

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

**Village Baseline Study:
Site Analysis Report for Khulna -
Morrelganj, Bangladesh (BA0416)**

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The tools and guidelines used for implementation of the village baseline study across all CCAFS sites, as well as the mapping outputs at a higher resolution can be accessed on our website (<http://ccafts.cgiar.org/resources/baseline-surveys>).

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Abstract

The Gabgachhia village is located in the coastal region of Bangladesh's Khulna district. The population is rising and living with high levels of poverty and food insecurity. Local resources that are not critically strained from climate change and poor resource management are few, beyond mosques, roads and schools. The community has seen dramatic changes in resources, as early as 1990, which they attribute to increased population pressures and climate change impacts. Forests have been depleted, rivers are full of silt and lacking life, farmlands have low productivity due to rising salinity, flooding and inappropriate varieties, drinking water is insufficient to meet human, crop and animal needs, and infrastructure is weak and unable to withstand the environment.

Subsistence farming of rice and some fruit and vegetables, aquaculture and limited poultry and livestock production are the main sources of food for Gabgachhia and there are neither excesses for markets nor many off-farm employment opportunities to earn income. The community's vision for the future focuses on addressing fundamental constraints faced by the village and was similar among men and women. Expanded income generating opportunities, means to address rising salinity, increased production, and access to freshwater are core aspects of their vision for the future.

There are numerous organizations working in and around the village, representing government, NGO, private sector and international entities. Their activities focus on religion, education, health, income generation, training, loans, local governance, agriculture, fisheries, water and disasters. The local government is core in providing and coordinating development services and the community also strongly supports mosques and schools.

Several organizations target food security and address food and fish production, access to finance, and capacity building on income generation, improved nutrition, water management, etc. Others shift their focus or engage when there is a natural disaster or crisis and provide food, clothing, drinking water, medicine and financial support for home construction. The community identified a handful of organizations addressing natural resource management, with a focus on water management infrastructure, biodiversity conservation, aquaculture and agroforestry training, and provision of tree saplings.

An analysis of linkages within and between organizations showed high levels of vertical linkages within organizations but very poor horizontal linkages and coordination between organizations. It was found that organizations focus on their own efforts and do not engage with other institutions beyond the local government. Organizational support was found to be provided on a regular basis and increased during times of need, however lack of coordination and limited resources was a large constraint.

Access to information was not identified as a major challenge and participants cited numerous sources for weather, agriculture, livestock/poultry, aquaculture and crisis topics. Both formal and informal sources were the most popular, with the majority of information coming from neighbours, radio and television and government. Men and women cited the same sources of information but often sought those sources out for different kinds of information.

The needs of Gabgachhia are numerous and each of critical importance. Without addressing pressures from climate change, poor natural resource management and rising populations, Gabgachhia will continue to face a rapid decline in food security, coping capacity and resiliency. The increasing salinity and soils must be managed, more appropriate and resilient varieties made available, fresh water access expanded, off-farm employment opportunities increased, nutrition and sanitation improved, production systems for rice, vegetables, fish and livestock strengthened, and water management infrastructure developed.

Keywords

Baseline; Bangladesh; village study; participatory mapping; organisations; access to information

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Introduction

The CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) is a strategic ten-year partnership between the Consultative Group on International Agricultural Research (CGIAR) and Future Earth to help the developing world overcome the threats posed by a changing climate, achieve food security, enhance livelihoods and improve environmental management. In 2010, CCAFS embarked on a major baseline effort at household, village and organisation levels across its three target regions, namely East Africa, West Africa and South Asia (more information about CCAFS sites is available on our website <http://ccafs.cgiar.org/regions>). CCAFS trained survey teams from partner organisations in the three regions to conduct the baseline.

The baseline effort consists of three components – a household survey, village study and organisational survey. The household baseline survey, a quantitative questionnaire on 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, was implemented by CCAFS partners in 35 sites (245 villages) with nearly 5,000 households in 12 countries to date. CCAFS partners are implementing village baseline studies (VBS) and organisational surveys in one out of the seven villages within each CCAFS site where the household survey was implemented. The plan is to revisit these villages in roughly 5 years, and again in 10 years, to monitor what changes have occurred since the baseline was carried out. The goal is not to attribute these changes to the program, but to be able to assess what kinds of changes have occurred and whether these changes are helping villages adapt to, and mitigate, climate change.

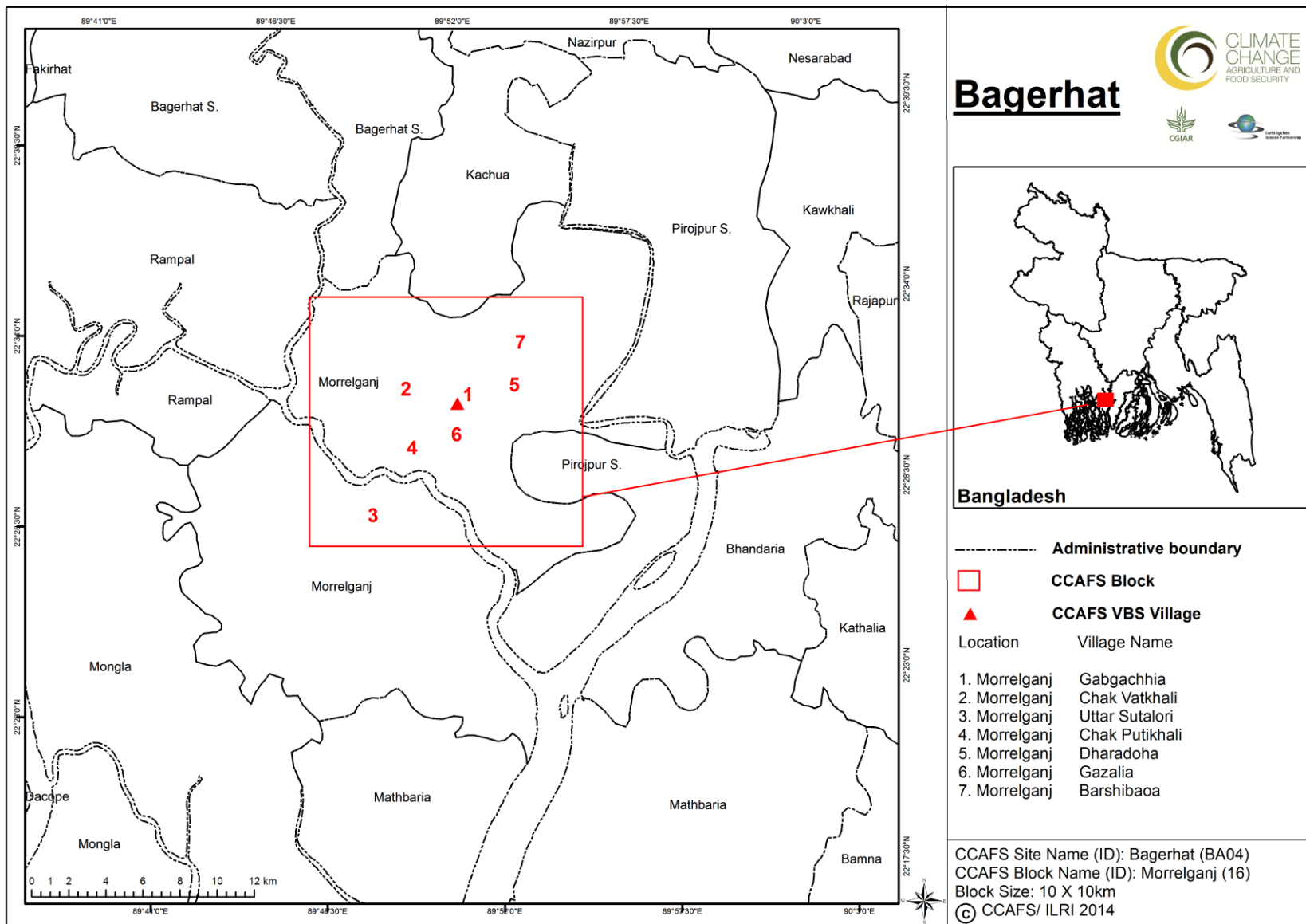
The focus of this site analysis report is the VBS. To date, 17 VBS were conducted. The VBS aims to provide baseline information at the village level about some basic indicators of natural resource utilisation, organisational landscapes, information networks for weather and agricultural information, as well as mitigation baseline information, which can be compared across sites and monitored over time.

The objectives of the VBS are to:

- Provide indicators to allow us to monitor changes in these villages over time. In particular, changes that allow people to
 - Manage current climate risks,
 - Adapt to long-run climate change, and
 - Reduce/mitigate greenhouse gas emissions
- Understand the enabling environment that mediates certain practices and behaviours and creates constraints and opportunities (policies, institutions, infrastructure, information and services) for communities to respond to change
- Explore social differentiation:
 - Perceptions of women and men will be gathered separately to be able to present different gender perspectives.
 - Focus group participants will be selected to present perceptions of groups differentiated by age.

The detailed tools and guidelines used for the implementation of the VBS across all CCAFS sites, as well as the manuals, data and analysis reports can be accessed on our website (<http://ccafs.cgiar.org/resources/baseline-surveys>)

Map 1. Location of the Gabgachhia village in the CCAFS benchmark Khulna site, Bangladesh



This report presents the results of the VBS conducted on December 1-3, 2012 in the village of Gabgachhia, Bangladesh (Khulna site) (Map 1). Gabgachhia village of Bagerhat Upozila (sub-district) is located near the Sundarbans and the Panguchhi River in the coastal region of Bangladesh's Khulna district. It takes half an hour to fly from Dhaka to Jessore airport and 5 hrs to drive from there to Khulna district city. Gabgachhia village is 50 Km and 1.5 hours from Khulna city on a fairly good road. Gabgachhia was chosen for the baseline survey because of its relative central location in the block. The survey team was composed of two facilitators, two note takers and two translators. Each pair was male and female. Consultations were made with the village authorities concerning time and place of meeting. They selected the Gabgachhia Primary School as an appropriate venue.

Invitations were sent out by the site team leader to three sets of participants who were chosen using random sampling. Each group was composed of 15 men and 15 women. Three consecutive days were selected for the survey and on each day only one set of participants were expected to participate in the survey. The whole community was invited on the first day of the survey for an introductory session where this survey was explained to and results of an earlier household survey shared. After the introductory session the rest of the community was set free and only the invited group of 15 men and 15 women remained behind to carry on with the survey. This was repeated at the end of the third day when the survey was completed. The whole community was again invited to attend a debriefing session where summaries of the findings were shared.

The survey used participatory methods of data collection. Throughout the data collection process groups of male and female members of the community worked separately. This was to allow for collection of gender-differentiated information.

The task on day one was to introduce the community group to a satellite image of the block and work with each group to identify and map/sketch resources that are important to the community, their current state, their past state and what caused the changes. The outputs were maps and sketches. The process of working with the community to identify the resources that are important to them depended entirely on how well they were able to understand and interpret the image.

The task on day two was to work with each group to understand the organisational landscape and the links that exist between the organisations in relation to food security in a normal year, in a year of crisis and in relation to natural resource management. The outputs were diagrams showing the organisational landscape. Information on each organisation was also captured cards. The links between the organisations were shown using lines and arrows on the diagrams.

There were two main tasks on day three. One was to work with each group on understanding information networks in relation to weather elements and farming activities. The outputs were diagrams. The second task was to bring the two groups together and generate a vision of what the community would like their village to be like in the future. The output was a map/sketch showing "the vision of the community."

Information generated from the survey was captured on sketches, maps, flip charts, information cards and notes, which were brought together in an initial debriefing and ultimately this final report. Photographs were also taken of all the activities and information generated at each stage. The survey materials were then labelled and packed for off-site processing. The debriefing report was prepared in the field so that it could benefit from the presence of the site team. The photographed sketches and maps were inserted in the debriefing report. In this site analysis report proper maps and diagrams derived from the field outputs replaced them.

