

# Baseline Study Report

## Adaptation in Ecologically Critical Areas in Bangladesh (AECAB)

November 2024



*NABAPALLAB, a consortium led by CARE in partnership with*

# **Baseline Survey Report**

Adaptation in Ecologically Critical Areas in Bangladesh (AECAB)

Nature Based Adaptation towards Prosperous and Adept Lives & Livelihoods in Bangladesh (NABAPALLAB/ নবপল্লব)

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# Table of Contents

<b>Acronyms</b> .....	<b>3</b>
<b>Executive Summary</b> .....	<b>4</b>
<b>1 Background and Introduction</b> .....	<b>8</b>
1.1 The Objectives of the Baseline Study .....	8
1.2 Purpose and Scope .....	9
<b>2 Methodology</b> .....	<b>9</b>
2.1 Limitations of the Study .....	11
<b>3 Key Findings and Analysis</b> .....	<b>12</b>
3.1 Demographic and Socio-economic Conditions .....	12
3.1.1 Occupational Patterns, Income and Expenditure .....	14
3.1.2 Land Ownership Patterns.....	15
3.1.3 Household Annual Income .....	15
3.1.4 Household Annual Expenditure .....	16
3.2 Dependency on Ecosystems & Awareness about LLA and NbS .....	17
3.2.1 Awareness about LLA and NBS .....	17
3.3 Participation in Institutions and Climate-relevant Decision-making Processes .....	18
3.4 Engagement of LGIs and Actors in NABAPALLAB.....	19
3.5 Impact of Climate Change on Livelihood and Coping Strategies .....	20
3.6 Climate Resilient Livelihoods .....	21
3.7 Decision-Making on Agricultural Production and Household Economic Decision and Gender Inclusion .....	23
3.8 Access to Clean and Renewable Energy .....	25
3.9 Drinking Water and WaSH Facilities .....	26
3.10 Climate Resilient Infrastructures (Housing and Community Infrastructure) .....	28
3.11 Access to Climate Information and Early Warning.....	30
<b>4 Appropriateness of Theory of Change (ToC) and Assumptions</b> .....	<b>31</b>
<b>5 Conclusion and Recommendations</b> .....	<b>32</b>

## Acronyms

BFD	Bangladesh Forest Department
BREB	Bangladesh Rural Electrification Board
CBOs	Community-Based Organisations
CFMC	Collaborative Forest Management Committee
CPG	Community Patrol Groups
CSOs	Civil Society Organizations
DAE	Department of Agricultural Extension
DLS	Department of Livestock Services
DoE	Department of Environment
DoF	Department of Fisheries
DPHE	Department of Public Health Engineering
DRR	Disaster Risk Reduction
DWA	Department of Women Affairs
EbA	Ecosystem-based Adaptation
ECAs	Ecologically Critical Areas
ESS	Ecosystem Services
EWS	Early Warning System
FGDs	Focus Group Discussions
HH	Household
ICF	International Climate Finance
ICS	Improved Cook Stoves
KIIs	Key Informant Interviews
KPI	Key Performance Indicator
LGI	Local Government Institute
LLA	Locally Led Adaptation
LPG	Liquefied Petroleum Gas
NbS	Nature-based Solutions
NGOs	Non-Governmental Organisations
NR	Natural Resource
NTFP	Non-Timber Forest Product
PDB	Power Development Board
PEA	Political Economy Analysis
PIO	Project Implementation Officer
PSF	Pond Sand Filters
RWHS	Rainwater Harvesting System
SLR	Sea Level Rise
ToC	Theory of Change
UNO	Upazila Nirbahi Officer
VCF	Village Conservation Forums
VCG	Village Conservation Group
WASH	Water, Sanitation, and Hygiene

## Executive Summary

The Ecologically Critical Areas (ECAs) of Bangladesh, especially the Sundarbans and Hakaluki Haor natural resources and biodiversity are crucial for the ECA dependent communities. However, these ecosystems are experiencing many challenges due to human activities, economic pressure, poor governance and adverse effects of climate change. These factors disproportionately affect marginalised groups, including women, persons with disabilities, and ethnic communities in the two ECAs. In response to these challenges, the NABAPALLAB project, supported by the UK Government, aims to improve ecosystem-based protection and restoration and increase climate resilience of ECA dependent communities in the Sundarbans and Hakaluki Haor ECAs. During the inception period, the project has conducted three studies simultaneously: i) An Ecological Assessment and Detailed Scoping Study, ii) Political Economy Analysis, and iii) Baseline Study.

The baseline study serves to establish pre-project conditions, providing essential data for monitoring, evaluation, and learning. It aims to capture baseline data for outcome indicators, disaggregated by sex, disability, and geography, and validate assumptions mentioned in the project's Theory of Change (ToC).

The study scope encompasses:

- Socio-economic conditions
- Climate change perceptions
- Awareness of ecosystem-based adaptation (EbA)
- Locally led adaptation (LLA)
- Nature-based solutions (NbS)
- The current status of project intervention areas.

### Methodology

The study has applied a mixed approach, integrating quantitative and qualitative approaches by incorporating household surveys (2622 household), Focused Group Discussions (FGDs) (2506 participants) and Key Informant Interviews (KIIs) (137 respondents). A multi-stage cluster sampling approach was applied to select the sampled households, while diverse community members and stakeholders were engaged through FGD and KII that provided comprehensive insights into local contexts, baseline situation and the needs of the communities in the six intervention areas of the project.

### Key findings

#### **1. There are high levels of poverty, landlessness, and climate vulnerability among target communities in both ECAs.**

- Food is by far the highest expenditure for households - demonstrating a high proportion of expenditure is simply meeting basic needs.
- It is also the case that a relatively high proportion of expenditure is used on the servicing of debt, again demonstrating the impacts for poor households on having to use debt as a coping mechanism.
- Borrowing money and cutting expenditure are by far the most used coping strategies, with reliance on savings and migration also prevalent.

- 28% of households in the ECA are landless, while 72% possess land, averaging 5.58 decimals.<sup>1</sup> In the Sundarbans ECA, the average landholding is 6.85 decimals, and in Hakaluki ECA, it is 4.18 decimals. This land is used for various purposes, including housing, agriculture, homestead gardening, cattle raising, and fish culture.
- 2. Climate-induced disasters severely impact livelihoods and natural resources, with limited awareness of EbA, LLA, and NbS approaches.**
- Household surveys reveal that around 91% of respondents were affected by climate hazards and disasters like floods, drought and cyclones in the last 5 years. FGDs participants also highlighted that the vulnerability of the communities is high due to the location of their settlement in a fragile area, with poor infrastructure, climate sensitive livelihoods and lack of access to government Social Safety Net (SSN) services and support.
  - Among the households, 32% have incurred loss of income and 23% loss of livelihoods. Over 17% of the respondents mentioned that climate change has increased health risks and medical expenditures in recent years.
  - In contrast to relatively high levels of negative coping mechanisms (e.g. borrowing money, or cutting expenditure), few households engaged in planned adaptation i.e. changing livelihood options, diversification of crops, changing types of crops.
  - The survey results revealed that 94% of the ECAs respondents do not know about LLA and NbS, suggesting considerable scope to work with communities to increase their understanding of these key issues.
- 3. Access to climate information has been inadequate and there has been a low degree of anticipatory action.**
- The survey revealed a low level of information on climate change and a lack of access to important climate information. The survey reveals that overall, 66% of the respondents do not know about the Early Warning System (EWS), around 23% have not received any early warning on floods, and only 11% got some early warning during the floods in the last five years
  - When asked if they take measures to strengthen their household infrastructure before local climatic hazards, approximately 57% of respondents in the ECAs reported that they do not take such measures.
- 4. Access to clean and renewable energy, safe drinking water, and sanitation is inadequate, particularly among vulnerable groups including poor women and ethnic minority communities.**
- 97% of surveyed households have access to grid electricity in the ECAs, with 5.3% using solar energy and 0.2% relying on biogas. However, the grid electricity supply is unreliable, with about 63% of these households experiencing load shedding for more than 4 hours daily.
  - There is also a significant reliance on traditional fuels (i.e. wood, twigs, cow dung, kerosine etc.) which is likely to have an impact on the broader sustainability of ECAs.
  - 41% of respondents collect drinking water from tube wells, followed by Rainwater Harvesting System (RWHS) (22%), pond and dug wells (17%).
  - Around 67% of the respondents use pit latrines with ring slabs (a type of improved sanitary latrine), whereas 20% use pit latrines without slabs.
- 5. Despite some positive trends in joint economic decision-making, women were not systematically included in decision-making around agricultural production.**

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<sup>1</sup> A decimal is one hundredth of an acre of land and is equal to 48.4 square yards or 435.6 square feet (40.47 m<sup>2</sup>).

- In key measures women appeared to have moderate levels of inclusion in household decisions. Participation in decision-making on household purchases the surveys demonstrated that on average, across both regions, 68.1% reported having moderate or high levels of participation in these decisions.
- Nearly three-quarters of the female respondents lacked the right to participate in decision-making in agricultural decision-making. Most female respondents in both regions (around 70.6% - 79.1%) did not share decision-making with their husbands about agricultural land use.

**6. There is little engagement of LGIs in conservation of natural resources, promoting resilient livelihoods. Participation of the community in formal and informal institutions is low.**

- Around 93% of ECAs respondents reported that they have no membership and affiliation with the local conservation committees and groups such as Community Patrol Groups (CPG) or Village Conservation Forums (VCF). About 96% of the ECAs respondents have no participation in the decision-making of the Local Government Institutions (LGIs). Participation of vulnerable groups in decision-making is higher (10%) in the Sundarbans ECA than that of Hakaluki Haor (0.2% only).
- The participation of the study population in formal (government-led) and informal (civil society-led, private sector-led) climate-relevant decision-making spaces is also very low in the ECAs. About 6% of the households' members participated in the decision-making spaces where 98% were male. The project must put more emphasis on the empowerment of people living in poverty and women for their effective participation in local decision processes that may benefit people living in poverty and women for adaptation and resilience building.
- Whilst community members felt that local authorities and committees had an important role to play in supporting farmers and forest-dependent communities, this support is currently inadequate due to constraints like insufficient human resources and capacity.

### Recommendations

People living in poverty, women, persons with disability and marginalised communities are most vulnerable to multiple disasters and their impacts. Further, lack of awareness, ability and motivation as well as lack of capacity and institutional support limit their adaptive capacity. Hence, increased awareness combined with strengthened capacity and institutional support for LLA, NbS, EbA, renewable energy, Water Sanitation and Hygiene (WaSH), resilient infrastructure and livelihoods, is expected to reduce risk and vulnerability. Empowerment of women with decision power, effective participation and raising voice at different forums may advance adaptation, mitigation and resilience at household, community and sub-national level.

Overall, the barriers and assumptions of the NABAPALLAB ToC were found valid for implementation without any modification. However, the study suggested adding some new custom indicators for measuring the market system development and NbS activities in both ECAs. It also provides critical information and insights into the socio-economic and climatic challenges facing communities in the Sundarbans and Hakaluki Haor ECAs. By addressing these challenges and implementing targeted interventions, the NABAPALLAB project could certainly foster community and ecological resilience to climate change, protect biodiversity, and improve the livelihoods of natural resources dependent communities, and thus ultimately contribute to achieving the National Adaptation Plan (NAP), Climate Change and Gender Action Plan (BccGAP), Nationally Determined Contributions (NDC) and Sustainable Development Goals (SDGs).

