

# Sagar Island, South 24 Parganas, West Bengal A Situation Analysis report - 2022

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# Executive Summary

## Introduction

Sundarbans, the world's largest contiguous mangrove forest, is one of the richest and unique ecosystems in the world and symbolize a world of human poverty and fragility packaged with natural richness; a world which is so close to the lights of development, yet so far. Sundarbans is home to 4.5 million of India's poorest and most vulnerable people. Fifty four of the Sundarbans' 102 islands are inhabited by around 45 lakh people, according to the 2011 census. Inhabitants of low-lying islands face increased threats due to climate change as a result of their higher exposure and lesser adaptive capacity. If the current trends in terms of loss of bio-diversity, degradation of natural resources and increasing vulnerability to climate risk continue, the eco-region will be severely damaged within few decades. Sagar Island, the largest inhabited estuarine island of Sundarbans and locally called as Ganga Sagar, is one of the 54 islands inhabited. Sagar Island is unique in a way because it reflects almost all the natural problems – soil erosion, embankment breaches caused by river and sea, tidal surges, salinity, loss of landmass, biodiversity, rising sea level and disappearing mangroves of Sundarbans as a whole. Sagar block has 85 km of embankments which breach ranged between six and seven km annually. The people displaced from the disappeared islands (such as Ghoramara) and other areas submerged due to rising sea level have been rehabilitated in Rudranagar Gram Panchayat.

A study was conducted in Sagar Island to understand the situation of child and women's rights in the areas of Health, WASH, Education, Protection, Livelihoods and Climate Change and challenges faced by the people, especially the children and women and its consequences on their life.

## Study Methodology

An extensive desk research has been conducted using various secondary data sources along with primary source of information. A census survey have been conducted in 15 villages in four Gram Panchayats of Sagar block in South 24 Parganas district. The survey was conducted during the month of February to April 2022 by 53 enumerators, who visited the households and conducted the interviews using mobile based digital data collection application.

## Key Findings

A total of 16,896 households were surveyed having 65,132 members. Out of which 15,742 (24.3%) are children aged below 18 years. Majority (90.6%) of the population are Hindu and 9.2 percent population are Muslim and 0.20 percent population include Sikh, Christian, etc. Sixty two percent of the population belong to general category, followed by 20 percent in Scheduled caste, 15 percent in Other Backward Class (OBC).

**Education:** About 63 percent of the respondents have studied up to elementary level (Class 1 to 8), 16.5 percent have studied till secondary level. Only 9.7 percent respondents have completed higher secondary or above and 10.5 percent respondents have never studied. About 80 percent respondents faced some challenges in continuing the study of their children. Two in every three respondents informed that they could not afford educational expenses (tuition fees, copy books, text books, pen/pencils, travel costs), 17 percent informed that school was far-off and road to school was unsafe and insecure. According to 83 percent respondents there is no mechanism available during the emergency

situation to continue their children's education in the village, while rest of the respondents find some mechanisms that include community/ neighbourhood schooling, education camp/ session in Flood Centres or special education sessions run by NGOs.

**Health:** More than half (52%) of the families visit local medical practitioners (quack) generally for seeking medical advice or medical treatment and 40.5 percent go to government hospital. At the primary healthcare centers a host of rudimentary medical activity takes place, but complicated pregnancies, deliveries and operations, serious illnesses or emergencies are not dealt with here. During health emergencies, are often referred by local doctors to hospitals on the mainland for critical care. They travel by boat across rivers because many of these remote regions are not connected by roads or bridges, which result delays since water travel is not permitted in bad weather to avoid the danger of boats capsizing, delays due low water level when tide begins to ebb resulting the chances of boats getting stuck on the riverbed. The adverse impact of salinity in water and soil cause diseases like skin ailments which shoot up significantly after cyclones and floods when the region got inundated.

**WASH:** Only 14 percent households have improved source of drinking water as piped water/public tap is the main source of drinking water of the families and 85 percent households have tube well or borehole as main source of drinking water, this has a higher possibility of getting contaminated during monsoon. About two out of every five households (38%) do not treat drinking water. Although about 91.7 percent households have their own toilets, some people defecate in the open (9.4% respondents had seen anyone goes out and defecate in the open in their village, within one week prior to the survey). About 30.5 percent respondents were found to be aware of at least 3 critical times (out of 5) of handwashing and 57 percent household have only water (no soap) for handwashing. About 65.4 percent girls and women use rag or piece of cloth as absorbent during their menstrual period and they prefer the same as it is easily available, easy to use, can be used for longer period and they can't afford a better option than this. Only 21.6 percent girls and women use sanitary napkin, reusable sanitary pad and menstrual cups during their menstruation. About 58.5 percent of the respondents believe one should clean a cloth, used during menstruation, by water and soap. More than half of the respondents throw the used sanitary napkins into drain or toilet. About half of the respondents were aware that during menstruation one should consume diversified food items like fruits, leafy green vegetables, fish, meat and eggs, etc. About 35 percent girls and women usually make decisions themselves about the materials they use during the menstrual cycle.