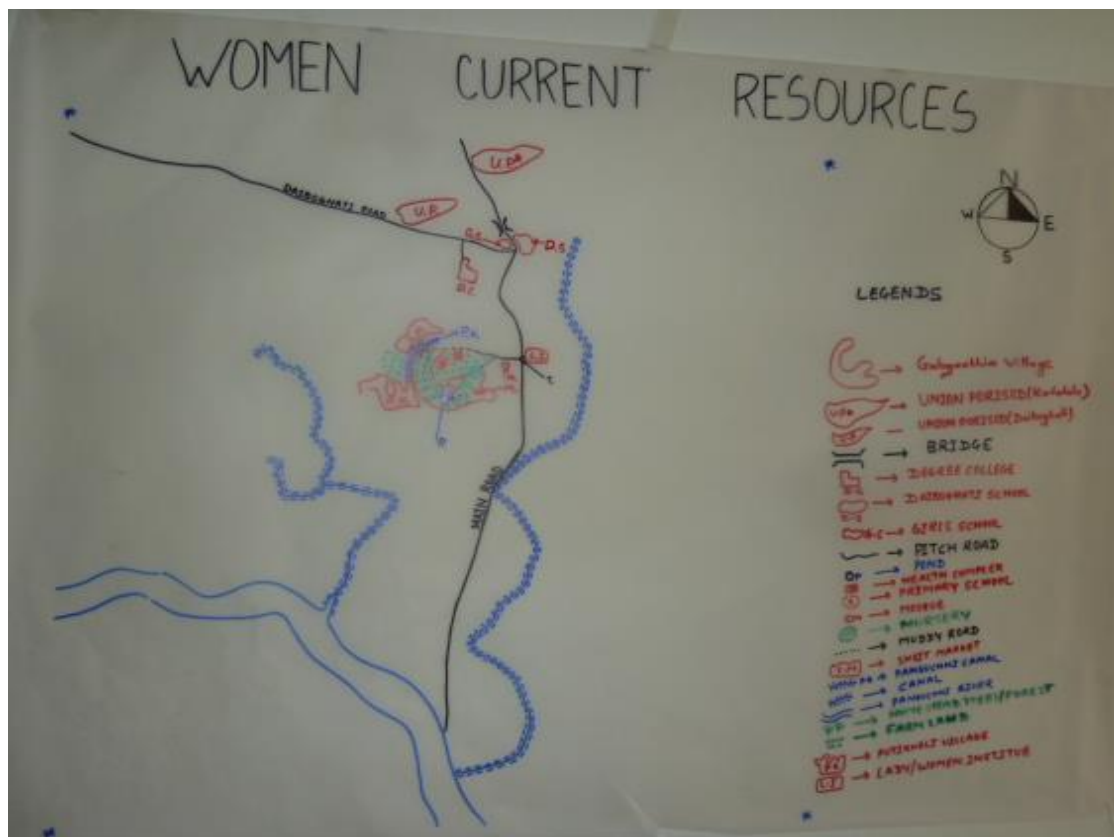
Topic 1: Community resources - participatory satellite imagery interpretation and visioning

Community infrastructure and resources and gender-differentiated access and utilisation of those resources have been analysed, based on a process of participatory visual interpretation of high resolution satellite imagery (RapidEye). The aim was to create a basic understanding of existing community resources, as well as of community dynamics in relation to its environment. The participants discussed the current state of those resources, in terms of quality, access, management, history and potential drivers of change. Later on, a mixed group developed an image of village resources and human well-being into 2030 to understand opportunities, constraints and aspirations for the future. The detailed approach to this exercise is outlined in the CCAFS Village Baseline Study Implementation Manual (follow the link to the baseline study from our website <http://ccafs.cgiar.org/resources/baseline-surveys>).

A. Current resources

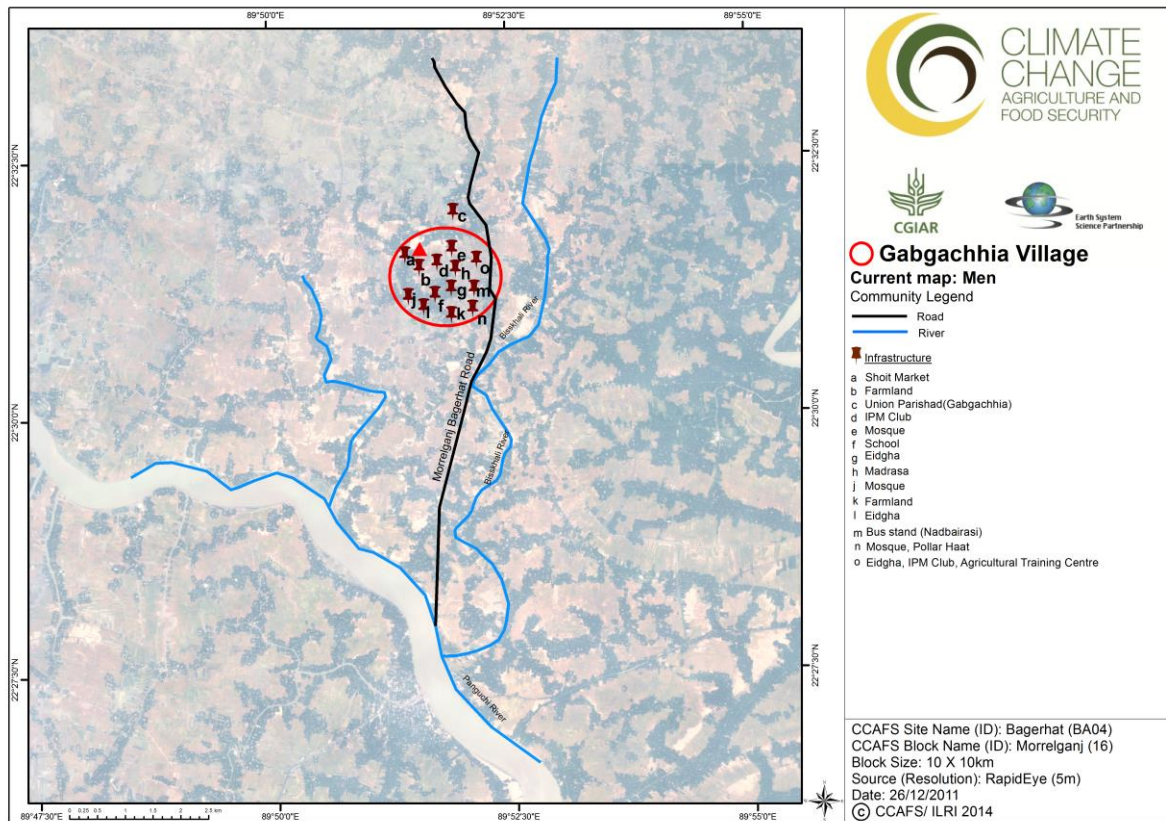
Separate meetings of male and female participants took place at the community meeting grounds. To begin the identification of community natural resources and infrastructure, groups generated initial diagrams on the floor as a basis for discussion and consensus before final versions were transferred to flipcharts by the research team (Photo 1). Following this activity groups were shown satellite imagery of their region to compare and confirm their maps. The appreciation of scale was important for participants to get their bearings. The exercise could not be rushed and took a lot of time, but both groups were ultimately able to identify key features from the images.

Photo 1. Current conditions mentioned by women regarding natural resources and infrastructure



Maps 2 and 3 represent the current conditions in the community regarding natural resources (water, forest, grazing, farmland, degraded land) and infrastructure (roads, markets, education, health) according to, respectively, male and female participants. The maps lay out information prepared by the community participants super-imposed on a satellite image.

Map 2. Men's map of current community resources



Map 3. Women's map of current community resources

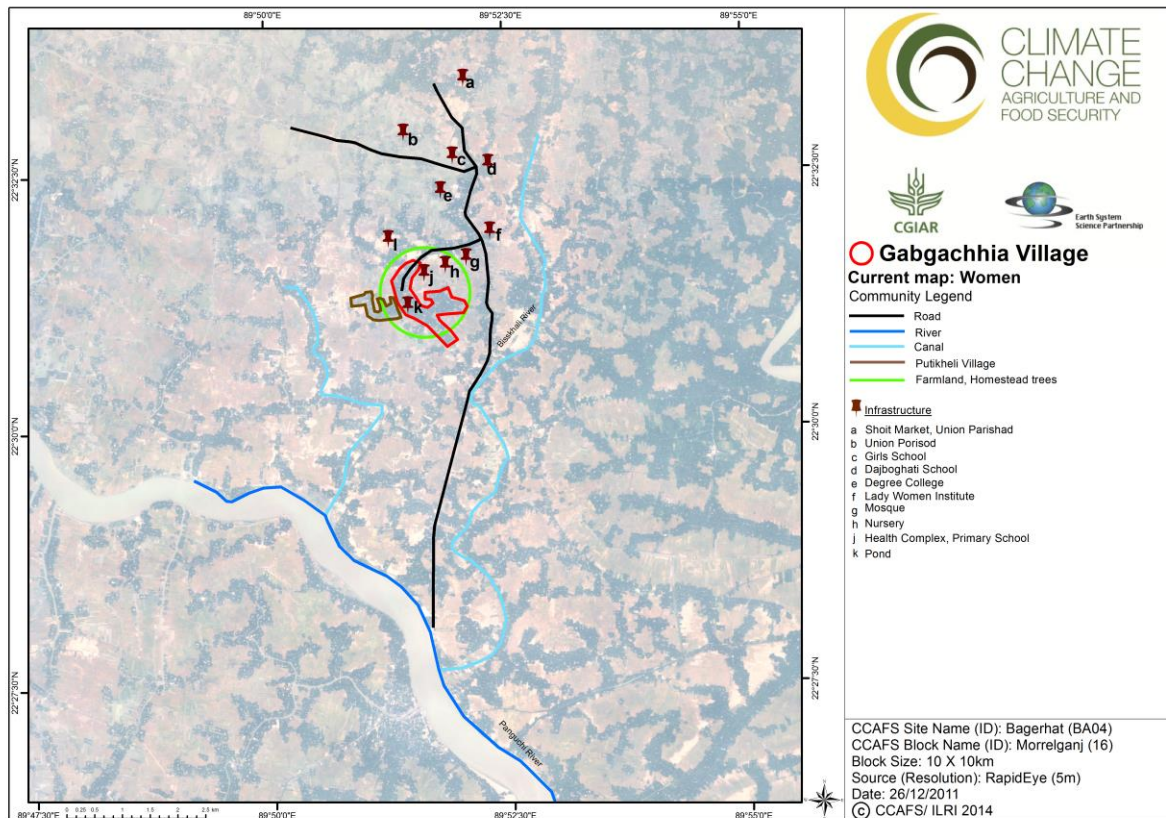


Table 1. Summary for Layer 1: current conditions, as perceived by men (M) and women (F)

Land cover class	Community determined land use	Location Names	Current state (quality)	Time to resource	Mgmt and ownership issues	Environmental Benefits	Opportunities	Limitations
Rivers (M)	Fishing, boating, irrigation and transport	Gabgachhia village. Charamola, Panguchhi, Bisskhali, and Mollechar rivers	All three rivers are very narrow and polluted. Half are full of silt and dead. No fish available.	All around village (10 minutes to 3 hours)	Government	Rivers provide immense benefit. Flora and fauna	Improving river quality that will benefit the community via access to seafood. Silt clearing and saline water management. Introduction of new flora and fauna species	Water fresh only during rainy season and three months after. Rest of year saline due to tidal waves
Rivers (F)	Panguchhi	Panguchhi	Good	2 hours by bus		Fresh air and source of water	Irrigation, fishing and boating	Very far from village and difficult to access
Roads (M)	Transport	Main road, Daibognyhati road and Gabachhia road	Functional	5 - 20 minutes by bus to Tulatala or Daibognyhati	Government		Better access and easier transport to different parts and places.	
Roads (F)	Main road, Daibognyhati, and Gabachhia road	Tulatala, Daibognyhati, and Tulatala to Gabachhia	Functional	10 - 20 minutes by buss	Government		Better access to different parts.	
Bridges (F)	Pangachhi (Canal) and Daibognyhati	Gabgachhia and Daibognyhati	Functional	10 - 20 minutes by bus	Government		Easy access to other places	
Farmland (M)	Paddy production	All around the village	Salinity increasing while production decreasing	5 minutes – 1 hour	Private	Residue adds organic matter to soil	Improving soil fertility, soil and water management, and resilient varieties	Feb/March, saline conditions worst
Ponds (M)	Shrimp & white fish production	All around the village	Production and quality decreasing	5- 10 minutes	Private	Increases soil moistures and provides drinking water for human and animals	New technologies to improve pond quality and rain water harvesting	Only 60% of land farmers have shrimp ponds. Pond water not used for irrigation