The baseline provides clear evidence to support key aspects of the ToC and highlights some specific areas where the project should concentrate efforts:

- 1. Ensure enhanced inclusion activities where women, people with disabilities, and other marginalized groups are most excluded:** Whilst there are areas of intrahousehold decision-making where women report moderate or high levels of participation it is the case that in many areas the participation of vulnerable and marginalised people, including women, is lacking. This is particularly true in terms of participation in agricultural decision-making and in terms of meaningful participation in community structures. The project must ensure that work in these areas deliberately works to ensure that women and other marginalised groups are not only present in decision-making forums but that they have the skills and power to meaningfully participate. This will likely mean not only working on the agency of women but also focusing on the relational and structural aspects of existing structures that currently prevent meaningful participation.
- 2. Strengthening local institutions' capacity for local climate actions and natural resource conservation:** Whilst there is a desire for local authorities to perform a function supporting climate action and natural resource conservation, qualitative evidence suggests a low level of resource to be able to fulfil this need. The project should work to make sure that it addresses the barriers to local institutions work and support system strengthening that is also gender aware. In addition, the project needs to focus on coordination with Local Government Institute, NGOs, ECA management committees, different conservation groups to develop ownership of protecting ECAs.
- 3. Enhancing climate information dissemination:** It is evident that some early warning information is available in both ECAs, but these often do not reach vulnerable communities. Therefore, the project should facilitate greater access of people to early warning and climate related information, to ensure for climate resilient agricultural practice, WaSH, infrastructure and livelihoods. CARE and the consortium partners should design climate information services (CIS) in such a way that women, persons with disabilities and socially marginalized groups are included.
- 4. Improving energy, water and sanitation infrastructure:** Communities mostly depend on traditional and captive energy (electricity) for cooking and lighting. There is a huge scope for using renewable energy like solar and biogas for both domestic and commercial purposes for expanding livelihood options. The baseline study identified the need to expand Rainwater Harvesting Systems (RWHS), water purification systems etc. at household and community level. The sanitation infrastructure includes single and twin pit latrines that should be accessible for the person with disabilities as well. Issues around energy are twofold: There is a need to ensure an understanding of how load shedding, and the reliability of the energy supply is affecting communities, particularly livelihoods perspective. It is also the case that the reliance on traditional fuels is likely to have a broader impact on sustainability within the ECAs. It is therefore recommended that cooking fuels are considered both from an energy perspective but also as a potential threat to broader work on conserving and supporting ECAs. However, the project will increase opportunities for vulnerable communities that help to reduce the loss of households' livelihoods by prioritising support for alternative sources of income and increasing uptake of crop diversity, specifically climate adaptive crops. In addition, the project will increase access to safe drinking water (particularly in the Sundarbans), sustainable energy sources and infrastructure – looking at cost-effective and self-sufficient approaches to do this well.



# 1 Background and Introduction

The Ecologically Critical Areas (ECAs) in Bangladesh including the Sundarbans and the Hakaluki Haor ECAs have been rich in natural resources and biodiversity. Many people living in and around the ECAs depend on natural resources and Ecosystem Services (ESS) for their employment, income, food, nutrition, traditional health seeking and livelihoods. But there are tremendous human pressures, uncontrolled market forces, institutional weakness, lack of regulation by the authority and agro-ecological pollution is affecting the resource base, compactness and productivity of the ecosystems.

The rapidly changing climate and the climatic disasters are affecting both the natural resources and livelihoods, particularly of natural resource dependent communities, women, persons with disabilities and the ethnic groups living in and around the ECAs. Hence, there is urgent need for protection, conservation and restoration of ecosystems and the ESS could be harnessed and utilised for enhancing resilient livelihoods and adaptation to climate change impacts by the most underserved and vulnerable communities<sup>2</sup>.

The UK Government funded NABAPALLAB project's goal is to improve ecosystem-based protection and restoration and increase climate resilience of the Sundarbans and Hakaluki Haor ECAs. To achieve this goal, the project has conducted three separate assessments/studies simultaneously at its inception stage. The three assessments/studies are: i) An Ecological Assessment and Detailed Scoping Study, ii) Political Economy Analysis (PEA), and iii) A Baseline Study. The cumulative results of these studies will:

- I. Inform ecological status of the two ECAs, including their interplay with climate change and people dependent on them,
- II. Design the best fit interventions to achieve the project objectives,
- III. Develop a policy advocacy and stakeholder engagement plan, and
- IV. Develop the results framework and M&E tools<sup>3</sup>.

## 1.1 The Objectives of the Baseline Study

The baseline study has two overall objectives:

- **Capture baseline data:** The baseline study has been conducted to establish a foundational understanding of the pre-project conditions, which will serve as a benchmark for future evaluations. Primary data was carefully gathered at the household and community levels, focusing on outcomes and output indicators in line with the International Climate Finance (ICF) methodology and guidelines. The baseline captured data for the selected outcome and output indicators, including ICF Key Performance Indicators (KPIs) with disaggregation of sex, age, disability data (collected through Washington Group Questions) and geographic locations. These values serve as benchmarks for monitoring and evaluation efforts to measure the effectiveness and impact of project interventions.
- **Identify and validate the assumptions and barriers mentioned in the ToC:** The report also validates assumptions in the project's Theory of Change (ToC), review outcome and output level indicators aiding in finalising the programme interventions and logframe. The findings will guide project team to review the interventions and contributing to upgrading the programme logframe. The study's findings would be shared with key stakeholders, including government line departments, the private sectors, academia, community representatives, and partners.

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<sup>2</sup> CARE Inc., (2022): FCDO's Ecosystem-Based Adaptation in Ecologically Critical Areas of Bangladesh, VIP Road, Mohakhali, Dhaka

<sup>3</sup> CARE Inc., et al (2023): ToR on Ecological Assessment and Detailed Scoping Study in the Sundarbans and Hakaluki Haor ECA for NbS and LLA

## 1.2 Purpose and Scope

- Collecting data at household and other stakeholder for outcome and output indicators, disaggregated by sex (male, female, other), person with disabilities, vulnerable groups (ethnic, tiger widow, migrants) and geographies (Sundarbans and Hakaluki Haor).
- Capturing data for ICF indicators with a clear ICF methodology and guidelines. Identifying the risk related to proposed programme intervention and validating the assumptions and barriers mentioned in the ToC.
- Reviewing /updating the outcome and output level indicators, ToC and intervention strategies, if required.
- Sharing the baseline study findings with relevant stakeholders including BHC Dhaka, relevant Government line departments, private sectors, academia, community representatives and partners.

**Expected outputs/Deliverables:** This baseline study findings will help to finalise the results framework, MEL Plan, tools, and deliver a comprehensive baseline report.

## 2 Methodology

The study has applied a mixed approach combining both quantitative and qualitative methods to collect data through semi-structured household interviews, Focused Group Discussions (FGD), and Key Informant Interviews (KII). The study tools were designed to capture the views, experience, knowledge, insights and perspectives of the vulnerable communities, and stakeholders.

The study followed the following steps to ensure quality, appropriateness, relevance and coherence of the tools developed and methods used:

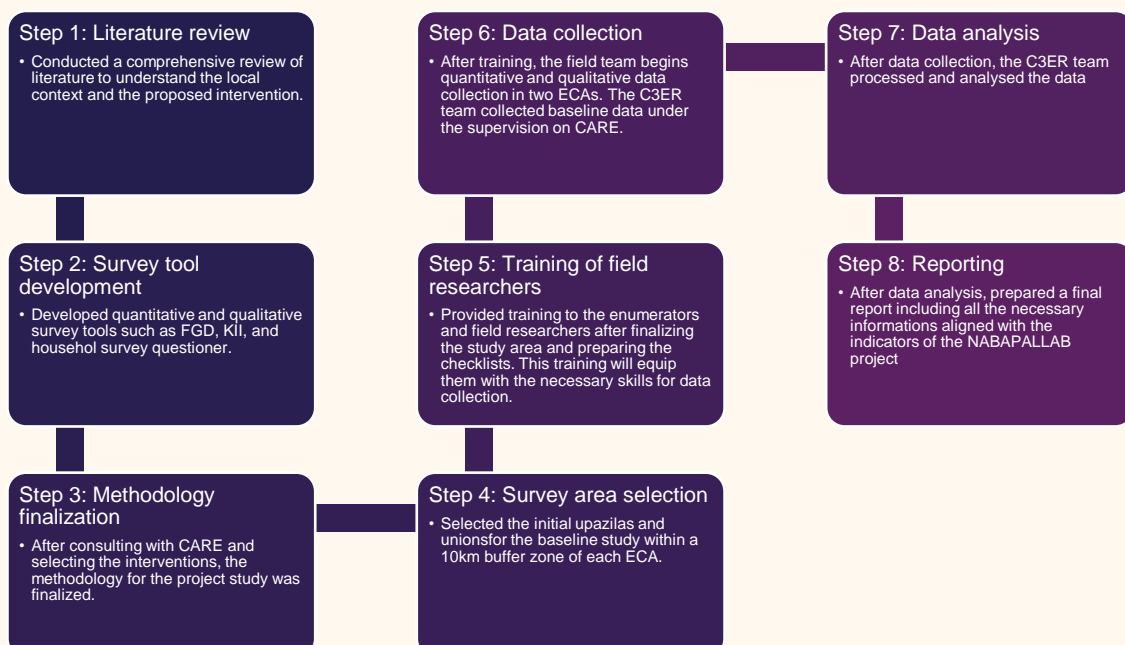


Figure 1: Key Steps of the Baseline Study

A multi-stage cluster sampling approach was employed for the household survey. The right-hand rule<sup>4</sup> was used for household selection within identified vulnerable areas, and the selection criteria ensured that the sample was representative of the communities within a 10 km buffer zone and adjacent to ECAs. Sample size was calculated using the following formula:

$$N = \frac{Z_{\alpha/2} \times P \times (1 - P) \times D}{E^2}$$

Where,

N = Sample Size

P = proportion of the population

E = margin of error = 0.05

D = Design Effect, considering the multi-stage cluster sampling it's 3.1

$Z_{\alpha/2}$  = 1.96 for a 95% confidence interval

$Z_{\alpha/2}$  =

Households' dependent on ECA resources, economically disadvantaged households<sup>5</sup>, women-headed households, households with persons with disabilities, and ethnic communities affected by climate change were included in the study. A total of 2622 households were interviewed as per the study plan. As per the ToR the baseline study was conducted from January to February 2024. Please see the sample size by two ECAs and adjacent areas in the **following table 1**:

*Table 1: Sample distribution by ECAs*

ECA Name	ECA Number	Adjacent ECA Number	Total
<b>Hakaluki Haor</b>	1041	208	1249
<b>Sundarbans</b>	1144	229	1373
<b>Total</b>	2185	437	2622

The households for survey were distributed at the district, Upazila, Union and village level. Finally, three categories of households i.e., male headed, female headed and ethnic community of economically disadvantage groups were selected from the study villages. It should be noted that ethnic community for the survey could not be found in all the study districts. Please see the following sampling framework in **figure 2**.

<sup>4</sup> In each selected union/village, a landmark such as a road, bazar, school, madrasha, and mosque will be considered as a starting point for household survey. The number of starting points will be determined in accordance with the total number of interviews to be conducted in each selected village. At the selected starting point, households were selected using the 'Right Hand Rule' with skipping 3 households where household falling to the right side of the road/bazar/mosque/ school/madrasha etc.

<sup>5</sup> A household with an annual income less than national average household income (BDT 378,000: BBS,2022) who cannot meet their household expenses from their own income sources.