**Protection:** In 30.5 percent households, children were reportedly engaged in at least one of the following activities during the last week preceding the survey: i) running any kind of business, ii) doing any work for cash or kind (excluding household chores), iii) doing any work as a domestic worker outside his/her home, iv) doing any work in his/her household's plot, farm, food garden or helped in growing farm produce or in looking after animals for the household (agriculture, animal husbandry, cattle grazing, fisheries) or supported parents in the family business, v) doing any construction or major repair work outside of his/her home. One in every four households, children were engaged in any work in their household's plot, farm, food garden or helped in growing farm produce or in looking after animals for the household (agriculture, animal husbandry, cattle grazing, fisheries) or supported parents in the family business.

The respondents are aware about three government sponsored schemes mostly: Lakshmi Bhandar Scheme (78%), Sasthya Sathee Scheme (68%) and West Bengal Krishak Bandhu Scheme (64%).

**Climate change related risks:** A multi-dimensional relative ranking of 41 mouzas with spatial assessment of four components indicates that most of the vulnerable communities survive in the marginal areas along the coastline. Shibpur–Dhablat, Beguakhali–Mahismari, and Bankimnagar–Sumatinagar are at high risk, while Kachuberia, Muriganga, Candipur are highly vulnerable but at lower risk of exposure. About one-fourth of the respondents are not aware about flood shelters either in the village or shared with other villages. Only 4.3 percent respondents have heard of any village level task force for managing disaster in their villages.

**Livelihood:** The income generating occupations of the households are dominated by agricultural labour (26%), followed by general labour including MGNREGA (18%), animal husbandry (17%) and farming (16%). In the last six months preceding the survey, just after the second wave of COVID-19, about 55 percent families were not able to meet their expenses on daily needs most of the time and another 40 percent were able to meet their expenses barely but were not able to save any money. The major use of the agro-forest land or forest resources is for collecting dry wood (28.7%), grazing livestock on pastures of forest (19.9%), making hay (17.4%), growing crops on forestry farm land (13.8%), collecting fruits (10.3%), collecting medicinal and aromatic herbs and plants (6.6%), beekeeping (1.3%) and others (1.9%). Two out of every five (43%) respondents believe that agro-forests should be maintained and enhanced for economic purposes while 37 percent and 12 percent of respondents believe that agro-forests should be maintained and enhanced for ecological values and social aspects respectively. More than 62 percent respondents are looking for any potential sources of alternative livelihood to increase their family income.

## Recommendations

There is a need to formulate comprehensive adaptation strategies at the policy and at the decision-making levels to help the vulnerable communities living in this island, in an extremely fragile ecosystem and need to deal with the adverse impacts of climate change as a part of their life. Key recommendations include:

1. Construction of rain water harvesting structure through pond, Mangrove Plantation, Bee Cultivation, Construction of water harvesting structure.
2. Restoration and promoting Mangrove Plantation to prevent ongoing soil erosion and slow down coastline erosion
3. Installation of Street Solar Lights in public places to maximise the use of renewable energy.
4. Financing the women SHGs through seed capital as part of Community Investment Fund (CIF) for taking up livelihood generation activities.
5. Promoting integrated pond based fish farming, poultry farming along with duckery, bee keeping and kitchen gardening.
6. Promoting digital and Smart Interactive Learning Infrastructure to make the teaching most effective and productive making the learning experience of the students attractive.
7. Promoting enhanced WASH facilities in schools- child friendly toilet facilities, access to improved source of uninterrupted drinking water supply, hand pumps with high raise platform, soak pits at vulnerable points to ensure access of safe drinking water.
8. Promoting equitable access to the health care system, by providing cost effective health services and facilities to the poor,
9. Awareness campaign and mobilisation activities through Behaviour Change Communication (BCC) to increase knowledge among young women and adolescent girls on various pertinent issues of menstrual hygiene; to link them with various government schemes.