Land cover class	Community determined land use	Location Names	Current state (quality)	Time to resource	Mgmt and ownership issues	Environmental Benefits	Opportunities	Limitations
Ponds (F)		Gabgachhia and every home	Functional	5-10 minutes	Individually owned	NA	Fishing rearing and washing clothes and utensils	Dries up Jan-Mar and floods 15-20 days during rainy season
Vegetable Gardening (M)	Beans, brinjal, tomato, gourd, sesame, chilli, red amaranth, cabbage, etc.	Households	Production and quality decreasing	1 -5 minutes	Private	Legumes add nitrogen to soil	Soil water management, more adaptive and resilient varieties, new technologies	Wet soil and saline water
Sugarcane (M)	Sugarcane production	Around village	Decreasing production due to increased salinity and erratic rainfall	15 minutes - 1 hour	Private	Sugarcane residue adds organic matter to soil	Soil water management, more adaptive and resilient varieties, new technologies	No big industries around
Aquaculture (M)	Community pond	Near agriculture training center for women	Decreasing production due to increased salinity and erratic rainfall	5 minutes - 3 hours	Community	Increases soil moisture, drinking water for humans and animals, and potential to diversify species for more production	Soil water management, more adaptive and resilient varieties, new technologies	Only one community pond available
Poultry (M)	Chicken production	Households	Decreasing production due to increased salinity and erratic rainfall	1 minute	Private	Add organic excretions and organic matter to soil	Rearing improved breeds and using modern management technologies	Only 10% farmers engaged. Few have up to 500 birds. Disease and cold problems
Livestock (M)	Cow, sheep and goat farming	Households	Low productivity due to lack of feed and fodder	1 minute	Private	Farmyard manure, fodder and nitrogen fixation beneficial to soil	Fodder production and animal raising technologies. Expand production and meet market demand.	Only 2-5% commercial. Lack of improved breeds and fodder. No support services

Land cover class	Community determined land use	Location Names	Current state (quality)	Time to resource	Mgmt and ownership issues	Environmental Benefits	Opportunities	Limitations
Horticulture and Nurseries (M)	Mostly mango, sofeda and guava. Some coconut and beetle nut	Around households	Salinity problem	1 - 2 minutes	Private	Adds greenery and improves environment. Provides fuel for cooking	Good varieties, technologies and support services can help	Small household areas
Plantation (M)	Homestead and road side	Around the homestead and on roadsides	Very few and in poor state	Depends on location	Homestead is private while roadside is community and government	Adds greenery and improves environment	Opportunity for roadside cultivation by the community and government	Maintenance of road side plantations
Forest (F)	Sundarban	Sundarban	Degrading	5 - 6 hours	Government	Habitation of various flora and fauna, and ecosystem balance	Fishing, firewood and honey collection	Tiger and crocodile danger
Local Forest (F)	Home Stead Trees Plantation	Around their Home	Good	1 – 2 minutes	Individually owned	For oxygen, shade during the summer, and protection from storms	Easy to utilize its resources	
Natural Irrigation Canal (M)	Fishing, boating, irrigation during rainy season	Around the village	Dead, full of silt	5 minutes - half an hour	Community and government		Clean river can add flora and fauna like in nature	Water becomes saline when tidal wave comes inland
Man-made Irrigation Canal (M)	For paddy farming		Deep tube wells by big farmers making irrigation canal themselves	10 minutes - 2 hours	Community	More greenery since two paddy growing seasons	Boro paddy grown under irrigation in rabi (winter) season to ensure food security. Cold and salt tolerant\ resilient varieties required	Only rich farmers are benefiting now
Pangachii Canal (F)		Gabgachhia	Functional	5 – 10 minutes	Natural	Source of water for daily use	Irrigation, fishing and boating	Dries up Jan-Mar and flooded 15-20 days during rainy season

Land cover class	Community determined land use	Location Names	Current state (quality)	Time to resource	Mgmt and ownership issues	Environmental Benefits	Opportunities	Limitations
Market (F)		Gabgachhia	Functional	10 minutes	Community		Easy for daily shopping	
Schools (F)	Gabagachhia Primary School, Girls School, Daibognyhati Bisheswor secondary, and Lady Institute	Gabgachhia and Daibognyhati	Functional	5 – 20 minutes	Government		Child education and vocational education for young women	Not enough teachers, no toilets, and lack of drinking water
Mosques (F)	Religion and guesthouse	Gabgachhia and Daibognyhati	Functional	5 – 20 minutes	Community		Prayer, religious value and guesthouse	

Male and female participants provided the following information on their community's resources, including infrastructure (building on Table 1).

Forest: Currently, there is no forest in or around this community. There are few fruit trees around the houses of the villagers. The only forest is the Sundarban, which is across the Panguchhi River and is a 5-6 hour journey by powerboat. Women mentioned that going into the forest is dangerous due to tigers and crocodiles. The community uses the forest as a source of honey, wood and fish.

Rivers: The three main rivers are Charamolla, Panguchhi and Bisakhali. Women participants mentioned the Panguchhi River is used for irrigation, fishing, boating, etc. All these rivers are very narrow, half full of silt, and lacking fish. The Mollechar River, which is 1-2 hours away, contains freshwater during the rainy season and 3-4 months after. The rest of the year the river is saline due to tidal waves. The participants mentioned that this river needs silt clearing and saline water management.

Canals: There is a small natural canal that is not of much use. Only some big farmers have deep tube wells that are used for boro rice paddy irrigation in the winter.

Farmlands: Farmlands are mainly for rice farming. The Food Security Indicator Survey showed 87% of households have less than one hectare of land and the remaining have more than a hectare. Only 40% of households are fully food secure and there are limited options for income generation on and off the farm. Only 56% of households earn cash income from on-farm employment while 17% receive cash income from off-farm employment and 35% earn cash income from small business and small trading activities. Only 60% of land farmers have shrimp ponds.

Sugarcane: It was being grown as a cash crop in the past, however this is decreasing due to increased soil salinity and erratic rainfall. There is no sugarcane industry around now. Farmers would like to grow sugarcane again if sufficient support is provided. More suitable and resilient varieties are needed for sugarcane production to be viable.

Horticulture and Nurseries: Few vegetables and fruit trees are grown in the village, with the exception of beans, brinjal, tomato, gourd, sesame, chilli, red amaranth, cabbage, mango, safeda and guava. Nurseries are found mainly only for mango, safeda, guava, coconut and beetle nut. Improvements are needed in soil and water management as well as condition-appropriate input development, such as high yielding, saline tolerant and submergible varieties.

Plantations: There are some plantation trees along some of the roads belonging to the government, however not all roads have this coverage even if there is potential. Farmers have very few trees in their household areas. It increases greenery and improves the environment, of which the Parishad (the local government) and the community are already aware. Activities like soil conservation can be tied up with the roadside tree plantation/orchard programs to improve the natural resources and the environment.

Ponds and Aquaculture: Most of the households have a small pond nearby. Ponds are not used for irrigation but are often used for drinking water or fish and shrimp production. There is a need for training in rainwater harvesting to increase available drinking water. Female participants mentioned they mainly use the ponds for fish rearing and washing clothes and utensils. There is only one community pond for aquaculture, located near the agricultural training center, and women mainly use it. The pond is also a source of drinking water for humans and animals. Production is constrained by lack of species diversity, increasing salinity, poor pond quality and erratic rainfall.

Poultry: Few birds are found in households and those present comprise standard breeds and are raised in the open. Farmers typically do not provide birds with feed. Yields are low and birds suffer due to disease and cold temperatures.

Livestock: Farmers mainly tend cows, sheep and goats at the household level. They reported low productivity due to lack of feed, fodder and support services. Poor breed quality is also an issue. Only 2-5% households reported doing it commercially largely do to lack of supply. Manure and fodder integration into soil could improve soil fertility and production.

Mosques: There are two mosques that are used for religious and social purposes: village mosque and big mosque. They are mainly used for prayers and religious functions. Occasionally they are also used for social occasions, events and announcements.

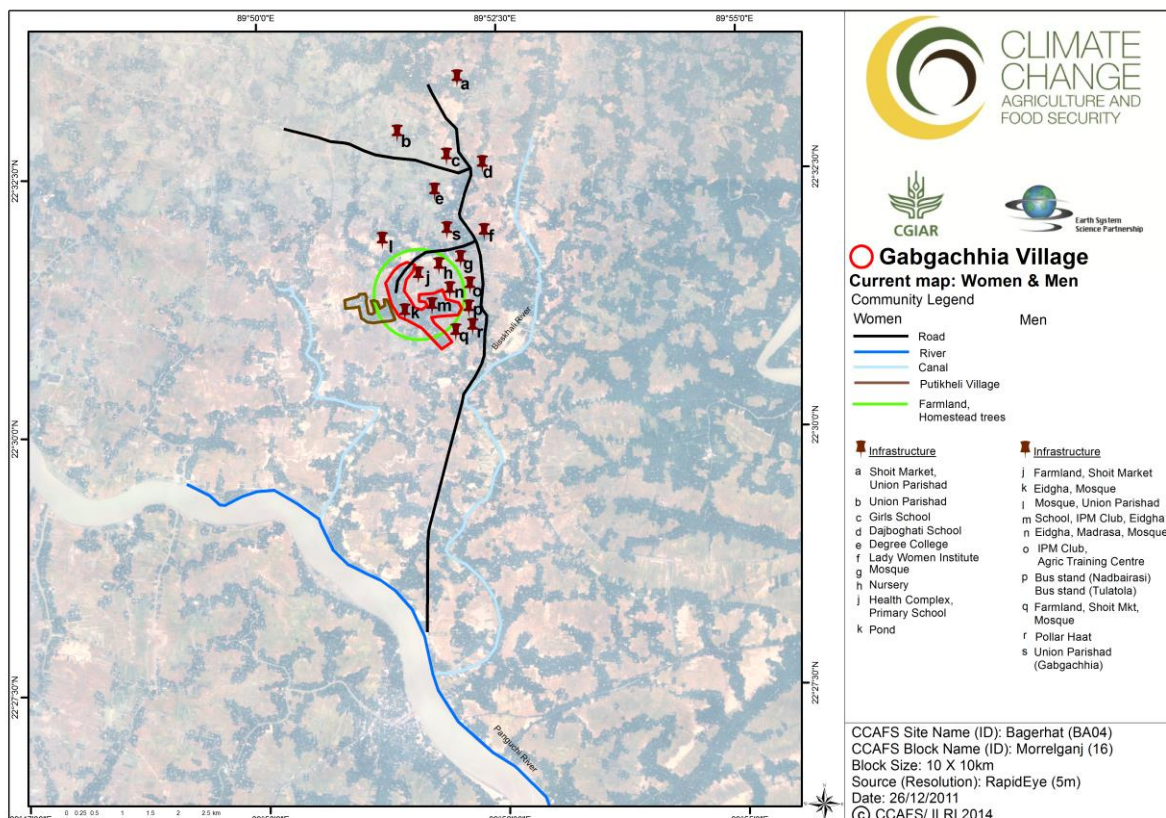
Bridges: The Pangachhi Canal and Daibognyhati Bridges are 10-20 minutes away. Farmers mentioned the easy access to other areas these bridges provide and that both are functional.

