, 38.57%, earn cash from employment on someone else's farm. Businesses, other than farm products, are the second source of income for households in the study villages (27.14%). Finally, almost 10% of households derive income from remittances or gifts.

Regarding the diversification index, most of the farmers, around 58%, reported producing 1 to 4 on-farm products and are thus put in the low diversification category. None of the surveyed households stated producing more than 8 items and thus is ranked in the high diversification category. Forty-two percent of the households can be classified in the intermediate level of diversification category as they reported producing 5 to 8 products.

4. Crop, livestock, land and water management changes

4.1. Crop-related changes

Adopters of new crops/ varieties

The survey inquired on changes made by households to their farming practices over the last seven years, including which crop these changes targeted and whether new crops were introduced. The result from the analysis shows that about 45.71% of the surveyed households did not report introducing any new crop whereas 13.57% of the households mentioned introducing mango as a new crop followed by Rice Boro for 8.57% of households. All new crops reported by the surveyed households are mentioned in Table 8.

Table 8. Introduction of new crops within the surveyed households.

Introduction of any new crop	Number of households	% of households
Banana	5	3.57
Betel nut	8	5.71
Carrots	2	1.43
Citrus	11	7.86
Coconut	8	5.71
Cucumber	3	2.14
Guava	10	7.14
Jackfruit	5	3.57
Leafy vegetable	1	0.71
Mango	19	13.57
Pumpkin/squash/gourd	1	0.71
Rice	5	3.57
Rice Aman	9	6.43

Rice Aus	4	2.86
Rice Boro	12	8.57
Rice Hybrid	11	7.86
Rice HYV Boro	2	1.43
Sofeda	6	4.29
No changes	64	45.71

Most households (93.57%) are not testing any new crops. A small percentage, namely 2.14% of the households surveyed, reported testing citrus.

Table 9. Number and percentage of households testing new crops among the surveyed households.

New crop testing	No. of households	% of households
Banana	2	1.43
Betel nut	2	1.43
Citrus	3	2.14
Eggplant/Aubergine	1	0.71
Guava	2	1.43
Leafy vegetable	1	0.71
Mango	2	1.43
Rice Hybride Paddy	1	0.71
No changes	131	93.57

The majority of the households, 61.43%, has not stopped growing any specific crops completely. Few households report having stopped growing garlic (10.71%), betel nut, rice aman (8.57% each) or eggplant (5.71%). See Table 10 for more details.

Table 10. Crops reported that are no longer grown amongst the surveyed households.

Stopped growing the following crops (totally)	Number of households	% of households
Banana	2	1.43
Betel nut	12	8.57
Coconut	5	3.57
Cucumber	1	0.71
Dates	1	0.71
Eggplant/Aubergine	8	5.71
Garlic	15	10.71
Kohlrabi	2	1.43
Leafy vegetable	1	0.71

Maize	1	0.71
Potatoes	4	2.86
Pumpkin/squash/gourd	3	2.14
Radish	1	0.71
Rice	4	2.86
Rice Aman	12	8.57
Rice Aus	1	0.71
Sofeda	1	0.71
Sweet potatoes	3	2.14
Yam	4	2.86
No changes	86	61.43

Changes made in the past 7 years

The surveyed households were also questioned on the changes they have made to crop varieties, livestock, fish and other aquatic animals, as well as on the management of water and land, and on their access to climate related information. The survey found that about 75.71% of the households reported having made changes related to their crop varieties, 28.57% to livestock, 16.43% to fish and other aquatic animals. Few households reported having made changes on the management of water and land, 3.57%, or on means of accessing climatic information, 0.71%.