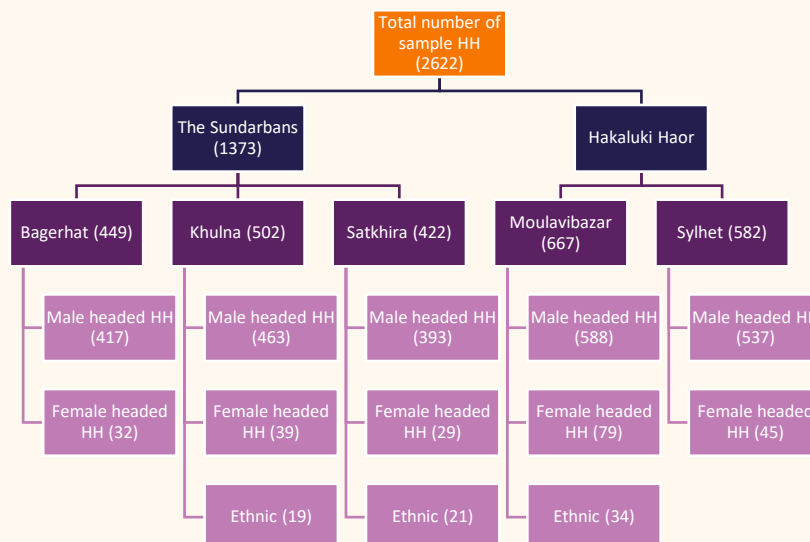


Figure 2: Baseline Sampling Framework

The study has collected household survey data using KOBO tools, which have been processed and analysed through the Statistical Package for the Social Sciences (SPSS) software for preparing necessary tables with a summary of values and comparisons between the ECAs and other disaggregated values.

Furthermore, FGDs were conducted with a diverse range of individuals from the local community, including men, women, older people, youth, persons with disabilities, and marginalized groups, poor and extremely poor<sup>6</sup> people, private sectors and ethnic communities in both ECAs. The participants (around 8-10 of each FGD) encompassed various occupations such as farmers, fishermen, livestock groups, Village Conservation Forums (VCF), and Village Conservation Groups (VCG), providing valuable insights into the community's needs, challenges, and opportunities. Key Informant Interviews (KIIs) were also conducted with key stakeholders, including the Upazila Nirbahi Officer (UNO), Union/Upazila Parishad Chairman, representatives from the Department of Agricultural Extension (DAE), Department of Livestock Services (DLS), Department of Fisheries (DoF), Forest range Officer, Project Implementation Officer (PIO), Department of Women Affairs (DWA), Department of Public Health Engineering, local NGOs, and CSOs providing valuable insights from different perspectives (**list of KIIs in the Annex 3**). During the study, a total of 179 FGDs (2506 participants), and KIIs (137 respondents) conducted under this study. The study team continuously monitored the data saturation level for the FGDs and KIIs, and once it reached the level, they stopped conducting the qualitative interviews to save resources and time. This comprehensive methodology ensured a representative and inclusive sample, providing robust data for the baseline study.

## 2.1 Limitations of the Study

The baseline study team felt time limitation while conducting this study. However, the study team was able to successfully reach all targeted households and collected necessary data deploying additional human resources to complete the study in time.

<sup>6</sup> According to the United Nations, extreme poverty is a condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information. Extreme poverty is defined as living on less than \$2.15 per day defined by World Bank.

### 3 Key Findings and Analysis

The household survey was the primary tool for gathering data on key outcomes. Over 83% of the surveyed households were interviewed from the ECAs and around 17% from the adjacent areas for making comparisons on various issues, including demographic and socio-economic conditions, awareness about climate change, livelihood assets and access to natural resources, ESS services & support for adaptation and resilient livelihoods (**Table A-1 in Annex 4**).

#### 3.1 Demographic and Socio-economic Conditions

The baseline survey reported that around 78.6% of the total respondents in the two ECAs were aged between 25 to 59 years, followed by 10.8% being 60 years and 10.6% between 18 to 24 years. There is no significant difference in the age structure of the respondent in two ECAs (**Tables 2 and Table A3 in Annex 4**).

Table 2: Age group distribution (%) of the respondent

Age Group	Household Located At				Total	
	Hakaluki Haor		Sundarbans		Number	Percentage
	Number	Percentage	Number	Percentage		
18 Yrs to 24 Yrs	139	11.1%	140	10.2%	279	10.6%
25 Yrs to 59 Yrs	983	78.7%	1077	78.4%	2060	78.6%
60 Yrs and Above	127	10.2%	156	11.4%	283	10.8%
<b>Total</b>	<b>1249</b>	<b>100.00%</b>	<b>1373</b>	<b>100.00%</b>	<b>2622</b>	<b>100.00%</b>

The survey results also revealed that most of the household heads of the study respondents are aged between 25 to 59 years (83%). Only 4.5% of them were found aged between 18 to 24 years and 12% of them were elderly people aged over 60 years. The ratio of elderly household heads is slightly higher in the Sundarbans ECA (13%) compared to 11% in the Hakaluki Haor ECA. There are 6.2% younger household heads (18 to 24 years) in Hakaluki Haor ECA, slightly higher than in the Sundarbans ECA at 3% (**Table-3**).

Table 3: Age group distribution (%) of the Household Head

Age Group	Household Located At				Total	
	Hakaluki Haor		Sundarbans		Number	Percentage
	Number	Percentage	Number	Percentage		
18 Yrs to 24 Yrs	77	6.2%	41	3.0%	118	4.5%
25 Yrs to 59 Yrs	1031	82.5%	1152	83.9%	2183	83.3%
60 Yrs and Above	141	11.3%	180	13.1%	321	12.2%
<b>Total</b>	<b>1249</b>	<b>100.00%</b>	<b>1373</b>	<b>100.00%</b>	<b>2622</b>	<b>100.00%</b>

The overall sex ratio of the household heads were 92% male and 8% female. While in the ECAs, around 91% of the surveyed household heads were males and 9% were females (**see Table A-4 in Annex 4**). Among the total surveyed households, 97.2% are Bengalis and only 2.8% of them are ethnic people with few sub-groups (**see Table A-5 in Annex 4**).

About half of the study population (50.3%) has medium-sized families with 4-5 members while 21% have small families and 29.2% have large families with 6 and more family members. The Hakaluki Haor has a greater number of large families (41%) than 19% of the Sundarbans ECA. The overall average family size of the surveyed households has been 4.82 (which is slightly higher than the national average, i.e., 4.26 (BBS, 2022)<sup>7</sup>). The average family sizes in the Hakaluki Haor and the Sundarbans ECA are 5.27 and 4.40, respectively because of socio economic patterns. While the combined family size of the ECA is 5 members (**Table-4**). The family size of the women households has been very small, i.e., 3.55 while which is 3.61 in

<sup>7</sup> BBS 2022: Statistical Year Book, Bangladesh Bureau of Statistics, GoB

both ECAs. It is to be noted that the average family size of the female headed household is very small in the Sundarbans which is 2.83 against 4.13 in Hakaluki Haor.

Table 4: Range of household members and family size\*

Range of Household Members	Household Located At				Overall ECA		Overall Total	
	Hakaluki Haor		Sundarbans		Number	Percentage	Number	Percentage
	Number	Percentage	Number	Percentage				
<b>Small Family (Up to 3 Members)</b>	171	13.7%	367	26.7%	429	19.6%	538	20.5%
<b>Medium Family (4 to 5 Members)</b>	572	45.8%	747	54.4%	1085	49.7%	1319	50.3%
<b>Large Family (6 Members and above)</b>	506	40.5%	259	18.9%	671	30.7%	765	29.2%
<b>Average Family Size</b>	5.27		4.40		5		4.82	
<b>Average women headed household family size</b>	4.13		2.83		3.61		3.55	

\*Note: Small family, medium family and large family are defined by Bangladesh Bureau of Statistics (BBS)

The study found that around 46% of the household heads are literate. The literacy rate of the household heads (HHs) is higher in the Sundarbans (49.0%) against 42% in the Hakaluki Haor. Among the literate household heads, 27% only completed primary education, 13.4% completed secondary education (up to class 10), 2.8% passed SSC, and 2.8% passed higher secondary education. There is no significant difference in the level of education between the ECAs. It has been found that around 56% of the household heads in ECAs are illiterate (**table A-7 and Table A-8 in Annex 4**). The attainment of education among young household heads remains corporately higher (67%), followed by the literacy rate of adult household heads 48% and elderly household heads 18% only.

The household survey collected information on disability from the respondents using the Washington Group Short Set on Functioning (WG-SS). The questions were asked regarding difficulties in seeing, hearing, walking, remembering, self-care and language problems for communication by the respondents. The survey has found that a minority of the overall respondents from the households are experiencing severe vision impairment, constituting less than 5% of the total respondents. Specifically, only 0.5% of individuals are completely unable to see, while the remainder grapple with some visual challenges. Similarly, in terms of hearing disabilities, only 0.3% of the respondents cannot hear anything, even with hearing aids, while 0.8% of them endure severe hearing difficulties. In contrast, a substantial portion of the respondents (6.1%) face significant difficulty in walking or climbing steps. Notably, this difficulty is most pronounced in the Hakaluki Haor ECA, where it affects 7.5% of individuals. Moreover, a small fraction, comprising 0.2% of the respondents, is unable to walk altogether. The prevalence of difficulties in remembering or concentrating and self-care has been reported very low: 1.4% and 0.2%, respectively (**see annex 5**).

Further, the National Survey on Persons with Disabilities (NSPD) of the BBS, 2021<sup>8</sup>, reveals that 2.80% of the population is affected by various disabilities. When disaggregated by gender, the prevalence of disabilities is higher among 3.29% in males, compared to 2.34% among females. Analysis by age group shows that the highest concentration of disabilities occurs among individuals aged 25 to 64 years. Data suggests that the ratio of disability is comparatively higher in the Sundarbans ECA. The disabilities among the males are higher in both ECAs (see figure 3).

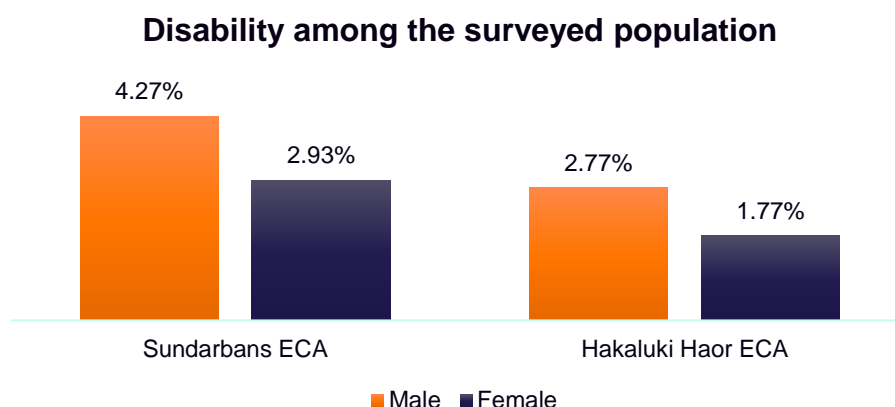


Figure 3: Disabilities in male and female by two ECAs

### 3.1.1 Occupational Patterns, Income and Expenditure

#### Employment and Occupational Patterns

Overall, the average earning members of a household was found to be 1.24 in ECAs (1.19 in the Sundarbans and 1.29 in Hakaluki), whereas it was 1.17 in adjacent areas. The majority (81%) of the interviewed households have single-earning members and the rest of households have 2-3 earning members. The employment status among women-headed households was found very low, at 1.25 (see table-5).

Table 5: Average earning members in the surveyed households in the ECAs and adjacent areas

Size	Hakaluki Haor		Sundarbans		Women headed HH		ECA Total	Overall Total
	ECA	Adjacent Areas	ECA	Adjacent Areas	ECA Total	Total		
Average Earning Members	1.29	1.20	1.19	1.14	1.25	1.25	1.24	1.23
<b>Total HHs</b>	<b>1041</b>	<b>208</b>	<b>1144</b>	<b>229</b>	<b>199</b>	<b>209</b>	<b>2185</b>	<b>2622</b>

The surveyed populations are engaged in various occupations. Around 25% households reported agricultural farming as their primary source of income in ECAs (20% in Hakaluki and 31% in the Sundarbans). Whereas 29% of households' primary<sup>9</sup> earning earnings were non-agriculture day labour and 10% transport workers in the ECAs (table A-9 in annex 4). It was learnt from FGDs that many of them have single earning options, while a few of them have secondary and tertiary occupations.