Market: Located in Gabgachhia village, which is 10 minutes away and used for daily shopping. The market is government supported and functional. Shops are individually owned. Participants did not report selling products in the markets.

B. Gender-differentiated comparison of current conditions

Men and women were both open with their input, however women were more reserved in front of the men and more vocal among only women. Men were generally more informed than women in many regards and were also largely literate while the majority of women are not. Women expressed more knowledge and concern about household and farming matters versus off-farm issues. Men were more focused on roads, transportation and off-farm income generation. Men also more clearly articulated challenges meeting their basic needs, including increasing lack of income opportunities and climate change impacts such as cyclones, sea level rise and increasing soil salinity. Both men and women identified many of the same resources, with men identifying more than the women. A key issue for both groups is the increasing salinity of farmland and the subsequent reduction in yields, particularly for rice. Sea level rise and its impact on inland farms and drinking water is a problem. Both groups also agreed that improvements are needed in the areas of education, health and income generation.

Map 4. Overlay of current conditions, comparing men's and women's maps

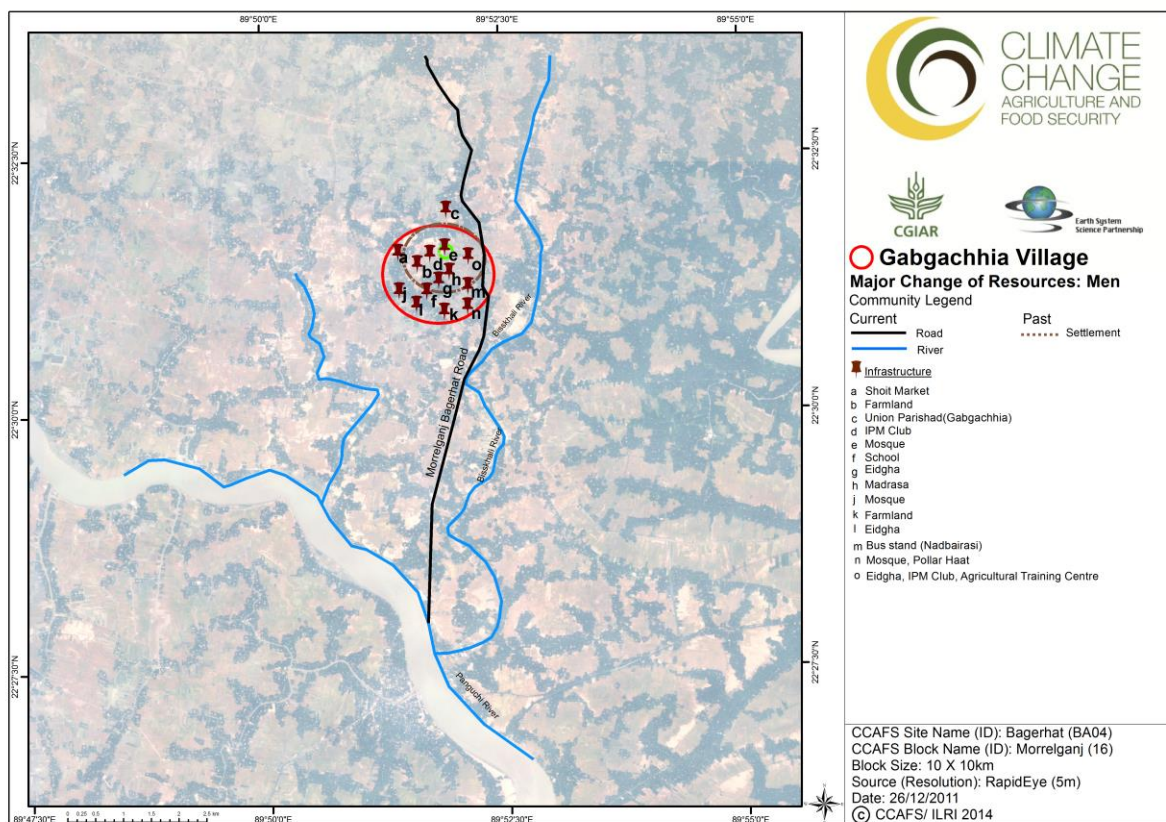


C. Major changes of resource conditions

Maps 5 and 6, and Table 2, show the most relevant changes in community resources as expressed by male and female participants. The community has seen dramatic changes in resources, as early as 1990, which they attribute to increased population pressures and climate change impacts. The immediate area used to have dense forests and mangroves but these no longer exist. Deforestation has

resulted in less available firewood and reductions in the number of bird and animal species. Sea level rise and soil erosion is a major concern for the population. The Sundarban also used to be more dense and full of diverse species. Examples of the abundance that used to be in the area include crocodile, fish, dolphin, monkey, fox, deer, pig, porcupine, snake, tortoise, wild cat, vulture, crane, wild dog, and owl. Both groups highlighted rising temperatures, increased salinity and cyclones as drivers of diverse impacts. Earlier the rainfall was more timely and the temperature more moderate. The availability of freshwater has also decreased and the rivers used to be an abundant source. Rivers used to be wide, clean, less silted and full of wildlife. Farmland also used to be more fertile but less organic matter, increased salinity and water issues have decreased food production. Land degradation was not a problem they encountered prior. Men recalled more details of the better climate and diversity of animal species that used to exist. They also noted more technical and social changes. Women reported more changes in the land, natural resources and infrastructure, such as a decrease in area grasslands and canals, improvements in schools, mosques and roads, times when farmlands were surrounded by forest, and decreasing freshwater availability.

Map 5. Major changes in resources (comparing past and present) for men



Map 6. Major changes in resources (comparing past and present) for women

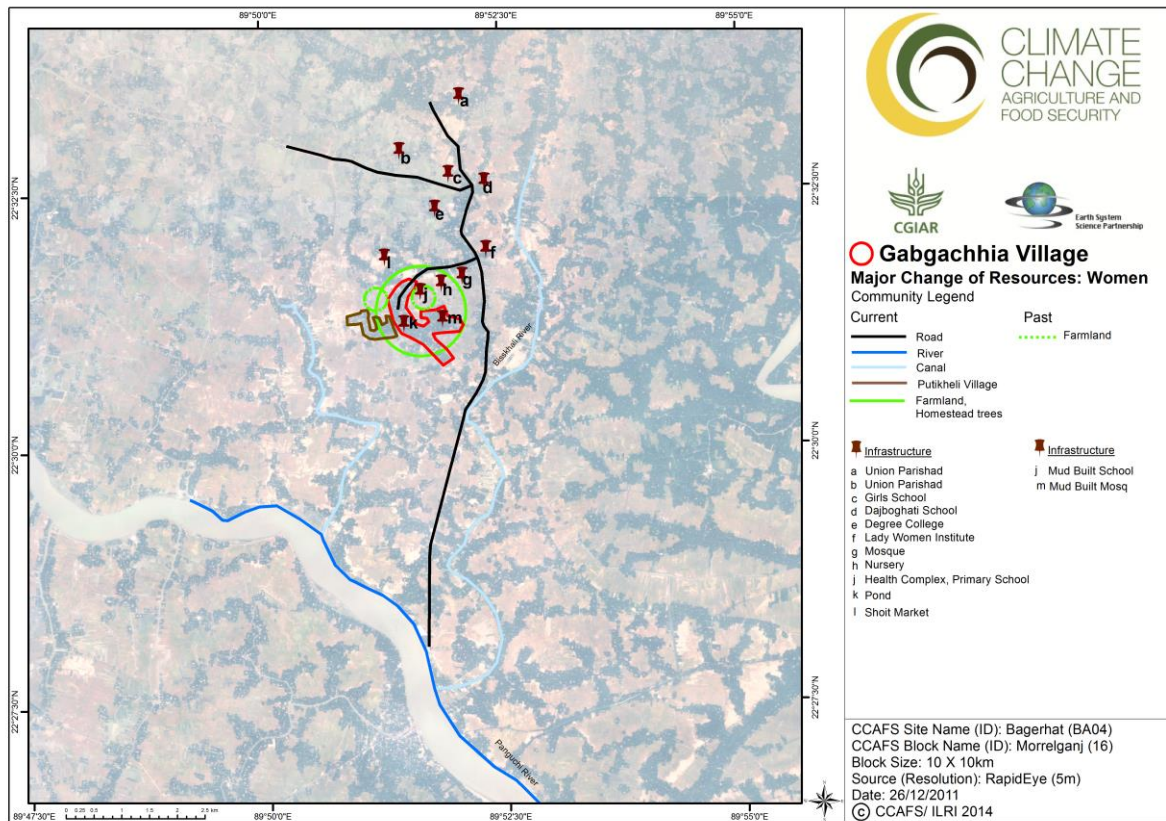


Table 2. Major changes and drivers of change in the last 10 years, as perceived by men (M) and women (F)

Land cover class	Past state (quality)	Drivers of change	Management and ownership issues	Environmental Benefits
Sundarban Forest (M&F)	It was rich in animals and birds. A dense natural forest having many species of trees	Human settlement encroachment and population growth as well as increased demand of farmland for food production. Deforestation and decrease in natural flora and fauna. Around 50% of degradation due to flood and other natural disasters	Government	It was a natural forest with natural land and water, free of pollution, and full of flora and fauna. Also provided ecosystem balance and livelihood resources
Grassland (F)	Good	Totally destroyed	Natural	Fodder and forage for livestock. Also provided fresh air
Rivers: Charamola, Panguchhi, Bisakhali and Molarzon (M&F)	All three rivers were very wide, clean, silt-free and natural, full of life. All common resource previously owned by the communities.	Climate change and manmade causes like unplanned settlement and road construction. Converted to small canal (Panguchhi canal)	Government	All the rivers were wide, clean and full of life such as fish, crocodile, dolphin, and all kinds of fish. Provided irrigation, water for daily purposes as well as, fishing and boating
Gabgachhia Primary School (F)	Mud built	Concrete building was built	Semi Government	Education
Roads (F)	Narrow and muddy	Wider and pitch	Government	Better mobility
Farmland (F)	Good	Decrease in size due to population increase and salinity in soil and water	Individual	Better production and source of food for livelihood

D. Vision of the future

With a mixed group of men and women, the goal was to develop an image of village resources and human wellbeing into 2030 to understand the opportunities and constraints, as well as aspirations for the future. This exercise built upon all the work completed in the previous sessions. In addition, the exercise took into account the photographs of the landscape, including things they are proud of and things that need to be improved upon in the future, that a group of young people had produced following instructions given on day 1. In the section below we include the map that encapsulates Gabgachhia village's vision of the future (Map 7). We also include a few of the photographs taken by the youth. These images operationalize the collective vision of the future.

The group's vision focused on addressing fundamental constraints faced by the community and was similar among men and women. Expanded income generating opportunities, means to address rising salinity, increased production and access to freshwater are core aspects of their vision for the future. With more nurseries and access to appropriate varieties better suited to local conditions, such as salt tolerant and submergible varieties, the village could improve yields, increase food security and expand income-generating opportunities. Opportunities beyond the farm were also seen as important for men and women were interested in starting women's groups. Both groups agreed that increased freshwater availability could be expanded by more rainwater harvesting for home consumption, improvement and rehabilitation of irrigation canals, and the establishment of a water purification plant in the village. Infrastructure improvements would also benefit the village, including cyclone shelters, a good road to the village, electricity, and improved health and education services. Government, NGO and private sector engagement were seen as important to achieve the community vision. The groups felt challenged in achieving their vision due to lack of opportunity, risk aversion, limited decision-making power by women and a continually changing environment.