Figure 7. Changes made in past 7 years within the surveyed households.
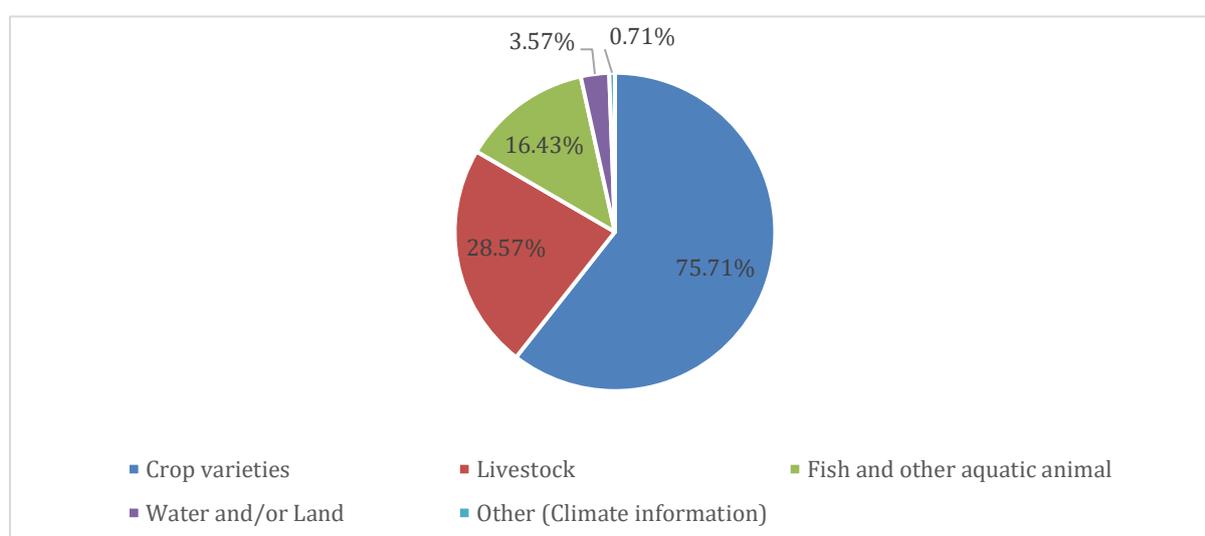
Cropping-related changes

The survey investigated changes made related to cropping patterns. Key changes reported included the introduction of new varieties (51.43%), planting better quality variety (2.14%), planting higher yielding variety (7.14%) and stopping the use of a variety (15%).

Figure 8. Cropping related changes within surveyed households.
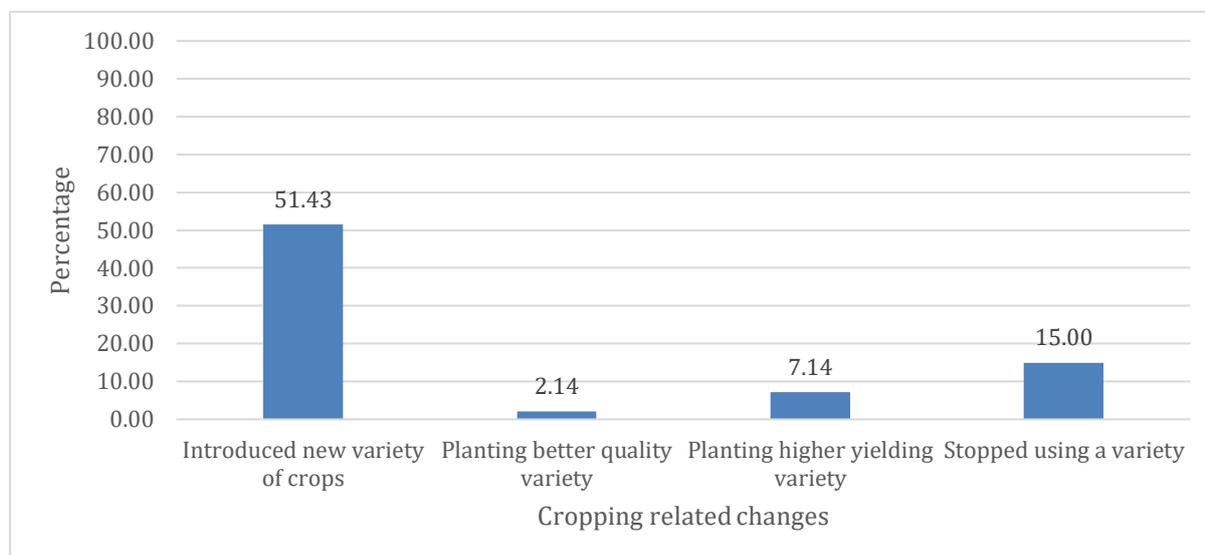
Market related changes

The survey reported three main factors influencing farmers decision making related to changes in farming practices, see Table 11. These factors were getting better yield, better prices, and new opportunities to sell. Indeed, 38.57% of households report being motivated by better yield, 45% report changing due to better prices. Few households, namely 1.43% of the households surveyed, mentioned new opportunities to sell as their reason for making changes in farming practices.

Table 11. Market related reasons for changes in cropping practices.

Market related changes	Number of respondent households	% of respondents
Better yield	54	38.57
Better price	63	45.00
New opportunity to sell	2	1.43

Climate related reasons

The study considered key climate related push factors that could lead farmers to make changes in their farming practices. During the midline survey, nine climate or environmental related reasons for changes were reported. These are higher salinity, higher temperature, later start of rains, less overall

rainfall, more erratic rainfall, more frequent cyclones, more frequent floods, more overall rainfall, and strong winds.