A total of 8.5% respondents were from **women-headed households**. Around 32.1% of the women-headed households are engaged in domestic household work and 26.8% of them are engaged in non-farm wage earning. A comparatively higher portion of women household heads are engaged in non-farm wage earning (i.e., 36.0%) in the Sundarbans ECA as against 19.4% in the Hakaluki Haor. A low proportion of women-headed households are engaged in

<sup>8</sup> (BBS), B. B. (2021). National Survey on Persons with Disabilities (NSPD).

<sup>9</sup> Primary occupation is considered where most of the time is spent for earning livelihood.

agricultural wage earning (3.1%) and crop farming (2.2%). Low proportions are also engaged in horticulture 7.1%, handicraft making 5.8%, fishing 6.3%, livestock and poultry rearing 1.8% as their primary occupation. 11% of women-headed households are engaged in fishing in the Sundarbans ECA as against 2.4% in the Hakaluki Haor (**see table A-10 in annex 4**).

### 3.1.2 Land Ownership Patterns

The survey data reveals that 72% of the households from ECAs have land for various purposes including housing and habitat, agriculture, home gardening, cattle raising and fish culture (77% in the Sundarbans and 66% in the Hakaluki Haor). The average land holding of ECA households has been 5.58 decimal, in Sundarbans ECA it was 6.85 and in Hakaluki ECA it was 4.18 decimal. Around 28% of the ECAs households were found completely landless (25% in the Sundarbans and 29% in Hakaluki Haor) (**table B-1, annex 4**).

The average amount of land for homestead is slightly higher in the Sundarbans ECA, i.e. 6.04 decimal versus 5.39 decimal in the Hakaluki Haor. The average amount of land for crop agriculture and gardening for vegetable growing is around 19 decimals in ECAs, whereas it is higher in Sundarbans (22.2 decimals) as compared to Hakaluki Haor (11.95 decimals) (**Table-6**).

*Table 6: Land used for different purposes in ECAs and by ECA and adjacent Areas (in Decimal)*

Size	Hakaluki Haor		Sundarbans		ECA Total	Overall Total
	ECA	Adjacent Areas	ECA	Adjacent Areas		
<b>Agriculture &amp; home gardening</b>	11.95	10.5	22.21	23.73	18.48	16.9
<b>Land in pond for fish &amp; water</b>	-	-	15.24	10.75	14.78	14.8
<b>Other</b>	5.57	3	0	16	5.8	5.8
<b>Land used for House and habitat</b>	5.39	5.3	6.04	5.46	5.78	5.7
<b>Small business &amp; enterprise</b>	-	-	4		4	4
<b>Livestock &amp; animal husbandry</b>	1.42	1	1.78	1.04	1.54	1.5

The surveyed households also have some amount of land for poultry and animal husbandry (about 1.5 decimal). A few families (0.4%) in the Sundarbans ECA have some amount of land for shrimp and fish culture, which is around 15 decimals on average. They have around 6 decimals of land for other purposes, including orchards and managing small businesses.

### 3.1.3 Household Annual Income

The average annual income of the surveyed households of ECAs was reported as being BDT. 142,119, while in adjacent ECAs the average is BDT 153,921 which is lower than the national average income (BDT. 390,000: HIES report of BBS, 2022).<sup>10</sup> The average household annual income remains a bit higher, i.e., BDT 153,076 in Hakaluki Haor ECA, as compared to BDT 130,209 in the Sundarbans ECA in 2023. The average household annual incomes in the adjacent areas were slightly higher in both sites: BDT 175,51 and BDT 134,089 in Hakaluki and the Sundarbans ECA, respectively. This might happen due to better livelihood opportunities, less dependency on ECAs, comparatively less vulnerable to climatic hazard etc.

<sup>10</sup> (BBS), B. B. (2022). Household Income and Expenditure Survey (HIES). Ministry of Planning.



in the adjacent ECAs as compared to ECAs. The study further collected and calculated sectoral income for the study households. The survey revealed that the households gain income from both agri-wage and non-agri-wage, while average income from non-agri-wages is slightly higher (BDT 106,596) from agri-wage (BDT 98,358). They also earned a good amount of money from inland fishing, sea fishing, small business, handicraft making, livestock rearing and foreign remittance, those who have family members working out of the country (see table A-13, annex 4). Average annual household income of the male headed households found higher BDT 1,48,115 compared to female headed households BDT 91,047 due to extent and scale of their activity. The survey result suggests that 8.3% households had loans or debts amounting 46,203 in the last one year.

### 3.1.4 Household Annual Expenditure

The average household annual expenditure was BDT 116,200 of the surveyed 2,622 families in 2023. The average annual household expenditure again remains a bit higher in the Hakaluki Haor, i.e., BDT 121,723, compared to BDT 111,661 in the Sundarbans ECA. There has been no big difference in annual expenditure between the two ECAs. In the Sundarbans and Hakaluki Haor ECAs of Bangladesh, households prioritise expenditures significantly. Food expenses alone constitute 45.1% of their total annual budgets, with Sundarbans 46.7% and Hakaluki Haor allocating 44% to food. Following closely, loan repayment represents the second largest expenditure category. Specifically, households in Hakaluki Haor allocate 16.3% of their annual expenditures to loan repayment, totaling BDT 30,049 annually on average. In comparison, households in Sundarbans allocate 12.7%, totaling 19,586 annually. The key item expenses for the ECAs are shown in figure 4.

**Annual Average Expenditure (in BDT) in ECAs Households and percent distribution of expense by key items**

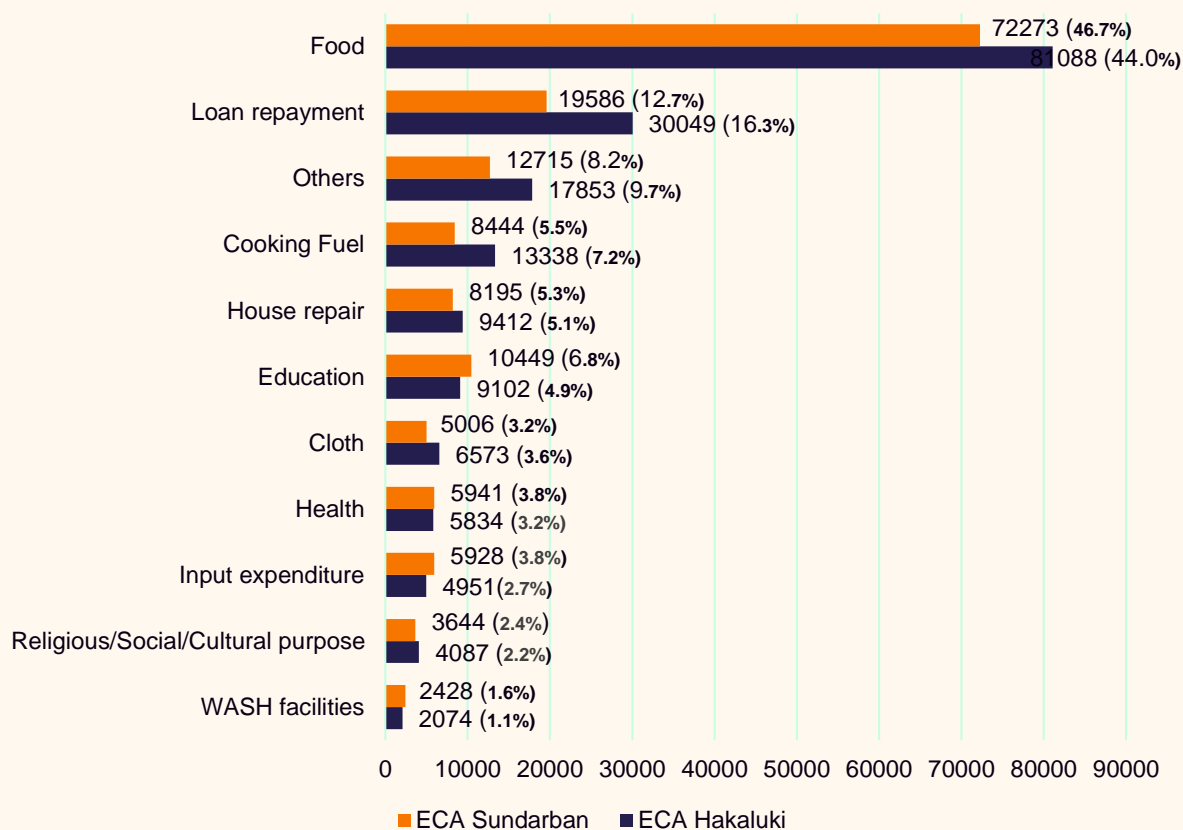


Figure 4: Key Expenditure in BDT

## Locally Led Approach to Nature Based Solutions

### 3.2 Dependency on Ecosystems & Awareness about LLA and NbS

The baseline study findings highlighted that a number of people depend on wetland resources in Hakaluki Haor; for fishing (32%) followed by duck rearing (29%), cattle rearing (28%) and fuelwood collection (6%)<sup>11</sup>. It was reported that the dependency ratio in mangrove forest in coastal Bangladesh of the lower income group was 74% earlier<sup>12</sup>. The ratio of dependency on Natural Resources (NRs) seems slightly higher in the Sundarbans ECA compared to Hakaluki Haor, i.e., 41% and 35%, respectively.

The dependency ratio on NRs in adjacent areas is again low in both ecosystems. Considering the categories of NRs, the dependency on fisheries is high in both sites (i.e., 26%), which differs between Hakaluki and the Sundarbans 19.4% and 33%, respectively (see table 7). Further, around 9% and 8% of ECAs households depend on wetland resources and forests respectively. In the Hakaluki Haor ECA, 13% collect wetland resources from *beels* (wetland), canals, river, and reed land forest while 8% of them collect wetland resources from canal, rivers and *charland* in the Sundarbans ECA. Very few of them depend on bio-diversity resources, Non-Timber Forest Project (NTFP) and eco-tourism.

Table 7: Percentage distribution of household's dependency on natural resources by ECAs and adjacent areas

Types of Natural Resources	Hahaluki Haor		Sundarbans		Overall ECA Total%	Total %
	ECA	Adjacent Areas	ECA	Adjacent Areas		
Not Dependent/ NA	64.6%	73.1%	58.7%	65.5%	47.0%	62.8%
Fisheries	19.40%	22.60%	32.50%	28.80%	25.70%	26.20%
Haor and wetland resources	12.60%	1.40%	8.30%	3.50%	8.90%	9.00%
Forest (Mangrove and Wetland Forest)	7.80%	4.80%	8.80%	7.90%	7.90%	8.00%
NTFP	-	3.80%	3.00%	-	1.60%	1.60%
Biodiversity	1.90%	0.00%	0.60%	0.90%	1.00%	1.10%
Others	0.10%	-	1.00%	-	0.50%	0.50%
Eco-tourism	-	-	0.50%	-	0.20%	0.20%

The survey results suggest that the people in the ECAs and adjacent areas depend on the natural resources and ecosystems to meet various livelihood purposes such as employment and income, food and nutrition, fodder, fuel and herbal medicines etc. (see table A-16 in annex 4).

#### 3.2.1 Awareness about LLA and NBS

The survey results revealed that 94% of the ECAs respondents do not know about LLA and NbS. The awareness level of LLA and NbS found higher in the Sundarbans ECA (10%) against the 0.1% in Hakaluki.

<sup>11</sup> Rana, M. P., Sohel, M. S. I., Akhter, S., & Alam, M. S. (2010). Haor based livelihood dependency of a rural community: a study on Hakaluki haor in Bangladesh. Proceedings of the Pakistan Academy of Sciences (Pakistan), (FAO) 47(1).

<sup>12</sup> Mohammad Abdullah, A. N., Stacey, N., Garnett, S. T., & Myers, B. (2016). Economic dependence on mangrove forest resources for livelihoods in the Sundarbans, Bangladesh. Forest Policy and Economics, 64, 15–24.