Map 7. Future map of the community

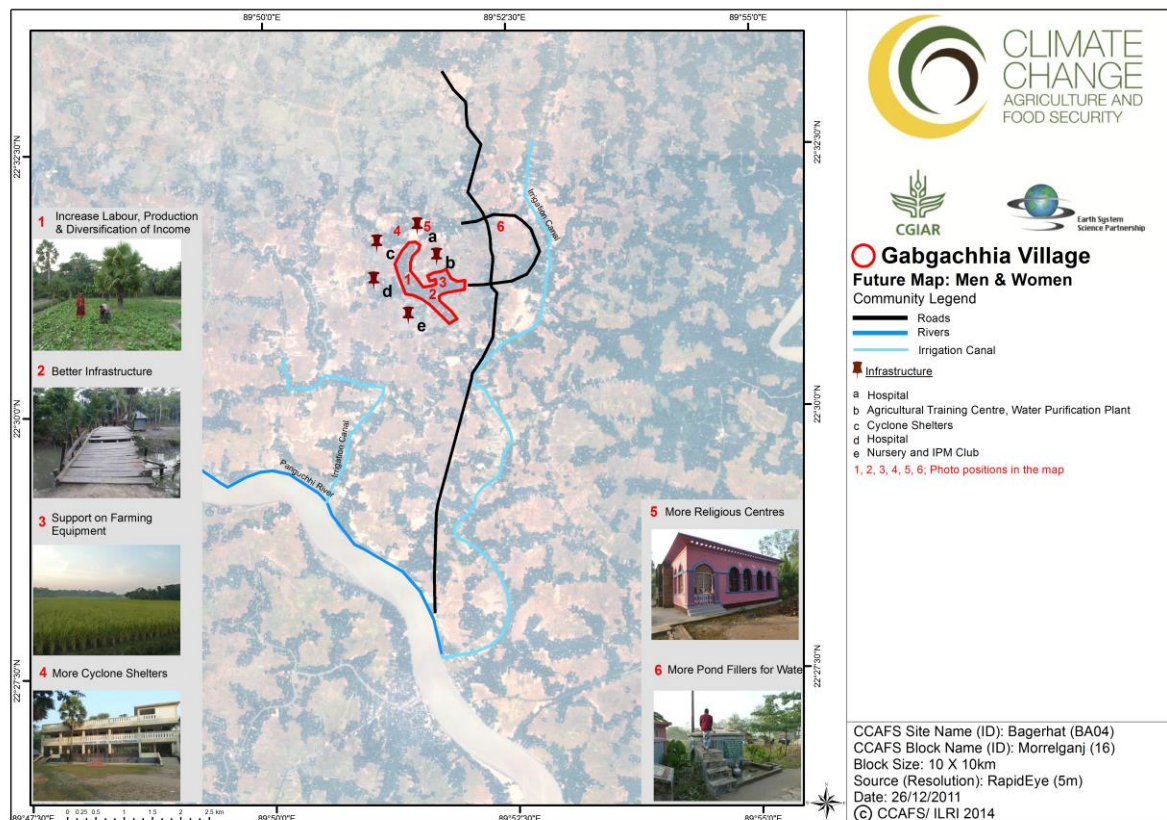


Table 3. Vision of the future

Resources	Preferred condition for 2030	Opportunities	Constraints	Organisations to involve
Improved Agro-forestry system	More trees in and around the village	Sufficient fodder, fruits and food for daily consumption and opportunities for income generation. More vegetation within village makes the surrounding area clean and provides shade during heat	There are not enough saplings and technical support	Government and NGOs
Nursery and IPM Club	More nurseries and an IPM club within the village	Availability of various kinds of tree saplings and IPM club will provide technical support for different kinds of diseases and pests as well as effective use of pesticides	Lack of sufficient nursery and IPM resources in village	Government and NGOs
Cyclone Shelters	Cemented cyclone shelters	Community will have shelter during cyclones, floods, storms and other climatic disasters	Financial support is lacking	Government and NGOs
Re-excavation of Canals	More well structured canals	An ample irrigation system will result in increased production and enhanced community food security		Government and NGOs
Water Purification Plant	Well structured water purification plant in village	Villagers will be able to get enough freshwater for drinking and won't have to continue drinking saline water	Lack of financial support	Government and NGOs
Electricity Facility	Village with good power supply	Villagers will be able to use different kinds of necessary electrical gadgets. Students can study at night	Lack of funds	Government and NGOs
Agricultural Training Center	Training institute that meets the needs of villagers	Villagers will have different technologies and there will be application of theoretical knowledge to practical work, which will be useful to develop the community and local capacity.	Lack of technical manpower and support	Government and NGOs
Road	Pitched Gabgachhia road	Ease travel as well as shipment of community products to market. Eliminate travel problems during rainy season	Lack of funds	Government and NGOs

Topic 2: Organisational landscapes

This topic aims to show evidence of organisational capacities that help address food security and manage resources. This will inform CCAFS about how prepared the village is to respond to the challenges envisaged as a consequence of climate change or other future challenges and to engage with CCAFS partners at a collective level.

Specifically, this section presents the different formal and informal organisations involved in the community in general terms, as well as with respect to food security in different situations (i.e. average and crisis conditions), and natural resources management (NRM). It also elaborates on what types of activities the organisations are engaged in, who their members are, whether the organisations are useful, etc.

A. Basic spheres of operation

Participants were asked to draw three large concentric circles on the ground. The inner circle would represent the community, the middle circle the locality and the outer circle beyond the locality. Participants were then asked to name organisations working in the area, whose names were written on cards, and place the cards in the appropriate circle. Thus, the group placed in the inner circle the cards of organisations that worked in the community, in the middle circle the cards of organisations operating in the locality, and in the outer circle those that operated beyond the locality. See Photo 2 for an example of the activity as carried out with the study participants. The results are shown in the diagrams that follow.

Based on this structure, the men identified 36 organisations in the village while the women identified 28. Both groups listed many of the same organizations and ranked the Mosque and Gabgachhia Primary School as their top two organizations. Other organizations of importance to women were a women's institute providing training in tailoring, hospitals and schools. Men cited the Grameen Bank and Dhaka Chittagong Garment Factory as their additional important organizations, given their opportunities for loans and employment. The groups broadly identified organizations focused on religion, education, health, income generation, training, loans, local governance, agriculture, fisheries, water and disasters. Organizations were well known and participants easily detailed their activities. An analysis of linkages within and between organizations showed high levels of vertical linkages within organizations. They tend to work strictly as per the instructions of their offices and limit their participation and cooperation with others accordingly. Horizontal linkages and coordination were found to be very poor, especially with other organizations engaged in similar activities within the same area. This lack of linkages is from the planning to implementation stages as organizations work independently following individual missions. In Tables 4 and 5, more detailed information is provided on the five most important organisations as they were ranked by the men's and women's groups.

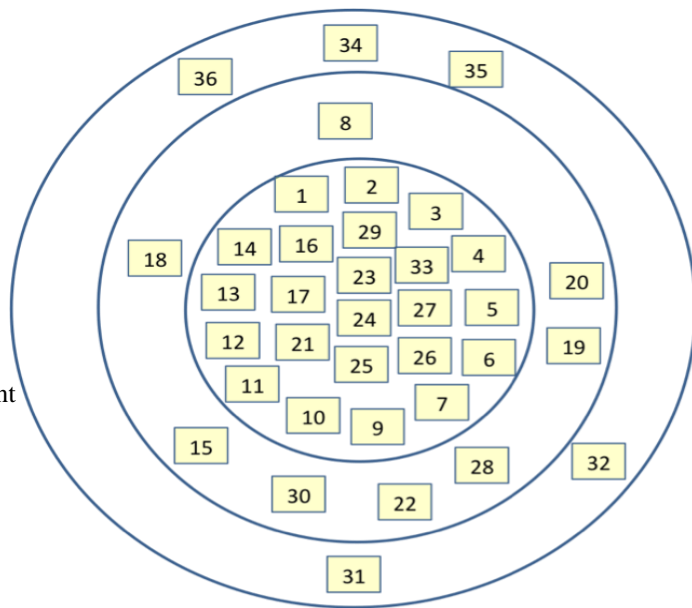
Photo 2. The organisational landscape activity in progress



Figure 1. Organisational landscape of the men's group

Legend

- 1 Gabgachhia Primary School
- 2 Bedkashi High School
- 3 Uttarputikhali Dakhil Madrasha
- 4 Mosques
- 5 Tulatola Agri Training Center for Women
- 6 Tulatola Eye Hospital
- 7 Union Parishad Complex
- 8 Morrelogonj Upazila Union Complex
- 9 Grameen Bank
- 10 Association of Social Advancement
- 11 BRAC
- 12 Uddipan
- 13 ASO Jiban Gari
- 14 Krishnachura
- 15 Social Welfare Office
- 16 BRAC Primary School
- 17 Community Clinic, Bedkashi
- 18 Agriculture Department
- 19 Fishery Department
- 20 Livestock Department
- 21 Darbakathi Hospital
- 22 Upajala Health Complex
- 23 Reva Audud Memorial Hospital
- 24 Union Information Training Center
- 25 Daibognyhati Boys-Girls College
- 26 Cyclone Center
- 27 Khalilur Rahman College

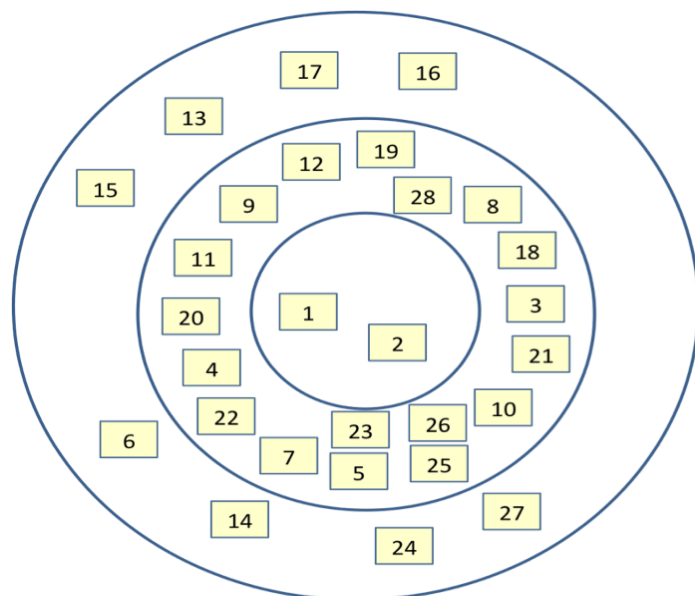


- 28 Local Govt. Engineering Dept
- 29 Relief Facility, Daibognyhati
- 30 Relief and Disaster Management Center
- 31 Bagerhat Court
- 32 Bagerhat District Hospital
- 33 Bagerhat PC College
- 34 Dhaka Chittagong Garment Factory
- 35 Bangladesh Water Development Board
- 36 Forest Department

Figure 2. Organisational landscape of the women's group

Legend

- 1 Mosque
- 2 Gabgachhia Primary School
- 3 Lady Institute
- 4 Government Health Complex
- 5 Lion general Eye Hospital
- 6 Government Hospital
- 7 Madarsa Masjid School
- 8 Telecom Office
- 9 Grameen Bank
- 10 BRAC
- 11 CODEC
- 12 ASA
- 13 Sonali Bank
- 14 Upazila Livestock Office
- 15 Islamic Bank
- 16 Fish Processing Zone
- 17 Agricultural Bank
- 18 ASOJIVONGORI
- 19 JUBOUNION
- 20 LGED
- 21 UDIPON
- 22 Livestock Health Centre
- 23 Upazila Fishery Office



- 24 Post Office
- 25 Jivan Bima (Life insurance)
- 26 Upazila Agriculture Office
- 27 Forestry Office
- 28 Local Government