Most of the households reported changing their farming practices due to less overall rainfall, for 42.86% of households, followed by later start of rain, for 28.57%, more erratic rainfall, 17.86%, higher temperature, 11.43%, and finally higher salinity (9.29%). See Table 12 for more details.

Table 12. Weather/Climate-related reasons for changes in farming practices in surveyed villages.

Climate related reasons	Number of households	% of households
Higher salinity	13	9.29
Higher temperatures	16	11.43
Later start of rains	40	28.57
Less overall rainfall	60	42.86
More erratic rainfall	25	17.86
More frequent cyclones	1	0.71
More frequent floods	1	0.71
More overall rainfall	2	1.43
Strong winds	3	2.14

4.2. Livestock-related changes

Livestock is an important component of the surveyed households' livelihood as well as an important asset as it generates income and is a complimentary resource to the production of crops. Households were asked regarding changes made in their livestock keeping practices.

A fifth of the households surveyed reported having introduced new farm animals while 11.43% of the respondents stated they stopped keeping one or more farm animals. Very few respondents introduced new breeds, 1.43%, tested new animals, 1.43%, or reduced the herd size, 0.71%.

Table 13. Changes made in livestock keeping practices per number and percentage of households.

Changes made in livestock keeping practices	Number of households responded	% of respondents
New breed introduction	2	1.43
New farm animals being tested	2	1.43
New farm animals introduced	29	20.71
Reduction in herd size	1	0.71
Stopped keeping one or more types of farm animal	16	11.43

Among the 140 households surveyed, 50 households made changes in the number of livestock owned. See Figure 9 for more details.

Figure 9. Percentage of households making changes in the number of livestock owned.
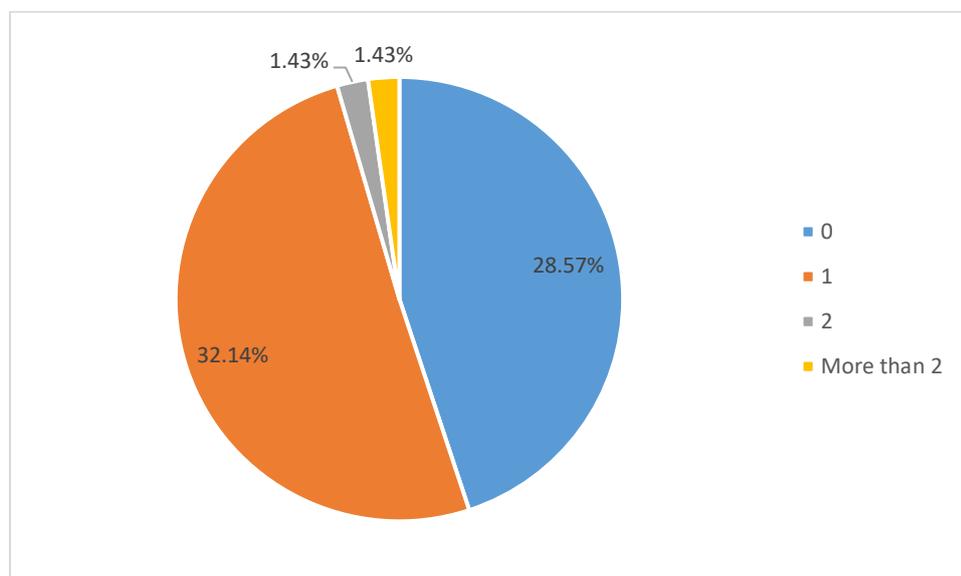
4.3. Reasons for making the changes

The analysis was done to understand the reasons for making changes to crops, livestock, fish and other aquatic animals as well as in land and water management. The result of which is shown in Table 14.

Table 14. Reasons for making the changes.

Reasons for the changes	Number of households	% of households
Market	77	55.00
Climate	86	61.43
Land	5	3.57
Labor	4	2.86
Pest and Diseases	2	1.43

The majority of households, namely 61.43%, mentioned climate as the main reason for the changes they made in the past 7 years, followed by market related reasons for 55% of households and land and water-related management for 3.57% of the households. The least important reasons reported for making changes were due to labor for 2.86% of households and pest and diseases for 1.43% of households.