However, FGD and KII results suggest that few projects aim to conserve and protect wetlands (beel and canals) and Haors resources in Hakaluki. There is a great need for awareness of LLA and NbS. The Upazila Forest Officers in the coastal district have informed that the local committees, i.e., VCF and Collaborative Forest Management Committee (CFMC) are engaged in conservation and awareness raising on the importance of the Sundarbans and its biodiversity. They would need further motivation and capacity building for effective participation in conservation and regeneration of forests (**see annex 8**). Beyond simple awareness raising, there is likely a need for work to change behaviours. The Climate Vulnerability Capacity Analysis (CVCA) may help not only increase knowledge, but also improve capacity to overcome any barriers to practice that may exist.

*Table 8: Percentage distribution of household's responses on awareness about LLA Initiatives by ECAs and adjacent areas*

Type of response	Hahaluki Haor		Sundarbans		Overall ECA Total%	Total %
	ECA	Adjacent Areas	ECA	Adjacent Areas		
<b>No</b>	99.9%	94.7%	89.9%	95.2%	93.7%	94.7%
<b>Yes</b>	0.1%	5.3%	10.1%	4.8%	6.3%	5.3%
<b>Total</b>	100%	100%	100%	100%	100%	100%

Around 93% of ECAs respondents reported that they have no membership and affiliation with the local conservation committees and groups such as, CPG, VCF, CFMC and other conservation groups. There is no big difference between the two study areas in this regard (**see data table in annex 4**).

### 3.3 Participation in Institutions and Climate-relevant Decision-making Processes

The participation of the study population in formal and informal institutions is very low. About 1.8% of households of the ECAs respondents have actively participated in the formal and informal decision-making space. Participation of the vulnerable groups in decision-making is a bit higher (around 3.2%) in the Sundarbans ECA than that of Hakaluki Haor (0.2% only) (**Table 9**).

*Table 9: Participation of household members in formal and informal decision-making spaces*

Type of response	Hahaluki Haor		Sundarbans		Overall ECA Total%	
	Count	%	Count	%	Count	%
<b>No</b>	99.9%	94.7%	89.9%	95.2%	93.7%	94.7%
<b>Yes</b>	0.1%	5.3%	10.1%	4.8%	6.3%	5.3%
<b>Total</b>	100%	100%	100%	100%	100%	100%

**CARE-28.6:** [14 Climate Justice (CJ)] # and % of people (disaggregated by gender) who have actively participated in formal and informal climate-relevant decision-making spaces.

This indicator measures the number and percentage of people of all genders who have actively participated in formal<sup>13</sup> and informal<sup>14</sup> decision-making spaces. Baseline data shows that overall, 995 and 1.54% of people have actively participated in formal and informal climate-relevant decision-making spaces. In case of location wise disaggregation, Hakaluki Haor has no participation in climate relevant decision-making spaces (Table: 10).

<sup>13</sup> Formal spaces may include formal village/community/ward development committees or associations that have recognized power by local government to carry out a decision or action; that are formally recognized by the government such as, Village Tiger Response Team (VTRT) to protect tiger, Community Patrol Group (CPG) to protection of Sundarbans ECA and Hakaluki Haor, Village Conservation Group (VCG) etc.

<sup>14</sup> These informal spaces may include community development forums, community scorecards, social audits, community (adaptation) action plan monitoring committees, participatory scenario planning, gender action plan committees, citizens' youth groups, farmers group etc.

Table 10: Indicator summary CARE-28.6 (14 Climate Justice)

Indicator	Unit of Measure	Base Value
CARE-28.6. [14 Climate Justice (CJ)] # and % of people (disaggregated by gender) who have actively participated in formal and informal climate-relevant decision-making spaces	Number (Percent)	995 (1.54%)
Geography	Number (Percent)	995 (1.54%)
<b>Sundarbans</b>		995 (2.95%)
<b>Hakaluki Haor</b>		0 (0%)
Sex	Number (Percent)	995 (1.54%)
<b>Male</b>		482 (48.44%)
<b>Female</b>		512 (51.46%)
<b>Other/ non-binary</b>		1 (0.1%)

The participation of the male members in the local decision process is higher in both ECAs compared to female members. Moreover, it is interesting to note that many of those who participated in the local decision process, 98% could express their problems and concerns to influence the decision. The project must put more emphasis on the empowerment of people living in poverty and women for their effective participation in local decision processes that may benefit people living in poverty and women.

### 3.4 Engagement of LGIs and Actors in NABAPALLAB

The community people and key stakeholders in the two ecosystems have felt that the role of LGIs and NGOs is important in raising awareness and capacity building of the natural resources-dependent people, as well as giving them support and services for enhancing resilient livelihoods.

The LGIs may also get involved in conserving and protecting natural resources, basic infrastructures and inclusive social development that will again benefit people living in poverty, women, persons with disabilities and indigenous communities in the project areas. According to the FGD participants in Hakaluki Haor, the LGIs and local administration sometimes take part in eliminating the poaching of birds in the area. They emphasised the need for regular meetings and training on capacity building of the VCG committee. The group meetings are crucially important for enhancing the committee's capabilities and effectiveness in addressing environmental conservation, including the prevention of illegal activities such as poaching and overfishing. Thus, the active involvement of the administration and NGOs in capacity-building efforts would demonstrate a collaborative approach towards environmental protection and NbS in the ECAs.

Local stakeholders should prioritise initiatives that promote the conservation of mangrove forests and biodiversity, sustainable farming practices, and enhance soil and water conservation. They may support farmers and fishers with climate information, technologies, and required services to adapt to climate change. The government service providers like DAE, DoF and DLS provide extension services to the farmers, though as per FGD findings, there is scope for improvement in service delivery (i.e., increase frequency of visits, reaching more farmers, etc.). The forest department has a larger role, but their human resource capacity is not adequate to serve the protection and restoration initiatives in both ECAs. They viewed that strengthening their capacity, allocating necessary resources, and fostering collaboration with poor farmers, fishers, women, and socially marginalised people can improve their

effectiveness in managing natural resources and agricultural practices and thus reduce climate risks. It was also felt that collaboration and coordination with local governments in the implementation of climate-resilient livelihoods and NbS and EbA would be an integral part of this project. Workshops and training sessions could be organised with government representatives and NGOs to integrate adaptation into agricultural practices, WaSH, sustainable Natural Resource Management (NRM), and resilient livelihoods.

### Outcome Indicator Status

**KPI-1:** Number of people supported to better adapt to the effects of climate change as a result of ICF.

It counts the number of people who have been supported by ICF programmes to prepare and equip them to adapt to the effects of climate change (CC). Under this indicator, supported by ICF refers agricultural inputs, renewable energy, capacity-building, communications (e.g. climate risk and early warning systems), information (e.g. advisory), WaSH facilities, shelter/infrastructure, cash/in-kind support, institutional strengthening, policy advocacy and implementation. Project yet not delivered any support related to ICF therefore the baseline status of this indicator is zero (0).

## Climate Resilient Nature Positive Livelihood Practices

### 3.5 Impact of Climate Change on Livelihood and Coping Strategies

The household survey, FGDs and KIIs gathered and analysed data regarding the impacts of climate change on the livelihoods in the ECAs and adjacent areas. Household surveys reveal that around 91% of respondents experienced climate hazards and disasters like floods, drought and cyclones in the last 5 years. The impacts of climate hazards are reported higher in the Sundarbans ECA (95%), whereas it is 87% in the Hakaluki Haor (**table E-2, annex 4**). Among the households, overall 32% of them have incurred loss of income and 23% of them incurred loss of livelihoods<sup>15</sup>. Over 17% of the respondents have informed that climate change has increased health risks and medical expenditures in recent years. Some differences are registered between the two ECAs in terms of income loss, loss of livelihood and loss of assets (**table E-4, annex 4**).

The FGD participants expressed their experiential knowledge and concerns about the growing impacts of flash floods in April and May as well as long-duration monsoon floods with high depth in Haor. They also face heat stress, drought, erratic rainfall and cold waves. The FGD respondents from the Sundarbans ECA informed about their increasing risks and vulnerability to cyclones with tidal surges, growing salinity in water and soil, water logging and high tides (**annex 6**). The participants from both ECAs also expressed their concerns about temperature rise, drought, heat stress, Nor'wester (*Kalboishaki Jhaar*) with thunderstorms, erratic rainfall, changes in seasons, and local weather patterns. They informed us that these are affecting their lives, assets, and livelihoods every year (**table E-2, annex 4**).

The survey result showed that over 13% household do not take any coping and adaptation measures. However, many of them resort to negative coping mechanisms i.e., borrowing money (25%) family members migrate to other places (12.2%), cutting off family expenditure during and after a disaster (24.5%). 13% of them use their savings during climate disaster while 10% of them did nothing to cope with climate disaster in both ECAs. In addition, few of them take planned adaptation i.e., changing livelihood options (1.7%), diversification of crops (1.4%), change of types of crops (1.1%) and early variety crops (7.1%) (**see Table 11**).

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<sup>15</sup> Livelihoods has five capitals: financial, physical, social, human and environmental.

Table 11: Percentage distribution of responses regarding coping & adaptation measures in the last five years in ECAs and adjacent Areas

Type of Adaptation Measures	Hakaluki Haor		Sundarbans		ECA Total	Total %
	ECA	Adjacent Areas	ECA	Adjacent Areas		
Borrowing money	27.80%	25.30%	22.80%	20.40%	24.90%	24.60%
Cut off household expenditure	21.10%	16.70%	26.90%	27.80%	24.50%	24.50%
Family members migrate to other place	10.50%	1.70%	15.20%	5.40%	13.30%	12.20%
Use savings	14.10%	14.90%	12.60%	11.60%	13.20%	13.10%
Depend on the assistance from the other sources	9.70%	11.50%	12.10%	14.70%	11.10%	11.40%
Did nothing	13.50%	29.30%	5.00%	10.80%	8.60%	9.50%
Change the types of crops or vegetables	0.90%	0.00%	1.10%	2.60%	1.00%	1.10%
Changed livelihood options	0.40%	0.60%	1.30%	1.00%	0.90%	0.90%
Change the preference for livestock	0.90%	0.00%	0.90%	3.10%	0.90%	1.10%
Vaccinating animals against disease	0.50%	0.00%	0.50%	0.30%	0.50%	0.50%
Crop diversification	0.30%	0.00%	0.40%	0.80%	0.40%	0.40%
Agroforestry	0.10%	0.00%	0.50%	0.30%	0.30%	0.30%

### 3.6 Climate Resilient Livelihoods

People living in poverty, farmers, fishers, wage earners, women and ethnic communities have limited livelihood options in the two ECAs and they are again very sensitive and vulnerable to climate change stresses (like temperature rise, erratic rainfall, drought, salinity and changes in seasons & local weather patterns) as well as climate disasters like floods and cyclones. Around 52% of the overall surveyed households are dependent on the ESS for their livelihood. They asserted that their livelihoods are dependent on natural resources of the Hakaluki Haor and the Sundarbans ECA, which are being impacted by climate change. The response regarding livelihood dependency on NRs seems a bit higher in both ECA compared to the overall dependency of people on NRs. It might happen since people are more concerned about the impact of climate change on their livelihood related resources. The livelihood dependency on natural resources and ESS is greater in the Sundarbans ECA (about 59%) than 48% in the Hakaluki Haor. Around 56% of both ECAs were dependent on the NRs. **(See the following table-12)**. The resource bases (i.e., fisheries, flora, honey collection, NTFP etc.) are degraded by climate change (like temperature rise, heat stress, drought, floods, cyclones and salinity) and the degraded ESS are again limiting the livelihood options and outcomes of the natural resources-dependent communities in terms of their decreased employment, income, food & nutrition and wellbeing of the communities.