Table 4. Information on the first five organisations ranked by the men

Organisation name	Main activities	Number of members (estimate)	Access (open or restricted to...)	Origin (indigenous, state, NGO, project)	Sphere of operation: community, local, beyond local	For community groups		
						Sources of funding (members, external, both)	Existed how long (less than 1 yr, 1-5, longer)	Formal or informal
1 Mosque	Religious values. Community funded (cash and in-kind) and owned	6 members in each Mosque. Only male members	Open	Indigenous	Community	Members and external	Longer	Informal
2 Gabgachhia Primary School	Used for teaching, social judgement and voting purposes	10 males and 3 females	Open	State	Community and local	External	Longer – Since 1989	Formal
3 Gramin bank at Amatola	Micro-credit/Loan for agriculture and all other purposes. Up to \$100 for poor. Ownership by 3000 members	Around 3000	Restricted to group members only	NGO	Community and beyond local	Members and external	Longer – Since 2000	Formal
4 Dhaka Chittagong Garment Factory	Garment production	500 workers	Open but some literacy required	Industry	Community and beyond local	External	Longer – Since 1987	Formal
5 Agriculture Training Center at Tulatola (aka Lady Institute)	Gives training in agriculture, fisheries, livestock, computers, tailoring and repairs (1300 trained already)	6 staff	Restricted to women only	State	Community and beyond local	External	Longer – Since 1997	Formal

Table 5. Information on the first five organisations ranked by the women

Organisation name	Main activities	Number of members (estimate)	Access (open or restricted to...)	Origin (indigenous, state, NGO, project)	Sphere of operation: community, local, beyond local	Sources of funding (members, external, both)	Existed how long (less than 1 yr, 1-5, longer)	Formal or informal
1 Mosque	Religious purpose, prayer, shelter during cyclones, and social meetings space	10-18	Restricted to men	Indigenous	Community	Members and external	Longer – Since 1972	Informal
2 Primary School	Education for children, shelter during cyclone, health camp and public meeting space. Provides free biscuits and books for children	10-12	Open	State	Community	External	Longer – Since 1972	Formal
3 Lady Institute (aka Agriculture Training Center at Tulatola)	All kinds of informal education for ladies as well as vocational trainings based on demand. Also provides financial aid, shelter, and food and clothing support to the villagers during disasters	22	Open	State	Local	External	Longer-Since 1996 (active since 2011)	Formal
4 Government Health Complex	Treatments of human diseases. Health facilities	NA	Open	State	Beyond local	External	Longer – Since 1972	Formal
5 Government Hospital	All types of medical treatment	NA	Open	State	Beyond local	External	Longer - Since 1971	Formal

B. Organisational landscape of food security

The goal of this exercise was to get an improved understanding of how the organisational landscape contributes to the food security of the group. Food security is mostly measured at the household level. Nonetheless, community-level organisations and interactions influence the food security of different groups within the community differently. Male and female participants were asked to discuss the concepts of food availability, access and utilization, and then review each organisation they had previously identified by asking which of them had activities that fell under these categories. Organizations identified by men and women are shown in Figures 3 and 4.

Several of the organizations identified by the groups were involved in food production and food security. Both male and female groups mentioned in detail the involvement of Gabgachhia Primary School, Mosque, Union Parishad, Agriculture Training Center for Women (Lady Institute), Department of Agriculture, Department of Livestock, Department of Fisheries, Bangladesh Rural Advancement Committee (BRAC), Community Development Centre (CODEC) and Grameen Bank in a range of ways to address these issues. Only women mentioned BRAC, the Association for Social Advancement (ASA), CODEC, Sonali Bank, and the fish-processing zone, while men only identified LGED and the Dhaka Chittagong Garment Factory. This was based on relevance to their lives and association. Linkages between the organizations and resources were also delineated. Almost all the linkages were found with Union Parishad, the lead and responsible local government organization with legal authority to coordinate all the development activities of the government and non-governmental organizations (NGOs) at the community level. All NGOs and stakeholders must make linkages and coordinate development activities with the Union Parishad, including and particularly during crisis periods. A summary of the major organizations involved in food security and their linkages is provided below.

- **Gabgachhia Primary School:** Supports nutrition through improved utilization and provides free biscuits to students. *Linkage:* Ministry of Education, Union Parishad and the community
- **Mosques:** Provides forum for information exchange on agriculture issues. *Linkage:* Union Parishad and community
- **Union Parishad:** Supports food security through improved availability and access via involvement in all production, distribution and exchange activities. Coordinates activities and manages government funds. Provides food and medicine during disasters. *Linkage:* All development work in the village. Funding
- **Agriculture Training Center for Women:** Also known as the Lady Institute. Involved in production, exchange, preferences, and improved utilization. Supports food aid, loans, vocational training, education on health and nutrition. *Linkage:* Community and Departments of Agriculture, Livestock and Fisheries
- **Department of Agriculture:** Involved in production, exchange, preferences, improved utilization and training in social safety and value. The local office provides production training, seeds and fertilizers, and input subsidies. *Linkage:* Government and farming communities. Funding
- **Department of Livestock:** Involved in production, exchange, preferences, improved utilization and training in social safety and value. The local office provides improved breeds, information, and medicine to support better production and income generation. *Linkage:* Government and farming communities. Funding
- **Department of Fisheries:** Involved in production, exchange, preferences, improved utilization and training in social safety and value. The local office provides free fingerlings, training on income generation through fish farming, aquaculture loans, and fish disease management advice. An area fish-processing zone supported by the government sells fish and provides jobs for men. *Linkage:* Government and farming communities. Funding

- **CODEC:** The NGO provides technical support for better crop, livestock and fish production. Also provides loans for business, farming, aquaculture and livestock as well as training on production of healthy crops and animal products. *Linkage:* Community
- **Grameen Bank and Others:** Involved in production, availability, affordability and allocation through loan provision and training in loan usage for farmers. The Agriculture Bank, Islamic Bank, Sonali Bank and ASA also provide loans and training on loan usage. *Linkage:* Funding
- **BRAC:** Technical support for improved crop production and livestock management as well as food aid during disasters. Also provides business and agriculture loans, free livestock and poultry to the needy and agriculture, health and sanitation training. *Linkage:* Community and funding

Figure 3. Organisational landscape of food security – men

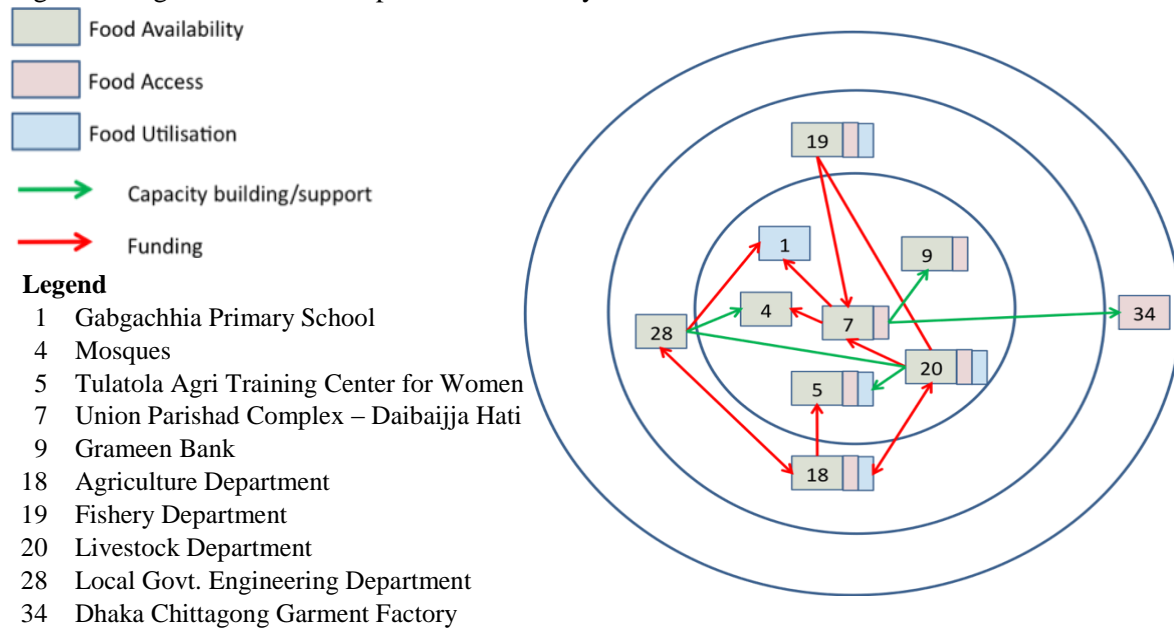
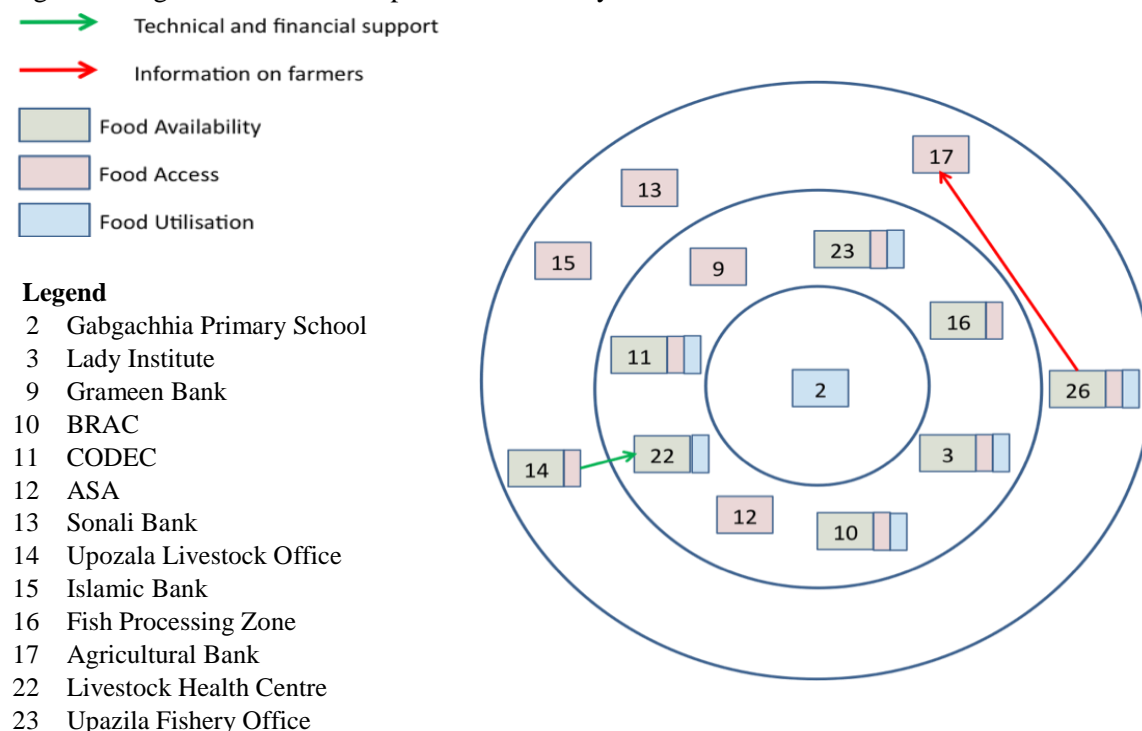


Figure 4. Organisational landscape of food security - women



C. Organisational landscape of food crisis situations

The purpose of this exercise was to understand how organisations help people to cope in times of food crisis. Participants identified a food crisis situation that they all remembered (e.g. a bad year or the lean season), and discussed how the organisational landscape of food security operated in that situation. The participants were asked to define a time when there was a food crisis in the community, identify the organisations that were involved in providing supporting during that period, and indicate their role in a graph. These results are shown in Figures 5 and 6.

Groups identified numerous famines and natural disasters that had impacted the community. Great famines were recalled in 1950 and after independence in 1973/74. The biggest cyclones were identified as Sidr in 2007 and Aila in 2009. Flooding was also a major problem in 1988 and 1998. Starting about 15-20 years ago the groups said increased soil salinity started to become a problem. During these periods food, resource and financial assistance often came in from government as well as local and international organizations. Organizations were cited as often working together on relief operations during crises. Groups also reported taking loans from relatives, friends and NGOs as well as relying on relief to cope during the disasters. In the minds of participants, food crises were tied to natural disasters and relief activities while the concept of food security was in relation to sufficient year round food production.