4.4 Adaptability/ Innovative index

An adaptability/innovation index was constituted as follows:

0 = 0 or 1 change made in farming practices over the last 7 years (low level)

1 = 2-10 changes made in farming practices (intermediate level)

2 = 11 or more changes made in farming practices (high level)

The result from the study shows that the adaptability index in Bagerhat is low as 87.14% of the surveyed households reported making zero to one change in crops, livestock and fish farming practices. There are no households which can be categorized in the high level of change categories.

Table 15. Adaptability/Innovative index.

Number of changes made in the last 7 years	Number of households	% of household
Zero to one (low)	122	87.14
Two to Ten (intermediate)	18	12.86
More than 11 (high)	0	0

4.5. Discussion

The area is witnessing major shifts in rainfall patterns with later starts of rains, less overall rainfall and more erratic rainfall being reported in the last five years. In the past 7 years, the midline survey points out that 75.71% of the households have made changes related to their crop varieties (Figure 7) and 61.43% of households report changing due to climatic shocks.

5. Food security

Households were asked several questions to evaluate their food security such as questions on the sources of food consumed, to understand whether the food consumed came from their own farm or from elsewhere (off-farm) for each month of the year. A total of 121 out of the 140 households surveyed reported obtaining food from their own farm throughout the year, whereas the remaining 96 households out of the 140 stated struggling for food at least one or several months of the year.

The results from the survey show that in case of the households who reported obtaining the food from their own farm, 85% of the households reported obtaining consumable food in November, followed by the months December and January for82.14%, February for 75%, October for 55% of households.

In June, July and August, very few households reported getting food from their farm. See Figure 10 for more details.

Figure 10. Main source of food by month (from own land).
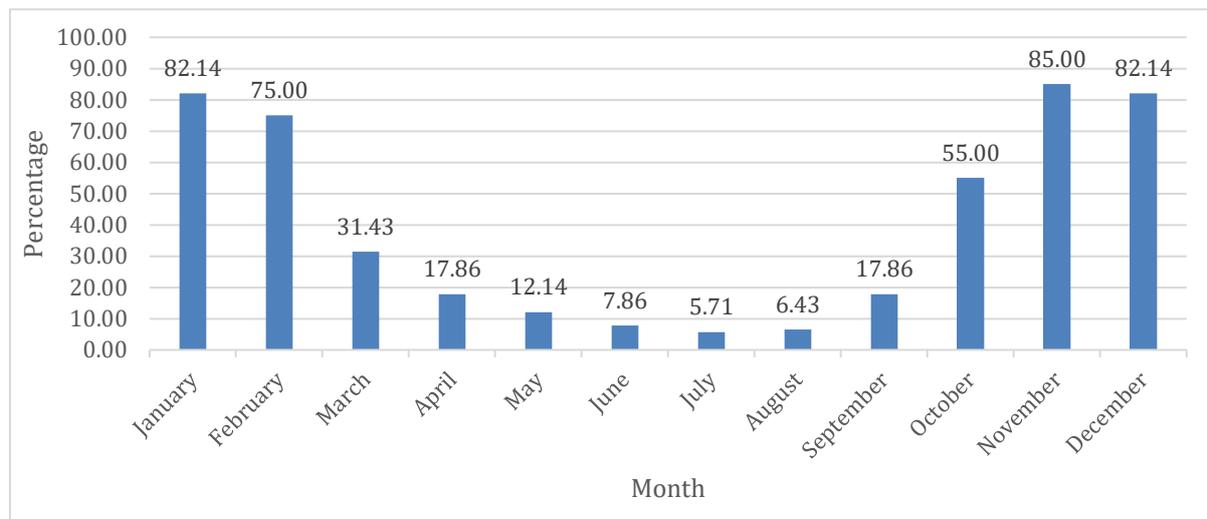
The surveyed households also reported the number of months in a year during which they experienced food shortages. 96 households reported facing food shortages at least one month in a year while the rest of the households surveyed reported facing food shortages at least twice a year. August was identified as the month during which most households face food shortages. Figure 11 reports the percentage of households experiencing food shortages per month.

Figure 11. Hunger/Food shortages experienced per month.

5.1. Food Security Index

The food security index is calculated based on the number of months during which a household reported experiencing difficulties in getting food from any common source. Among the surveyed households, 31.43% did not report a hungry period in the year. 20.71% reported struggling one or two months of the year whereas 32.14% of households reported facing difficulties three or four months a year. Finally, 9.29% of the households surveyed stated that they experienced difficulties for five to six months a year while 6.43% of the households surveyed reported suffering of food shortages more than 6 months in a year. See Table 16 for more details.