Table 12: Percentage distribution of responses regarding livelihood dependency on NRs in the last five years in ECAs and adjacent areas

Type of Responses	Hakaluki Haor		Sundarbans		Overall ECA Total %	Total %
	ECA	Adjacent Areas	ECA	Adjacent Areas		
Yes	48.8%	38.9%	59.2%	38.4%	55.9%	51.7%
No	51.2%	60.6%	40.8%	61.6%	44.1%	48.3%

People living in poverty, women-headed households and ethnic communities mainly catch fish from the *Beels* and canals; collect firewood and bio-resources in Hakaluki Haor, while people living in poverty in the Sundarbans ECA collect shrimp fry, firewood, juvenile crab and NTFP, including honey and *Nypa* leaves from the ECA. A good proportion of people in the adjacent areas are also dependent on the natural resources in the ECAs. The dependency varies depending on availability, productivity of the items and seasonality, which is again influenced negatively by climate change. Overall, 32% of them depend on fishing in the Beel and canal, 20% of them collect firewood from the ECAs and 19% of them collect shrimp and carp particularly in the Sundarbans ECA. There is no significant difference between the ECA total and overall total. **See table 13.**

Table 13: Percentage distribution of responses regarding types of NRs for livelihood in the last five years in ECAs and adjacent areas

Type of Natural Resources	Hakaluki Haor		Sundarbans		Overall ECA Total %	Total %
	ECA	Adjacent Areas	ECA	Adjacent Areas		
Fishing in the Beel or canals	31.10%	5.30%	32.80%	47.70%	32.20%	32.20%
Firewood collection	33.10%	9.10%	15.00%	8.50%	21.30%	19.70%
Shrimp fry and crab collection	0.00%	0.00%	28.90%	31.60%	18.90%	19.00%
Others	19.30%	85.10%	4.30%	7.60%	9.50%	12.90%
Honey collection	0.00%	0.00%	12.00%	0.60%	7.90%	6.90%
Pole or timber collection	6.40%	0.50%	6.80%	4.00%	6.70%	6.20%
Collection of bio-resources (tree, twigs, honey etc.)	10.2%	0.0%	0.2%	0.0%	3.7%	3.2%

In the face of the impacts of climate change and growing vulnerability, the community is taking some adaptation measures to enhance the resilience of their livelihoods. The adaptation measures differ in the two localities to adjust to the specific climate stresses like early & flash floods, drought, salinity, water logging and frequent cyclones. 43% of the households who are practicing salt tolerant crops 29% less water consuming crops, and 14.3% flood tolerant varieties. They also promote early variety and short duration variety in both ECAs (**see Table 14**).

Table 14: Percentage distribution of responses regarding adaptation measures in the last five years in ECAs and adjacent areas

Type of Measures	Hakaluki Haor		Sundarbans		Overall ECA Total %	Total %
	ECA	Adjacent Areas	ECA	Adjacent Areas		
Salt tolerant crops	0.00%	0.00%	60.00%	0.00%	42.90%	42.90%
Less water consuming crops	25.00%	0.00%	30.00%	0.00%	28.60%	28.60%
Flood tolerant crops (flood)	50.0%	0.0%	0.0%	0.0%	14.3%	14.3%

torrent rice variety)						
Early variety of crops	25.00%	0.00%	0.00%	0.00%	7.10%	7.10%
Short duration crops	0.00%	0.00%	10.00%	0.00%	7.10%	7.10%

### 3.7 Decision-Making on Agricultural Production and Household Economic Decision and Gender Inclusion

The baseline study aimed to understand gender inclusiveness by analyzing the participation of female respondents in decision-making processes related to agricultural production and household economy in male-headed households. This participation was measured using a Likert scale (0-5), where "0" indicates no participation and "5" indicates strong participation.

#### Agricultural Decision-Making of Women in Male-Headed Households

Participation in agricultural decision-making was examined through six statements: i) agricultural land use, ii) shared responsibility for land use purposes, iii) crop cultivation on the land, iv) buying agricultural inputs, v) crop harvesting, and vi) taking agricultural products to the market. The response 3 and above in each statement was considered as the women in a male headed household participating in the specified dimension. Then a composite score was generated to measure the active participation based on the responses against the statements of measuring decision making status of women in agricultural production.

The composite score analysis revealed that approximately 12% of female respondents actively participated in agricultural decision-making. However, significant regional differences were observed. In Hakaluki, 15% of women participated actively, while in Sundarbans, the participation rate was only 8%. In Hakaluki, women's involvement in agricultural decision-making was notably higher across all dimensions compared to Sundarbans. For instance, 17.45% of women in Hakaluki reported participating in decisions regarding agricultural land use, whereas only 9.24% did so in Sundarbans. Similarly, 18.22% of women in Hakaluki participated in crop cultivation decisions compared to 10.37% in Sundarbans. This trend was consistent across other dimensions such as buying agricultural inputs, where participation was 16.67% in Hakaluki compared to 9.89% in Sundarbans (see annex: Table H-1).

#### Economic Decision-Making of Women in Male-Headed Households

Participation in economic decision-making was assessed through four statements: i) household purchases, ii) taking loans, iii) purchasing productive assets, and iv) climate-related information and action. Similar to women's participation in agricultural production, the composite score for economic decision showed that about 14% of women respondents actively participated in economic decision-making activities at the household level. This participation was found to be almost similar both in Hakaluki and Sundarbans. However, certain differences were observed in specific dimensions. In Sundarbans, 17.67% of women participated in household purchase decisions compared to 13.71% in Hakaluki. The most significant participation was seen in loan discussions, with 29.01% of women in Sundarbans and 24.77% in Hakaluki actively participating. Women in Sundarbans also had slightly higher participation in decisions related to purchasing productive assets (15.88% vs. 14.33% in Hakaluki). Participation in climate-related decisions was low in both regions, with 10.59% in Hakaluki and 10.05% in Sundarbans, indicating an area where both regions could improve (see annex: Table I-1).

#### Outcome Indicator Status

**CARE-14 FWN** (Right to food, water and nutrition): # and % of women (in male headed households) who have actively participated in household decision making in agricultural production as well as off-farm livelihood.



The indicator measures the women active participation in household decision making in agricultural production and off-farm livelihood. Household decision making in agricultural production and off-farm livelihood refers to decisions taken such as which land to use, size of land to use for a particular crop (cash crop/crop for consumption), what to produce/cultivate including livestock raising, who undertakes the agricultural tasks, procurement and use of tools/equipment, seeds to be used, what inputs to buy for agricultural production, when to harvest, when or who would take produce to the market, how to use the harvest, who and where to sell the produce and at what price. 13572 (12.33%) of women who have actively participated in household decision making in agricultural production as well as off-farm livelihood (Table 15).

Table 15: Indicator summary CARE-14 FWN

Indicator	Unit of Measure	Base Value
CARE-14 FWN (Right to food, water and nutrition): # and % of women who have actively participated in household decision-making in (a) agricultural production	Number (Percent)	13572 (12.33%)

**CARE-14 WEJ** (Women’s Economic Justice): # and % of women who have meaningfully participated in economic decision-making in the household.

The indicator measures the women meaningful participation in household economic decision making. 15927 (14.47%) women have meaningfully participated in economic decision making.

Table 16: Indicator summary CARE-14 WEJ

Indicator	Unit of Measure	Base Value
CARE-14 WEJ (Women’s economic justice): # and % of women who have meaningfully participated in economic decision-making in (a) the household (RELATIONS)	Number (Percent)	15927 (14.47%)

**KPI-17:** Hectares of land that have received sustainable land management (SLM) practices as a result of ICF.

Sustainable land management covers the use of land resources, including soils, water, animals and plants to produce goods to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions. Project has not yet delivered any SLM practices yet therefore the baseline status of this indicator is zero (0).

**CARE-28.1:** # and % of people (disaggregated by gender, age and disability) that have applied at least 3 practices to protect their livelihoods from negative impacts of climate related shocks and stresses.

The indicator measure the number of people practices nature positive livelihood options such as introducing water efficient agricultural practices to reduce pressure on scarce water sources, locally appropriate climate smart agriculture practices to withstand climate extremes such as: mulching, multi cropping, agroforestry, soil management practices, crop diversification, promotion of legumes in crop rotation, nature based solutions, such as mangrove planting to protect fish and shrimp nurseries, fishponds and/or fields near the coast from rising sea levels etc.

Overall, 2,686 people and 0.5% of people have applied at least 3 practices to protect their livelihoods from negative impacts of climate related shocks and stresses. In case location wise disaggregation 2,686 people and 0.5% and 0 people and 0% in the Sundarbans and Hakaluki applied at least practices respectively (Table 17).

Table 17: Indicator summary CARE-28.1

Indicator	Unit of Measure	Base Value
CARE-28.1: # and % of people (disaggregated by gender) age and disability that have applied at least 3 practices to protect their livelihoods from negative impacts of climate related shocks and stresses (Adaptive)	Number (Percent)	2,686 (0.5%)
Geography	Number (Percent)	2,686 (0.5%)
<b>Sundarbans</b>		2,686 (0.96%)
<b>Hakaluki Haor</b>		0 (0%)
Sex	Number (Percent)	2,686 (0.5%)
<b>Male</b>		1,302 (48.47%)
<b>Female</b>		1,383 (51.49%)
<b>Other/ Non-binary</b>		1 (0.07%)

## Renewable Energy Solutions

### 3.8 Access to Clean and Renewable Energy

The use of traditional stoves is (99%) in the Sundarbans ECA as against 92% in Hakaluki Haor ECA. The use of LPG stoves is slightly higher in Hakaluki Haor ECA (7%) whereas it is 2% in the Sundarbans ECA. Very few households (0.2%) use biogas and electric stoves among the study population. **(See Table C-1 in Annex 4).**

It is interesting to note that the study population uses various cooking fuel types from various sources. The majority use wood as cooking fuel (64%) followed by straws and leaves of trees (32%) in ECAs. Other types of cooking fuel are LPG and electric stove. Around 2% of ECAs households informed that they don't spend any money for cooking fuel purposes. **(See following table-18).** The FGD and KII have suggested that there is huge potential for promoting biogas plants, which are a source of clean energy, and the byproducts of biogas could be used as organic fertiliser.

Table 18: Percentage distribution of responses regarding types of cooking fuels used by the HHs in ECAs and adjacent areas

Types of Cooking Fuels	Hakaluki Haor		Sundarbans		Overall ECA Total %	Total %
	ECA	Adjacent Areas	ECA	Adjacent Areas		
<b>Wood</b>	79.00%	59.20%	53.50%	60.40%	64.00%	63.40%
<b>Straw/leaf/ cow dung</b>	18.60%	3.70%	41.90%	31.10%	32.30%	30.40%
<b>Don't have to spend any money</b>	0.60%	0.00%	2.90%	7.90%	2.00%	2.40%
<b>LPG</b>	1.80%	37.20%	1.60%	0.60%	1.70%	3.70%
<b>Electricity</b>	0.00%	0.00%	0.20%	0.00%	0.10%	0.10%

The study has found that people spend a significant amount of money on cooking fuel. They spend on average BDT 776 monthly on cooking wood fuel, BDT 998 for LPG monthly **(See Table C-3 in Annex 4).** About 47% of them collect cooking fuels from forest and community forestry, while 43% of them collect fuel wood and twigs from homesteads in both ECAs. **(See Table C-5 in Annex 4).** The survey revealed that both males (54%) and females (35%) collect cooking fuel in the ECAs. In a few cases, girls (3%), boys (8%) and paid labour (1.8%) collect

cooking fuel from the available sources. (See Table C-6 in Annex 4). They spend about 50.30 minutes on average daily for the collection of cooking fuel, while slightly more time is needed for the collection of cooking fuel in Hakaluki (i.e., 56 minutes) as against 50 minutes in the Sundarbans ECA. Against 50 minutes the overall study population, 52 minutes time is required in the two ECAs (See Table C-7 in Annex 4).