Women specified that the government, BRAC, ASA and the Lady Institute provided food, clothes, drinking water, medicine and financial support for home construction during crises. Women also noted that BRAC was involved in disaster preparedness training, CODEC provided tree saplings, poultry, livestock and machinery to the victims, and the Grameen Bank provided some financial support. Men reported that during crises the Union Parishad distributes and allocates relief material. Other organizational activities during disasters included the provision of loans by the Grameen Bank and inputs and technology provision by Departments of Agriculture Extension and Fisheries.

Figure 5. Organisational landscape for food crisis situations -men

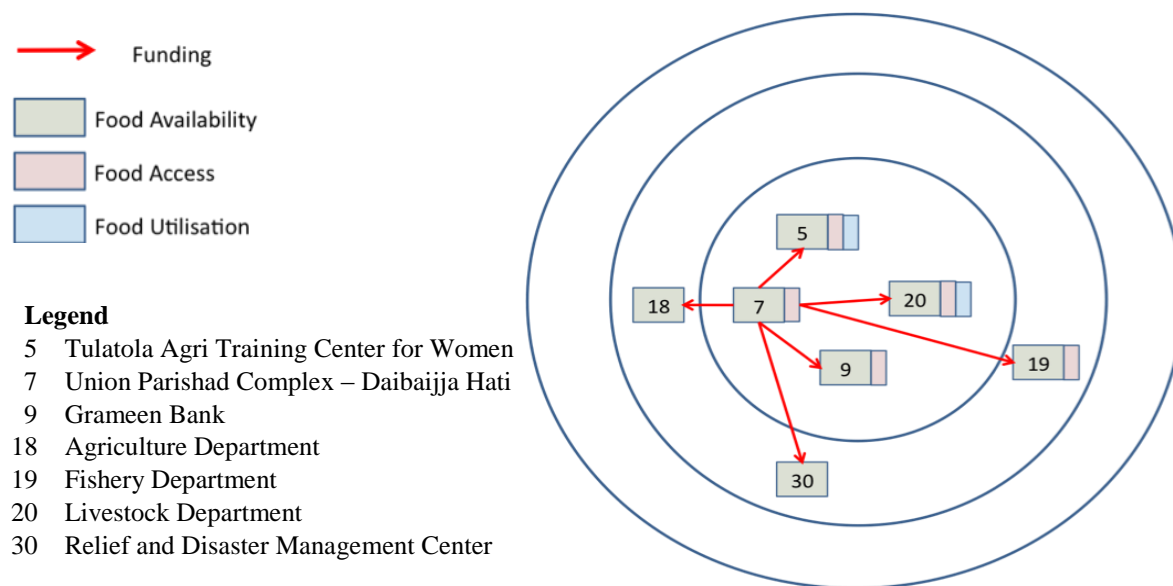
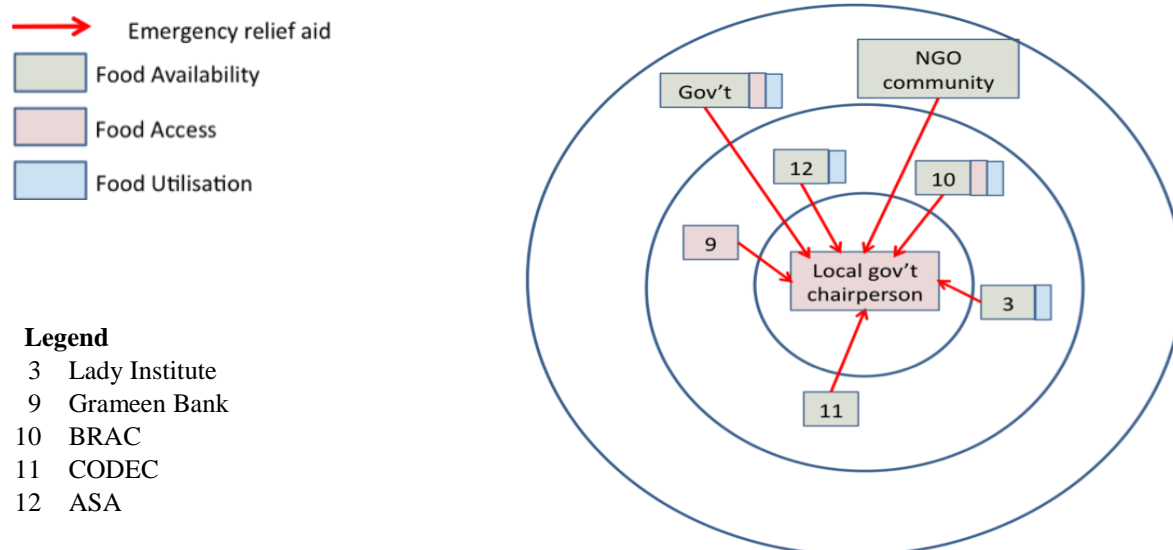


Figure 6. Organisational landscape for food crisis situations -women



D. Organisational landscape of natural resource management

In this section, the organisational landscape in relation to NRM is discussed. Specifically, what organisations were actively working to protect the environment, manage natural resources, etc.? The process entailed asking the group to highlight what organisations are involved in the management of natural resources in the community; developing a list of natural resources important to the livelihoods of the community; and asking the group to decide on a symbol for each type of natural resource listed.

The men's and women's group identified a total of 9 organizations supporting NRM, with both groups listing many of the same organizations. These NRM organizational landscapes are shown in Figures 7 and 8. The Bangladesh Water Development Board (BWDB) and the Bagerhat Forest Department were cited as the most active organizations working directly on NRM issues. The BWDB is focused on constructing dams, embankments, and sluice gates to control flooding as well as water, nursery and plantation development. The Forest Department focuses on forest protection and management, agroforestry, biodiversity and conservation training, and quality sapling production. The Union Parishad also coordinates all NRM related development activities, including canal and rural road construction. Other identified organizations address NRM in addition to other issues. BRAC, ASA, CODEC and the Lady Institute often provide NRM services such as aquaculture and agroforestry training as well as loans for income generation and tree saplings. The BWDB and the Forest Department work closely together, however groups noted other organizations had few linkages and work independently on different aspects of NRM.

Figure 7. Organisational landscape of natural resource management – men

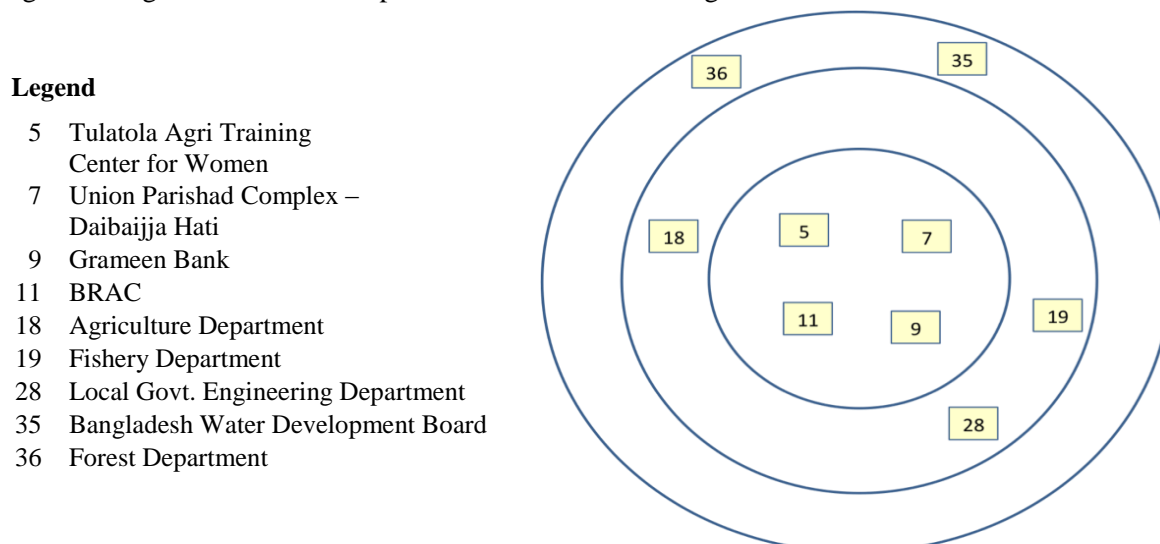


Figure 8. Organisational landscape of natural resource management – women

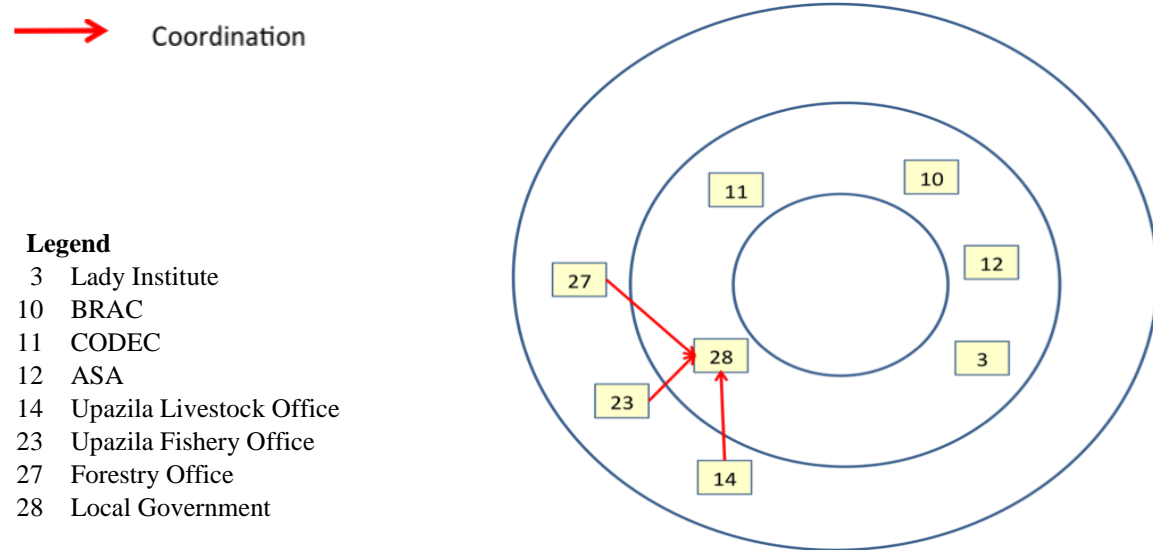


Table 6 below summarizes information on all the organisations identified separately by male and female participants. The organisations are classified according to their role in supporting food availability, access and/or utilization, as well as the provision of relief in times of food crisis, and the management of natural resources.