Table 16. Food Security Index

Hunger months	More than 6	5-6	3-4	1-2	None
% of households	6.43	9.29	32.14	20.71	31.43

5.2. Discussion

There is a slight decrease in the percentage of households which are food secure all year long, with 31.43% of household reporting it at midline while 40% of the households had reported not experiencing any food shortages at the time of the baseline. Fewer households are experiencing extreme food insecurity; at baseline the survey showed 20% of households had more than six months of hunger in a year, but at midline this figure had dropped to 6.43%.

Lower productivity of the crops, a majority of smallholder farmers and fewer livelihood options compounded by several climatic and environmental issues such as salinity, floods, cyclone etc. are all contributing towards food insecurity.

6. Land and water

6.1. Water for agriculture

About 20% of the households surveyed have access to an irrigation source, either owned or hired. Bagerhat is a saline prone area. 44.29% of households also depend on rainwater harvesting in either tanks/infrastructure, or water ponds for 11.43% of households for their agricultural activities. Only 2 households use solar water pumps.

Table 17. Water sources for on-farm agricultural activities.

On-farm water source	Number of households	% of households
Irrigation	28	20
Tanks/infrastructure for water harvesting	62	44.29
Dams or water ponds	16	11.43
Solar water pumps	2	1.43

6.2. Land use

Many of the households are relatively poor as can be inferred from the small plot sizes. Table 18. Total land size accessed by households8 shows that 81.43% of the households reported owning or renting less than one hectare of land. 18.57% of households reported operating on plots of 1 to 5 ha of land. The biggest land size reported among the respondents is of 3.26 ha. None of the respondents used communal land. Moreover, all categories of households used almost all land for the production of crops. Two households reporting owning or renting land deemed unproductive and degraded.

Table 18. Total land size accessed by households.

Number of hectares of land owned and rented in	% of households
Landless	0
Less than 1 hectare	81.43
1 to 5 hectares	18.57
More than 5 hectares	0.00

7. Inputs and credits

The household surveyed reported the use of a variety of agricultural inputs including improved certified seeds, chemical fertilizers, pesticides and veterinary medicines. Very few households reported the purchase of crop or livestock insurance. The findings on this are summarized in Table 19.

More than three-quarters of farmers reported buying improved seeds while 80% stated buying fertilizers. Moreover, 77.14% of the households reported buying and using pesticides to support the intensive cultivation of food crops and for some, the cultivation of vegetables for commercial purposes. Livestock being an important enterprise in the area, 70% of farm households declared purchasing and using veterinary medicines. 14.29% of the farmers reported the purchase of credit.

Only one household reported buying insurance for crop or livestock and one household stated subscribing to a weather-based insurance.

Table 19. Number and percentage of households purchasing inputs.

In the last year, did you purchase	Number of households	% of households
Improved seed	108	77.14
Inorganic mineral fertilizer	112	80.00
Pesticides/herbicides	108	77.14
Organic fertilizer	54	38.57
Veterinary medicines	98	70.00
Credit for agricultural activities	20	14.29
Crop or livestock insurance	1	0.71
weather based insurance	1	0.71

8. Climate and weather information

The survey data report that 58.57% of respondents got climate and weather-related information from multiple sources which included the radio, television, cellphone, internet, newspaper, friends and relatives. Households reported receiving information on extreme events, the start of the rains among other general weather-related information.

8.1. Information recipients in the households

About 99.29% of the surveyed households declared receiving information on weather or climate related issues over the past 12 months. Approximately 58.57% of the households reported accessing information on extreme events. Finally, 93.57% of the households surveyed reported receiving weather forecasts for the next 24 hours to 3 days.

Table 20. Type of weather-related information received by the surveyed households.

Type of weather-related information	Number of households	% of households
Extreme event	82	58.57
Pest or disease outbreak	0	0
Start of the rains	1	0.71
Weather for the following 2-3 months	0	0
Weather for today, 24 hours and/or next 2-3 days	131	93.57

8.2. Types of weather-related information

Respondents reported receiving weather-related information through various sources, including radio, television, friends, relatives, neighbor, newspaper, cell phone, NGO project officers and the internet. The following section details on the main sources of information for the different types of weather forecast received, including information on extreme events or the weather conditions for the next two to three days.

Extreme events

Out of the 140 households surveyed, 82 households, that is 58.57%, reported receiving information on extreme events. Of these 82 households, 55% reported receiving the information from friends, relatives and neighbors. More than half reported accessing information on extreme events through their cell phones. Moreover, 51.43% of the surveyed households reported receiving information related to extreme events through the television. Finally, 2.86% stated accessing information through the internet on their smartphones.