About 97% of the surveyed households have access to electricity, and only 3% do not have access to the national electricity grid. (See Table C-8 in Annex 4). There is no big difference between the two ECAs in this regard. Most of the surveyed households get electricity from the Bangladesh Rural Electrification Board (BREB) (81%) followed by the Power Development Board (PDB) (12%) and 5% of them use solar energy. (See Table C-10 in Annex 4). However, about 63% of the households reported more than 4 hours load shedding in a day. FGDs and KIs have suggested that there is huge potential for expanding household and community-based renewable energy solutions in the project areas. The detailed scoping study also identified the scope to work with renewable energy in the communities since the community has limited access to RE solutions. It was also learned that over 99% of the families use electricity for household consumption and only 0.4% use it for business purposes, including small business and battery charging stations in the rural study villages. (See Table C-12 in Annex 4).

### Outcome Indicator Status

**KPI-2:** Number of people and social institutions with improved access to clean energy as a result of ICF

This indicator highlights the number of people and social institutions with improved access to clean energy (clean cooking and clean electricity) as a result of ICF. As projects has yet not delivered renewable energy solution in the targeted locations therefore the baseline status of this indicator is zero (0).

## Climate Resilient WaSH Services

### 3.9 Drinking Water and WaSH Facilities

The study population collects drinking water from various sources, including tube wells, tap or piped water, Rainwater Harvesting Systems (RWHS), ponds and dug wells. They take water from multiple sources: 41% of them collect drinking water from tube wells, followed by RWHS (22%), pond and dug wells (17%) and piped/tap water (11%) in the ECAs. The survey suggested that more people depend on tube well water in Hakaluki Haor ECA 83% as against 19% in the Sundarbans ECA. The RWHS is the main source of drinking water of 33% households in the Sundarbans ECA (see the following table-19). There is no significant difference between the overall ECA total and overall total. It is to be noted that about 1.9% households drink river or canal water in overall ECA. FGDs suggest that they generally treat river water through boiling and using water purifying tablets or alum before drinking.

Table 19: Percentage distribution of responses regarding sources of drinking water in ECAs and adjacent areas

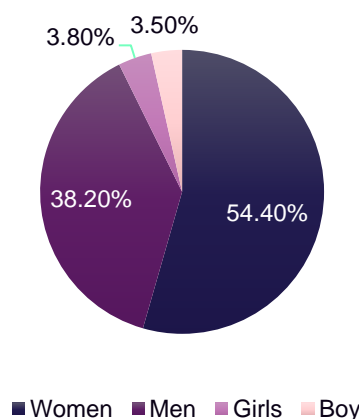
Sources of Drinking Water	Hakaluki Haor		Sundarbans		Overall ECA Total %	Total %
	ECA	Adjacent Areas	ECA	Adjacent Areas		
Tube well	82.70%	29.30%	19.40%	43.20%	41.40%	40.90%
Rainwater	0.10%	0.00%	33.40%	24.30%	21.80%	20.70%
Pond and dug-well	6.60%	0.50%	22.10%	18.90%	16.70%	16.00%
Tap/Piped water	10.50%	69.80%	11.50%	2.10%	11.10%	13.80%
Other	0.00%	0.00%	10.50%	10.90%	6.80%	6.80%
PSF	0.10%	0.00%	8.30%	7.50%	2.50%	2.40%

<b>River or canal</b>	0.00%	0.50%	3.00%	0.60%	1.90%	1.70%
<b>Reverse Osmosis</b>	0.00%	0.00%	0.20%	0.00%	0.10%	0.10%

The ownership of drinking water sources differs across the surveyed household between the two ECAs. About 32% have their own sources and systems of drinking water. The ratio of self-ownership is relatively higher in the Hakaluki Haor (51%) than that of Sundarbans ECA (19%). From the ECAs surveyed households, about 31% collect drinking water from their neighbouring households. Additionally, 19% of them collect drinking water from community-owned sources, 6% from government and NGO-supported drinking water sources (see **Table D-2 in Annex 4**). Around 18.3% of the women-headed households and 17.7% of the ethnic people have their own sources of drinking water (see **Table D-3 in Annex 4**).

The average time for drinking water collection has been 18 minutes in both ECAs, which ranges from 1 minute to more than an hour. The surveyed families in the Sundarbans ECA need a higher amount of time: 26 minutes of water collection daily on average compared to 10 minutes in Hakaluki Haor. Around 47% of families spend 10 minutes daily collection of drinking water. Around 22% households in the Sundarbans ECA spent more than 30 minutes time per day for collecting drinking water (see **Table D-4 in Annex 4**). Both men and women collect drinking water for their families. The survey results suggest that more men (54%) are engaged in drinking water than that of women (38%). Boys and girls are also engaged in the collection of drinking water collection, i.e., 3.8% and 3.5%, respectively (see **figure 5**). However, the FGD and KIIs suggest that a greater number of women and adult girls are engaged in

**Percentage Distribution of Family Members Collecting Drinking Water**



*Figure 5: Percentage Distribution of Family Members Collecting Drinking Water*

drinking water collection, particularly in the coastal villages of Sundarbans ECA (see **Table D-5 in Annex 4**).

The surveyed population use different types of toilets and latrines. The majority (67%) use pit latrines with ring slabs (a type of improved sanitary latrine), whereas 20% use pit latrines without slabs, and 7% of them use flush toilets. (See **Table D-6 in Annex 4 and figure 6**).

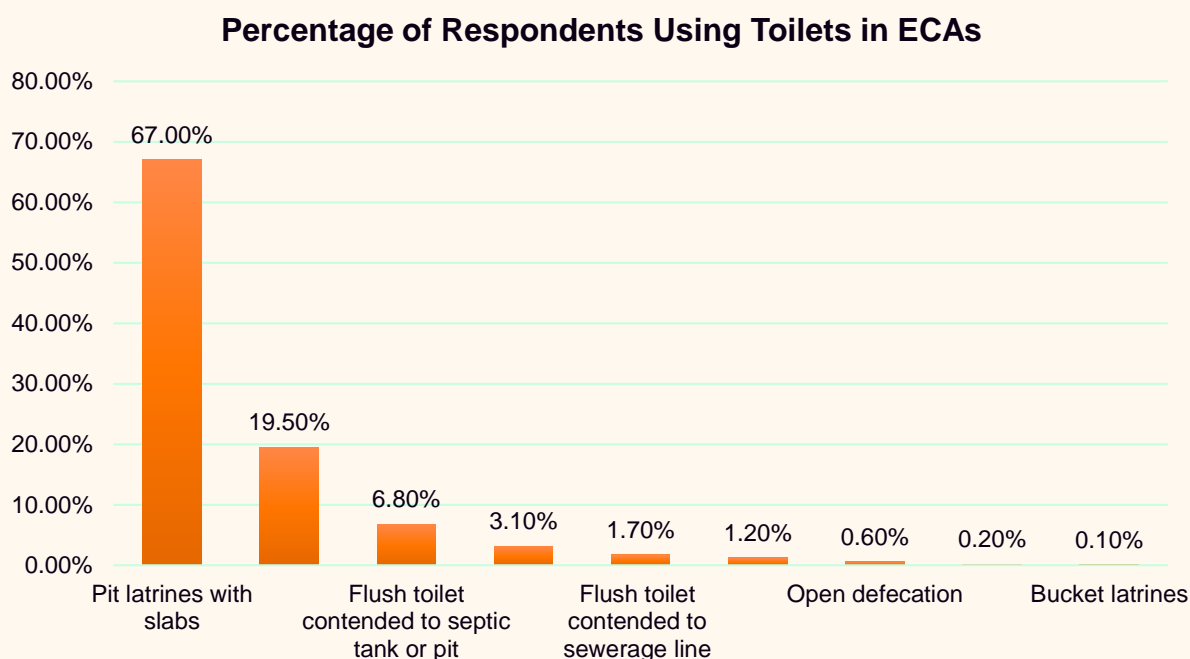


Figure 6: Percentage of Respondents Using Toilets in ECAs

## Outcome Indicator Status

**CARE-27** (custom): #and % of targeted population with direct access to WaSH services through implementation of climate resilient adaptation measures.

This indicator highlights sanitation and water services which refers to basic drinking water<sup>16</sup> and basic sanitation services<sup>17</sup>. The baseline will be zero since it measures direct access through implementation of climate resilient adaptation measures through NABAPALLB project.

## Climate Resilient Infrastructures and Technical Know-how

### 3.10 Climate Resilient Infrastructures (Housing and Community Infrastructure)

The baseline data revealed that approximately 57% of respondents in the ECAs reported that they do not take measures like plinth raising, strengthening the structure of the house, and reinforcing the roof, and 3% don't know about when and how to take measures to protect their housing structure and dwellings. Around 40% of households in the ECAs responded indicating they do take necessary measures like plinth raising, strengthening the structure of the house, and reinforcing the roof (**See Table G-1 in Annex 4**).

The disaster preparedness measures are not sufficient among the women-headed households and ethnic communities. They may take one or two measures such as, plinth raising of the house and homestead, strengthening the houses with poles of the required six to eight measures. About 33% of the women headed household and 34% of the ethnic

<sup>16</sup> Drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing

<sup>17</sup> Safely managed sanitation which is use of improved facilities

community people take disaster preparedness measures (see Table G-2 in Annex 4). Hence, there is a great need for awareness, motivation, capacity building and resource support for the vulnerable communities, including the women, persons with disability and ethnic communities in both ecosystems. The common measures for strengthening resilience of the infrastructures included reinforcing roofs of the houses (21%) followed by plinth raising (18%), structural improvement of the houses and improving WASH facilities (16%), trimming trees (11%) in the coastal villages before a strong cyclone and planting trees (1.6%). However, around 28% of them did not take any specific action for the protection of their basic infrastructures in the ECAs. The project must pay more attention to this group of people for awareness, climate risk communication, and DRR.

*Table 20: Percentage Distribution regarding Actions taken for Strengthening Infrastructures considering Climate Hazards by All HHS in ECAs and adjacent ECAs \**

Types of Respondents		ECA Hakaluki	Adjacent hakaluki	ECA Sundarbans	Adjacent Sundarbans	Overall ECA Total	Overall Total
<b>Reinforced roofing</b>	Number	259	2	355	47	614	663
	Percentage	19.70%	1.00%	22.10%	15.70%	21.00%	19.30%
<b>Elevation/Plinth raising</b>	Number	206	4	324	53	530	587
	Percentage	15.70%	2.00%	20.10%	17.70%	18.10%	17.10%
<b>Structural improvement</b>	Number	195	8	266	25	461	494
	Percentage	14.80%	3.90%	16.50%	8.40%	15.80%	14.40%
<b>Trimming trees</b>	Number	119	1	207	49	326	376
	Percentage	9.10%	0.50%	12.90%	16.40%	11.20%	11.00%
<b>Site selection carefully</b>	Number	35	19	78	14	113	146
	Percentage	2.70%	9.30%	4.80%	4.70%	3.90%	4.30%
<b>tree plantation</b>	Number	13	0	34	0	47	47
	Percentage	1.00%	0.00%	2.10%	0.00%	1.60%	1.40%
<b>Modify construction materials</b>	Number	3	1	13	1	16	18
	Percentage	0.20%	0.50%	0.80%	0.30%	0.50%	0.50%
<b>Modify house facing/direction</b>	Number	3	0	4	0	7	7
	Percentage	0.20%	0.00%	0.20%	0.00%	0.20%	0.20%
<b>No specific adaptation</b>	Number	480	169	328	110	808	1087
	Percentage	36.5%	82.4%	20.4%	36.8%	27.6%	31.7%

<b>Other</b>	Number	1	1	0	0	1	2
	Percentage	0.1%	0.5%	0.0%	0.0%	0.0%	0.1%

The survey further reveals that the women-headed households and ethnic communities have undertaken very few protective measures to enhance the resilience of their infrastructures in the recent past, before and during a flood.