Table 6. Information on highlighted organisations of men and women (1=yes, 0=no)

Organisational Landscape		Men				Women				
Name of organisation	Org. ID by men	Sphere 1=Village 2=Locality 3=Beyond locality	Food security	Food crisis	NRM	Org. ID by women	Sphere 1=Village 2=Locality 3=Beyond locality	Food security	Food crisis	NRM
1. Gabgachhia Primary School	1	1	1	0	0	1	1	1	0	0
2. Bedkashi High School	1	1	0	0	0	0				
3. Uttarputikhali Dakhil Madrasha	1	1	0	0	0	1	2	0	0	0
4. Mosques	1	1	1	0	0	1	1	0	0	0
5. Tulatola Agriculture Training Center for Women (Lady Institute)	1	1	1	1	1	1	2	1	1	1
6. Tulatola Eye Hospital	1	1	0	0	0	1	2	0	0	0
7. Union Parishad Complex	1	1	1	1	1	1	2	0	0	1
8. Morrelogonj Upazila Union Complex	1	2	0	0	0	0				
9. Grameen Bank	1	1	1	1	1	1	2	1	1	0
10. Association of Social Advancement	1	1	0	0	0	1	2	1	1	1
11. BRAC	1	1	0	0	1	1	2	1	1	1
12. Uddipan	1	1	0	0	0	1	2	0	0	0
13. ASO Jiban Gari	1	1	0	0	0	0				
14. Krishnachura	1	1	0	0	0	0				
15. Social Welfare Office	1	2	0	0	0	0				
16. BRAC Primary School	1	1	0	0	0	0				
17. Community Clinic, Bedkashi	1	1	0	0	0	0				
18. Agriculture Department	1	2	1	1	1	1	2	1	0	0
19. Fishery Department	1	2	1	1	1	1	2	1	0	1
20. Livestock Department	1	2	1	1	0	1	3	1	0	1
21. Darbakathi Hospital	1	1	0	0	0	0				
22. Upazila Health Complex	1	2	0	0	0	1	2	0	0	0
23. Reva Audud Memorial Hospital	1	1	0	0	0	0				
24. Union Information Training Center	1	1	0	0	0	0				
25. Daibognyhati Boys-Girls College	1	1	0	0	0	0				
26. Cyclone Center	1	1	0	0	0	0				
27. Khalilur Rahman College	1	1	0	0	0	0				
28. Local Govt. Engineering Department	1	2	1	0	1	1	2	0	0	0
29. Relief Facility, Daibognyhati	1	1	0	0	0	0				
30. Relief and Disaster Management Center	1	2	0	1	0	0				

Organisational Landscape		Men				Women				
Name of organisation	Org. ID by men	Sphere 1=Village 2=Locality 3=Beyond locality	Food security	Food crisis	NRM	Org. ID by women	Sphere 1=Village 2=Locality 3=Beyond locality	Food security	Food crisis	NRM
31. Bagerhat Court	1	3	0	0	0	0				
32. Bagerhat District Hospital	1	3	0	0	0	1	3	0	0	0
33. Bagerhat PC College	1	1	0	0	0	0				
34. Dhaka Chittagong Garment Factory	1	3	1	0	0	0				
35. Bangladesh Water Development Board	1	3	0	0	1	0				
36. Forest Department	1	3	0	0	1	1	3	0	0	1
37. Telecom office	0					1	2	0	0	0
38. CODEC	0					1	2	1	1	1
39. Sonali Bank	0					1	3	1	0	0
40. Islamic Bank	0					1	3	1	0	0
41. Fish Processing Zone	0					1	3	1	0	0
42. Agricultural Bank	0					1	3	1	0	0
43. ASOJIVONGORI	0					1	2	0	0	0
44. JUBOUNION	0					1	2	0	0	0
45. Livestock Health Centre	0					1	2	1	0	0
46. Post Office	0					1	3	0	0	0
47. Jivan Bima (life insurance)	0					1	2	0	0	0
TOTALS	36	Village=23 Locality=8 Beyond locality=5	10	7	9	28	Village=2 Locality=18 Beyond locality=8	14	5	8

Topic 3: Information networks

The aim of this exercise was to understand the diversity of options people use for accessing information on agriculture and weather; how people take advantage of sources of information available, and if some sources are not used and why. We want to describe networks of how people access and share information within the community.

Men and women identified 11 sources of information that were used by both groups. The most popular sources of information for both groups were neighbours, friends or relatives, government and radio and television. Friends and neighbours were a common source of information about rainfall, temperature, natural disasters and agriculture. On an organisation level, sources of information for men and women had commonalities and differences. In some cases men and women used the same organizations for different types of information. For example women reported receiving aquaculture, livestock and poultry information from the village block and state government, while men cited these organizations as sources for rainfall, temperature and tidal information. The Mosque was also cited as an important community resource for accessing critical flood and cyclone information. Market information was not cited as a popular topic of inquiry among men or women.

Table 7. Sources of information for men and women (1=yes, 0=no)

Source	Topic (women)				Topic (men)						Total
	Weather	Agriculture	Livestock/ Poultry	Aquaculture	Weather	Markets	Natural Disaster	Agriculture	Temperature/ Rainfall	Flood/ Tides	
<i>Individual</i>											
Friends/relatives	1	1	1	1	1	1	1	0	1	1	9
Neighbour	1	1	1	1	1	1	1	1	1	1	10
Astrologist/priest	0	0	0	0	0	0	0	0	0	0	0
<i>Organisations</i>											
Agri. Dev. Office	1	1	0	0	0	0	0	1	0	0	3
Dairy	0	0	0	0	0	0	0	0	0	0	0
Block /State	1	0	1	1	1	0	1	1	0	1	7
Government	1	1	1	1	1	0	1	1	1	1	9
PACS	0	1	0	0	0	0	0	1	0	0	2
<i>Media</i>											
Radio/TV	1	1	1	1	1	1	1	1	1	1	10
<i>Others</i>											
Observation	1	0	0	0	0	0	0	0	1	0	2
Agro-vet	0	0	1	0	0	0	0	0	0	0	1
Trainings	1	1	1	0	0	0	0	1	0	0	4
Field visit/tour	0	0	0	0	0	0	0	0	0	0	0
Markets	1	0	1	1	0	0	0	0	0	0	3
Total	9	7	8	6	5	3	5	7	5	5	

Conclusion and recommendations

Gabgachhia village is located near the Sundarbans and several rivers in the coastal region of Bangladesh's Khulna district. As the population, natural disasters and climate variability have increased its resources have become strained. The village does not have a waterway but is well connected via a descent road. Bridges, schools, mosques, markets and health services are close to the community, however their conditions vary. Rice and fish are the traditional sources of food and some households are also growing fruits and vegetables for home consumption. A community fishpond currently provides some fish. Access to land is limited and farmers typically work off less than one hectare and do not produce enough to market excesses. Few villagers are raising poultry or livestock due to lack of resources, services and disease. Flooding, erosion and salinity are having significant impacts on production and the village does not have year round food security or good nutrition. The community has limited access to fresh water for irrigation, livestock and drinking from ponds and few wells. No safe water facility or electricity is available in the village. The rivers surrounding Gabgachhia have become overrun with silt and no longer support life. Deforestation has also reduced the surrounding forests. Combined with limited off-farm employment options, the village is poor and faces a rapidly declining environment on which they are dependent. In the lifetimes of many residents, the forest used to be more expansive and supported diverse natural resources, rivers were clean and an important source of fish and freshwater, and land was fertile and provided robust crops of rice. Erratic rainfall, sea level rise, flooding, more dramatic temperature variation and typhoons are having direct impacts on Gabgachhia's livelihoods and food security.

There are numerous organizations operating in and around Gabgachhia. Men identified 36 organisations in the village while the women identified 28. They include local and national government agencies, local and international NGOs, private sector entities, banks, mosques, schools and training institutes. The most important organizations among participants are the mosque and primary school. The local government is also core in providing and coordinating development services. The focuses of identified organizations vary and several address food and fish production, food security, access to finance, and capacity building on income generation, improved nutrition, water management, etc. The majority of these organizations are working in the village and in the locality, with fewer working beyond the locality. There is regular support from identified organizations as well as increased assistance during food crises, however it is not sufficient to meet needs and address the range of challenges faced by the village. During times of crisis, participants reported a shift in assistance to services focused on provision of food, clothing, drinking water, medicine and home construction. Resources are limited and coordination among organizations is poor, beyond linking with the local government as required. While several organizations were identified that focus on food related issues there were far fewer addressing NRM and infrastructure to protect and maintain the surrounding environment. Some organizations are supporting tree planting, environmental protection and canal repair.

The most popular sources of information for men and women are neighbours, friends or relatives, government and radio and television. Participants identified a total of 11 sources on information. Women reported sourcing the most information on the weather, followed by poultry/livestock, agriculture and aquaculture. Men sought information firstly on agriculture, followed weather and natural disasters, and ultimately markets. The Mosque was cited separately as an important source of flood and cyclone information. Market related information was the lowest ranked topic of information, which appears due more to lack of need rather than lack of resources. A range of sources provided information on several topics, with friends and neighbours being a common source of information about rainfall, temperature, natural disasters and agriculture. Men and women often cited the same source as a means for accessing different types of information depending on the group.

Implications for CCAFS

Future CCAFS work and that of other organizations will need to address improved technologies, resource conservation and management, sustainable production systems, and expansion of income

generating opportunities to improve the resiliency, food security and livelihoods of the Gabgachhia population.

In the last 20 years, Gabgachhia has seen the impact of climate change, population expansion, and poor natural resource management as the sea level rises, soil salinity increases, crops fail, climate variability and severity expands, and resources degrade and deplete, resulting in food insecurity and livelihood vulnerability for villagers. Without an expansion of efforts, Gabgachhia will continue to face a rapid decline that threatens the health and stability of the population. The needs of the village are numerous and each of critical importance. The increasing salinity and soils must be managed, more appropriate and resilient varieties made available, fresh water access expanded, off-farm employment opportunities increased, nutrition and sanitation improved, production systems for rice, vegetables, fish and livestock strengthened, and water management infrastructure developed. To meet these needs research, outreach, funding and coordination are key among government, NGO, private sector, international and other entities. While there are numerous organizations operating in and around Gabgachhia, the lack of linkages and resources limits their impact and effectiveness, given the immense challenges of this highly vulnerable region to climate change.

Among the organizations noted by the groups, those presented in Table 8 are of particular interest for CCAFS. Viable partner options are low and organizations face significant challenges in terms of resources and personnel. Given the implications for CCAFS and the identified challenges for Gabgachhia, Table 9 provides a summary of targeted recommendations based on opportunities.

Table 8. Potential CCAFS partners

ORGANISATION	SPHERE OF OPERATION	ACTIVITIES	STRENGTH
BRAC, CODEC and ASA	Village and locality	Loans and training	Microfinance, agriculture and livestock sector support
Gabgachhia Union Parishad	Village	Coordination and management	Engaged in wide range of community development and security activities
Department of Fisheries	Village and locality	Fisheries	Aquaculture
Department of Agriculture	Village and locality	Agriculture	Seeds, extension, and fruit and vegetable production.
Department of Livestock	Village and locality	Livestock	Poultry and livestock

Recommendations for major opportunities

Table 9. Recommendations for major opportunities

Gaps in knowledge/ current constraints that could provide opportunities/niches for CCAFS and partners	Opportunities for research (CCAFS)	Opportunities for Action Research (CCAFS partners)	Development Interventions (Partners)
1. Resilient rice and vegetable varieties to address flood and saline conditions	X	X	
2. Resource conservation technology expansion	X	X	
3. Mitigating and managing soil salinity	X	X	
4. Supporting climate friendly agricultural practices such as organic agriculture, roadside plantations, IPM and plant clinics, composting, bio-fertilization, etc.	X	X	

Gaps in knowledge/ current constraints that could provide opportunities/niches for CCAFS and partners	Opportunities for research (CCAFS)	Opportunities for Action Research (CCAFS partners)	Development Interventions (Partners)
5. Technology transfer	X		
6. Expand and upgrade current initiatives	X		
7. Support fresh water aquaculture resilience and sustainability	X		
8. Support seed sector development			X
9. Helping farmers in agriculture and NRM		X	
10. Action research and capacity development of the community		X	
11. Agro-processing and value addition		X	X
12. Improvement in drinking water situation		X	X
13. Market access, infrastructure and linkage expansion		X	X
14. Develop sanitation and hygiene facilities			X
15. Improve cooking and toilet facilities			X
16. Develop, equip and support local council on a long term basis in climate friendly interventions			X
17. Upgrade quality and facility in schools and plan for 2 new colleges in future			X
18. Upgrade and equip existing health facilities			X
19. Upgrade and repair seasonal canal facility			X
20. Develop nurseries for farmer private use and community road side plantations			X
21. Construct and equip multipurpose shelters			X
22. Encourage agriculture, livestock and fish production			X
23. Support river clean-up and sustainable usage			X