Both men and women households' members of the surveyed households reported receiving information on extreme events. However, in most cases, men were the primary recipient of the information from the external sources. In Bagerhat, 57.14% of households reported that information on extreme events is received by both men and women. However, only 1.43% of the men in the surveyed households indicated being the only one receiving the information on extreme events (Figure 12).

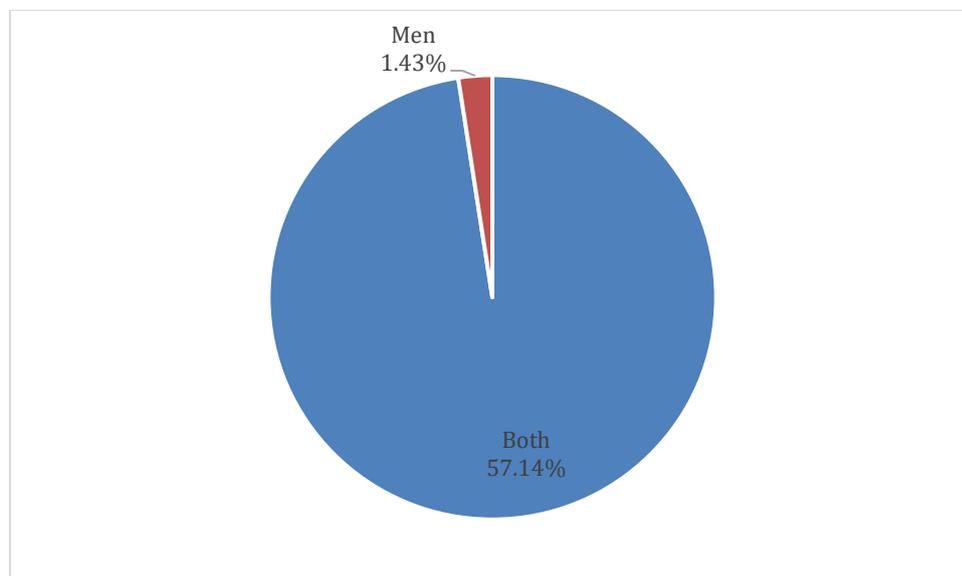**Figure 12. Gender breakdown of getting extreme event information.**

Table 21. Sources of information about extreme events.

Source of information on extreme events	Number of responses	% of respondents
Radio	2	1.43
Television	72	51.43
NGO project officers	1	0.71
Friends, relatives or neighbours	77	55.00
Newspaper	2	1.43
Local group/gatherings/meetings	1	0.71
Cell phones	73	52.14
Internet	4	2.86

Weather forecasts on the next 24 hours to 2-3 days

Among the surveyed households in Bagerhat, 93.57% of households reported obtaining weather forecasts for the day, the next 24 hours and/or the next 2-3 days.

The most important source of information providing weather forecasts for the next two to three days was the television, reported by 80.71% of households, followed by friends, relatives and neighbors for 73.57% and cell phone for 72.14%.

Table 22. Sources of information for the weather forecast for the next two three days.

| Source of information	Number of households	% of respondents
Radio	6	4.29
Television	113	80.71
Friends, relatives or neighbours	103	73.57
Own observation	5	3.57
Cell phones	101	72.14
Internet	7	5.00

8.3. Discussion

From the results of the survey, it may be inferred that the majority of the households got information climate and weather-related information from multiple sources with television, cell phones and friends and relatives emerging as the most important sources of information on extreme events amongst the surveyed households.

9. Community groups

Community groups are affinity groups, which are formed to support efforts related to production, marketing, savings and credit, or water use. The fishing groups are one of the most successful rural groups found in Bagerhat. Among the 140 households, 21, that is 15% of households, reported being members of a fishing group followed by 9 households, 6.43%, reporting membership in a tree nursery/tree planting group and 4 households, 2.86%, reported membership in a vegetable production group. Very few farmers have also organized themselves into irrigation user's groups which was reported by 1.43% of the households surveyed.