### Outcome Indicator Status

#### **CARE 28.4 # and % of people of all genders that took at least 3 steps to protect their dwellings and direct surroundings from the negative impacts of climate related shocks and stresses (Absorptive)**

The baseline data shows 827 and (7.9%) people took at least 3 steps to protect their dwellings and direct surroundings from the negative impacts of climate related shocks and stresses. As per geographical disaggregation 488 (8.96%) and 339 (6.89%) people took at least 3 steps to protect their dwellings and direct surroundings from the negative impacts of climate related shocks and stresses respectively in the Sundarbans and Hakaluki Haor.

Table 21: Indicator summary CARE 28.4

Indicator	Unit of Measure	Base Value
CARE 28.4 # and % of people of all genders that took at least 3 steps to protect their dwellings and direct surroundings from the negative impacts of climate related shocks and stresses (Absorptive)	Number (Percent)	827 (7.9%)
Geography	Number (Percent)	827 (7.9%)
<b>Sundarbans</b>		488 (8.96%)
<b>Hakaluki Haor</b>		339 (6.89%)
Sex	Number (Percent)	827 (7.9%)
<b>Male</b>		399 (48.25%)
<b>Female</b>		427 (51.51%)
<b>Other/ Non-binary</b>		1 (0.12%)

## Climate and Weather Services

### 3.11 Access to Climate Information and Early Warning

The survey reveals that the level of awareness about climate change is poor among the population. Overall, 32% of the respondents have some knowledge about climate change in the two ECAs. Among the 32%, awareness of climate change is relatively higher in the Sundarbans ECA 44% against 25% in the Hakaluki Haor ECA. It is worrying to note that 68% of the surveyed households are unaware of climate change and its possible impacts on the localities (see Table E-1 in Annex 4).

The survey reveals that overall, 66% of the respondents do not know about the Early Warning System (EWS), around 23% have not received any early warning on floods, and only 11% got some early warning during the floods in the last five years (see the figure 7). The ratio of receptivity of flood warnings remains a bit higher in the Sundarbans ECA than that of the Hakaluki Haor ECA: 51% and 19%, respectively among the responses (see Table E-7 in Annex 4). The FGDs and KIIs have suggested improving the EWS, considering the frequency and forcefulness of climate disasters and the needs of the local people, particularly women, Persons with Disabilities, and elderly people. Moreover, they also suggested introducing season and sector specific climate information services.

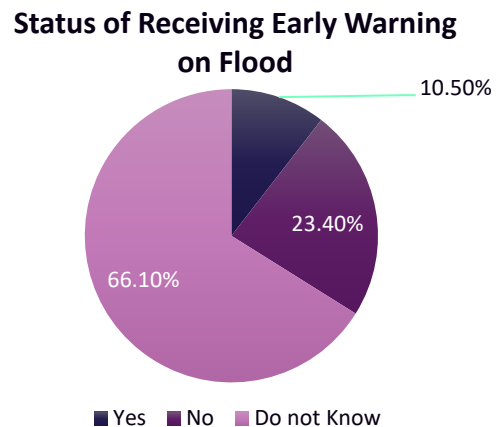


Figure 7: Status of Receiving Early Warning on Flood

Regarding the early warning of cyclones, about 86% of them responded positively to the Sundarbans ECA (see Table E-5 in Annex 4).

The study has further explored the trusted sources of early warning. According to the findings, most of the early warning received through miking (22%) while 40% comes from combined sources including family members, neighbors, relatives and specific place of declaration in the ECAs. Additionally, 38% of households received early warnings from other sources. On the other hand, in the ECAs 2% of the respondents have received early warnings through social media sites like Facebook. The FGDs have suggested improving EWS and its effectiveness through ICT, billboards and community radio in the local language (see Table E-8 in Annex 4). Among the respondent who received early warning practicing stayed in the home during a climate disaster 30.4%, strengthen repaired houses, 22.9% respondent with children, elderly, women, and pregnant women, person with disability of the family have been sent to safe places 22.9%, and 6.6 % arranged extra money for safety etc.

#### Outcome Indicator Status

**CARE-28.2:** # and % of people that have applied climate knowledge and information services to inform their adaptation strategies.

As the climate information service is not available to the survey respondent, so the application of that knowledge is certainly zero.

## 4 Appropriateness of Theory of Change (ToC) and Assumptions

NABAPALLAB's ToC has validated through numbers of FGDs, KIIs, stakeholder consultation workshops. The study findings show that all the assumptions mentioned in ToC are still valid for implementation.

The government officials at the Upazila Levels (DAE, BFD, DoF, DWA, BWDB, DPHE etc.) Strongly felt that protection and restoration of the ecosystem and biodiversity are the key priorities of the national policies, strategies and legislations. Hence, the local government officials, government duty bearers and local actors have a key role and responsibility for protection, restoration and regeneration of the Hakaluki Haor ECA and the Sundarbans ECA. The community and key stakeholders recognized the Locally Led Adaptation (LLA) initiatives



may facilitate ecosystem restoration, resilient livelihood of the vulnerable community and contribute to social inclusion and gender equity. Hence LLA, EbA and NbS would be the core activities of the NABAPALLAB that will contribute to localisation of NAP and integration of EbA, NbS and resilient livelihood in the local development plans and strategies.

It is also felt that massive awareness and motivation on EbA, NbS and LLA as well as climate risk communication through climate and weather information services would put a strong basis for planning and implementation of NABAPALLAB. These will enhance people's practice with required knowledge of environment friendly technologies, nature positive and climate smart solutions and services. The field observations and survey results suggest that community members have very limited access to renewable energy like solar and biogas. But they have great interest in establishing household and community level renewable energy systems that may support resilient livelihood activities in both ECAs. The small infrastructures in the communities are extremely vulnerable in both ECAs. Vulnerable communities and actors are very interested in making the infrastructure and WASH facilities resilient to climate change stresses like flood, cyclone and tidal surges. The communities demanded the active role of the local government and service providers for sustained support and services of the project.

Communities and service providers acknowledge the significance of resilient technologies and demanded the know-how for planning and implementation of NbS approach as the key solution for EbA and LLA. It is also assumed that timely and effective disaster response through local level contingency fund and shock can support the EbA, NbS and resilient livelihoods. The responsive local government and NGOs with Social Safety Nets can help the communities to sustain the results of EbA, NbS and LLA. For this, required resources and authority are to be given to the local government for their effective participation and contribution to resilience building at the local, regional and ecosystem levels.

Finally, the identified interventions (conservation and biodiversity; nature positive livelihoods and energy solutions; climate resilient homes, infrastructure and WASH facilities; climate and weather information services) were also validated in the scoping study.

## **5 Conclusion and Recommendations**

The analysis reveals that poverty is widespread in both ECAs, with a significant portion of the population being functionally landless and heavily reliant on limited livelihood resources, which are further strained by climate change. The average household income is alarmingly low, and most earnings are spent on necessities, highlighting the economic vulnerability of these communities.

Communities are frequently affected by climate-induced disasters, with significant reporting of severe impacts. These include floods, droughts, cyclones, and salinity, all of which severely limit livelihood options and outcomes. Vulnerable groups, such as poor women, women-headed households, persons with disabilities, and indigenous people, are disproportionately affected. Additionally, there is a marked lack of awareness about Ecosystem-based Adaptation (EbA), Locally Led Adaptation (LLA), and Nature-based Solutions (NbS), with the majority of respondents unfamiliar with these approaches.

Access to clean and renewable energy is minimal, with most households relying on firewood and other traditional fuels. There is a pressing need to expand renewable energy sources like solar PV and biogas to improve household energy security and create green jobs. Access to safe drinking water and adequate sanitation facilities is also significantly below the national average, exacerbated by climate impacts on infrastructure.

Community decision-making remains male-dominated, particularly regarding land use and agricultural practices, and participation in formal and informal institutions is low. However,

there is a growing engagement of local government institutions and actors in climate action, though further awareness and skill development are necessary for effective participation.

The findings underscore the need for coordinated efforts between NABAPALLAB, development agencies, and local actors to enhance the implementation of EbA, NbS, and resilient livelihoods. There is substantial interest in clean and renewable energy among the community, but a lack of necessary skills and resources hinders progress. Building capacity for innovation in agriculture, ecosystem conservation, and resilient infrastructure is crucial. Improved co-generation and dissemination of climate information and early warning systems will support effective climate risk reduction and the successful implementation of project interventions.

## Recommendations

Both the ECAs are poverty stricken and disaster prone. Various climate disasters are affecting people, assets and livelihoods all year round. People living in poverty, women, persons with disability and indigenous communities are most vulnerable to the multiple disasters and their impacts. Further, lack of awareness, ability and motivation as well as lack of capacity and institutional support limit their adaptive capacity. Increased awareness combined with strengthened capacity and institutional support for LLA, NbS, EbA, renewable energy, WaSH, resilient infrastructure and livelihoods is expected to reduce their risk and vulnerability. Empowerment of women with decision power, effective participation and raising voice at different forums may advance adaptation, mitigation and resilience at household, community and regional level.

The baseline study validated the NABAPALLAB Theory of Change. It also provides critical information and insights into the socio-economic and climatic challenges facing communities in the Sundarbans and Hakaluki Haor ECAs. By addressing these challenges and implementing targeted interventions, the NABAPALLAB project has the potential to foster community and ecological resilience to climate change, protect biodiversity, and improve livelihoods of natural resources dependent communities, and thus ultimately contribute to achieving the NAP, BccGAP, MCPP, NDC and SDGs.

The baseline provides clear evidence to support key aspects of the Theory of Change and highlights some specific areas where the project should concentrate efforts.

- 1. Ensure enhanced inclusion activities where women, people with disabilities, and other marginalized groups are most excluded:** Whilst there are areas of intrahousehold decision-making where women report moderate or high levels of participation it is the case that in many areas the participation of vulnerable and marginalised people, including women, is lacking. This is particularly true in terms of participation in agricultural decision-making and in terms of meaningful participation in community structures. The project must ensure that work in these areas deliberately works to ensure that women and other marginalized groups are not only present in decision-making forums but that they have the skills and power to meaningfully participate. This will likely mean not only working on the agency of women but also focusing on the relational and structural aspects of existing structures that currently prevent meaningful participation.
- 2. Strengthening local institutions' capacity for local climate actions and natural resource conservation:** Whilst there is a desire for local authorities to perform a function supporting climate action and natural resource conservation, qualitative evidence suggests a low level of resource to be able to fulfil this need. The project should work to make sure that it addresses the barriers to local institutions' work and support system strengthening that is also gender aware. In addition, the project needs to focus on coordination with Local Government Institute, NGOs, and village conservation groups to develop ownership of protecting ECAs.

- 3. Enhancing climate information dissemination:** It is evident that some early warning information is available in both ECAs, but these, often do not reach to the vulnerable communities. Therefore, the project should facilitate greater access of people to early warnings and climate related information for climate resilient agricultural practice, WaSH, infrastructure and livelihoods. CARE and the project partners should design climate information services (CIS) such a way that ensuring including women, persons with disabilities and socially marginalized groups.
- 4. Improving energy, water and sanitation infrastructure:** Communities mostly depend on traditional and captive energy (electricity) for cooking and lighting. There is a huge scope for using renewable energy like solar and biogas for both domestic and commercial purposes for expanding livelihood options. The baseline identified the need to expand rainwater harvesting systems (RWHS), water purification systems etc. at household and community level. The sanitation infrastructure includes single and twin pit latrines that should be accessible to persons with disabilities as well. Issues around energy are twofold: There is a need to ensure an understanding of how load shedding, and the unreliability of the energy supply is affecting communities, particularly livelihoods perspective. The reliance on traditional fuels is likely to have a broader impact on sustainability within the ECAs. It is therefore recommended that cooking fuels are considered both from an energy perspective but also as a potential threat to broader work on conserving and supporting ECAs. The project will increase opportunities for vulnerable communities that help to reduce the loss of households' livelihoods by prioritising support for alternative sources of income and increasing uptake of crop diversity, specifically climate adaptive crops. In addition, the project will increase access to safe drinking water (particularly in the Sundarbans), sustainable energy sources and infrastructure – looking at cost-effective and self-sufficient approaches to do this well.

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