Figure 13. Community Groups.
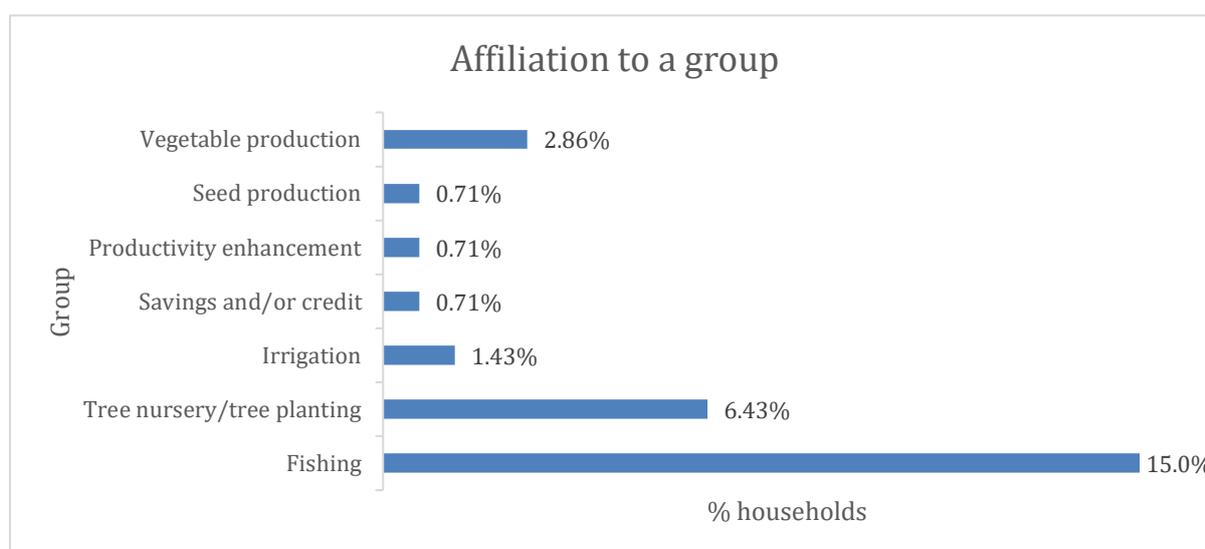
9.1. Climate-related crisis

The survey also aimed to investigate whether households reported facing a climate related crisis in the last 5 years and if they had received help to deal with the impacts. For the households who reported receiving help, further questions were asked to inquire on the source of it. Among the surveyed households, 97.86% reported facing a climate related crisis in the last 5 years. Only 2.14% of the households stated they did not experience any climate related crisis in the last 5 years. 20% of the households who experienced a climate related crisis sought help – of which 12.86% reported receiving help from Government agencies and 7.14% from both Government agencies and NGOs as well as from CBOs.

Figure 14. Percentage of households reporting having experienced a climate related crisis in the last 5 years.
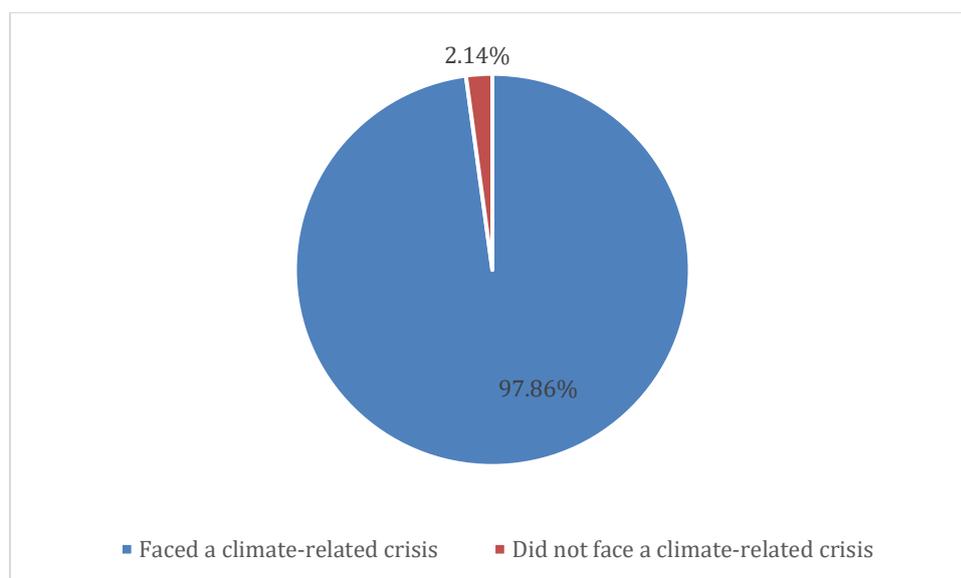
9.2. Discussion

In Bagerhat district, storms and cyclone have been regular occurrences in the last five years. Heavy rainfall damages considerably agricultural products. Most of the Gher farming systems, in which a pond is dug into a rice field, become inundated when heavy rainfall occurs which leads to a decrease in crops and fish farms productivity. Bagerhat being a cyclone prone area, people often have to take shelter and receive assistance from multiple sources such as government agencies as well as NGOs.

10. Assets

Households were asked whether they owned different types of assets such as:

- Transport: Bicycle, motorcycle, car, truck, boat
- Energy: solar panel, generator (electric or diesel), battery, LPG
- Production assets: tractor, plough, mill, thresher, treadle pump, fishing net
- Information assets: radio, TV, cell phone, computer, internet access
- Luxury items: refrigerator, air conditioning, electric fan, bank account, stove.

The population surveyed in the Bagerhat site is relatively impoverished, the majority of households did not possess many assets.

More than a quarter of the households surveyed reported using a bicycle as the primary means of transport followed by motorcycles for 5.71% of the households. Only 3 households among the 140 surveyed reported owning a boat and 2 households owned battery vehicle. See Table 23 for more details.

Table 23. Ownership of transport assets.

Transportation assets	Number of households	% of households
Bicycle	38	27.14
Motorcycle	8	5.71
Boat	3	2.14
Battery Vehicle	2	1.43

Among the surveyed household, no household reported owning a mechanical plough, mill, thresher and motor-powered spraying tank. 2.14% of the households reported owning a water pump. There are 38 households, 27.14% of households, who reported owning fishing nets. See Table 24 for more details.

Table 24. Ownership of various production assets.

Production assets	Number of households	% of households
Water pump/Treadle pump	3	2.14
Mechanical plough	0	0
Mill (for grinding cereals or oilseeds)	0	0
Thresher	0	0
motor powered spraying tank	0	0
Fishing net	38	27.14

However, most of the households surveyed in Bagerhat reported being connected to the electricity. Sixteen households, representing 11.43% of the total households, declared using solar panels for energy. LPG is used for cooking fuel, and it was reported by 26 households out of 140 households, that is by 18.57%. Generators, reported by only 0.71% of households, and batteries, reported by 0.71% as well, do not seem to be common energy assets in the study area. Moreover, no household reported owning a biogas digester. Table 25 details on the ownership patterns of these assets.

Table 25. Ownership of various energy assets.

Energy assets	Number of households	% of households
Solar panel	16	11.43
Generator (electric or diesel)	1	0.71
Battery (large, e.g. car battery for power)	1	0.71
Biogas digester	0	0
LPG	26	18.57

Among the information assets generally possessed, cell phones are the most common with ownership reported by 96.43% of the surveyed households. This is followed by the television, which is reported by 42.86% of the households. Radios are less owned, reported only by 6.43% of the households. Computers are only reported by three households. Moreover, 12 households, 8.57% of households, reported having internet access. See Table 26 for more details.

Table 26. Ownership of information assets.

Information assets	Number of households	% of household
Radio	9	6.43
Television	60	42.86
Cell phone	135	96.43
Computer	3	2.14
Internet access	12	8.57

The luxury assets included in the survey were refrigerators, air conditioners, electric fans, bank accounts and improved stoves. None of the households reported owning an air conditioner. Electric fans were reported by 79.29% of the surveyed households whereas only 14.29% of the households stated having a bank account. Moreover, only 26 households, that is 18.57% of the total, reported owning a refrigerator. See Table 27 for the breakdown.

Table 27. Ownership of luxury assets.

Luxury Assets	Number of households	% of households
Refrigerator	26	18.57
Air conditioning	0	0.00
Electric fan	111	79.29
Bank account	20	14.29
Improve stove	1	0.71

10.1. Asset index

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

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

Among the surveyed households, 71 households, that is 50.71%, belonged to the intermediate asset level category while 68 households, that is 48.57%, can be classified in the high-level asset category. Only one household among the surveyed households belonged to the basic level asset category. See Table 28 for more details.

Table 28. Asset index of the farm households surveyed in Bagerhat.

Number of queried assets	Number of households	% of households
None (basic level)	1	0.71
1-3 (intermediate level)	71	50.71
4 or more (high level)	68	48.57

10.2. Discussion

More than 48% of households reported owning four or more assets. Half of the households were ranked in the intermediate category. None of the households reported owning an air conditioner and only one household reported an improved stove. The overall prosperity in terms of owning luxury assets thus remains extremely low in the study area.

Annexes

Annex 1. Study team members

List of enumerators and survey team members:

- B.M. Hanif
- Anindita Das
- A.T.M. Eunus
- Efat Afroz
- Harun Or Rashid (Site Team Leader)

Annex 2. List of villages in Bagerhat

List of villages sampled in the midline:

- Gabgachhia
- Chak Vatkhali
- Uttar Sutalori
- Chak Putikhali
- Dharadoha
- Gazalia
- Borshibaoa