10. Organizing medical camps to create and enhance awareness through appropriate intervention services and convergence and provide treatment to children, adolescents and adults as appropriate.

## Introduction

Sundarbans, the world's largest contiguous mangrove forest, is one of the richest and unique ecosystems in the world. The biodiversity of Sundarbans is dominated by mangroves. The mangroves-

- Form a natural barrier against the ferocity of the tidal waves
- Assist in the formation of new landmass
- Play an important role in swamp morphology
- Act as major suppliers of nutrients to the marine life and several other benefits

Fifty four of the Sundarbans' 102 islands are inhabited by around 45 lakh people, according to the 2011 census. The Sundarbans symbolize a world of human poverty and fragility packaged with natural richness; a world which is so close to the lights of development, yet so far. Sundarbans is home to 4.5 million of India's poorest and most vulnerable people. 70 percent of the people in the Sundarbans live below the poverty line, with a per capita income of INR 13,300 per annum<sup>1</sup>. Poverty here is cyclically entwined with the ecosystem; increasing economic stress makes people recklessly feed on natural resources which, in turn, leads to erosion of the traditional source of livelihood for the poor and builds more stress. Increasing pressure of population, unregulated drives towards commercialization of natural products, and poor resource management add strength to this cyclical movement. Without the option of industrial development, the livelihood choices of the people of Sundarbans are limited to land and natural resource-based activities. Most of them depend on agriculture for livelihood, growing paddy as the major crop. Other occupations include fishing, pisciculture, honey gathering, and catching crabs. Nearly 80% of the households pursue livelihood options involving inefficient production methods of agriculture, fishing and aquaculture. The local population relies heavily on the mangroves as it provides fodder, fuel wood, tanbarks, fish, honey and medicines.

Due to climate change, the Sundarbans faces several challenges. With rising sea levels, islands are disappearing and the increased salinity in the water and soil is severely affecting the crops. There have been serious disturbances of hydrological parameters and change in fishing patterns, resulting in disastrous consequences for the fishermen community. Frequent cyclones and erratic monsoon rain pattern are giving serious threat to the livelihoods of thousands of people. The suffering face of the Sundarbans is perpetuated by a poor physical infrastructure. There are only 42 km of railway line and about 300 km of metal roads in the entire area of about 4500 square KM, almost half of which are inaccessible in the monsoons. People have to depend on simple or mechanized country boats (*bhutbhuti*) and limited number of steamer launches for moving from one island to the other or to the mainland.

If the current trends in terms of loss of bio-diversity, degradation of natural resources and increasing vulnerability to climate risk continue, the eco-region will be severely damaged within few decades. Several habitations will be sub-merged under sea water, thousands of people will be homeless, wild life will be destroyed, and overall, the entire area, including the city of Kolkata will be prone to frequent cyclones.

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<sup>1</sup> <https://www.newslaundry.com/2020/12/18/cracks-in-the-shield-how-the-sundarbans-is-dying-and-making-bengal-prone-to-cyclones>

Inhabitants of low-lying islands face increased threats due to climate change as a result of their higher exposure and lesser adaptive capacity. Sagar Island, the largest inhabited estuarine island of Sundarbans and locally called as Ganga Sagar (21°37'21"N to 21°52'28" N and 88°02'17" E to 88°10'25" E), is one of the 54 islands inhabited. It is surrounded by Muriganga River in the north and east, and Hooghly in the west. The island like other parts of Sundarbans is characterized by mangrove swamps, waterways and small rivers. Owing to its location within a tidal creek and having very low elevation, the island is experiencing severe coastal erosion, frequent cyclones, flooding, storm surges, and breaching of embankments, resulting in land, livelihood, and property loss, and the displacement of people at a huge scale. About 19.5% of mouzas (administrative units of the island), with 15.33% of the population at the southern part of the island, i.e., Sibpur–Dhablat, Bankimnagar–Sumatinagar, and Beguakhali–Mahismari, are at high risk (0.70–0.80). The island has undergone tremendous land system transformations and changes in climatic patterns<sup>2</sup>.

Sagar Island is unique in a way because it reflects almost all the natural problems – embankment breaches caused by river and sea, tidal surges, salinity, disappearing mangroves - of Sundarbans as a whole. Sagar block has 85 km of embankments. Breaches in these embankments ranged between six and seven km annually. Embankments raised along rivers are of critical importance for the safety of lives and protection of crops, against daily tides and tidal surges.

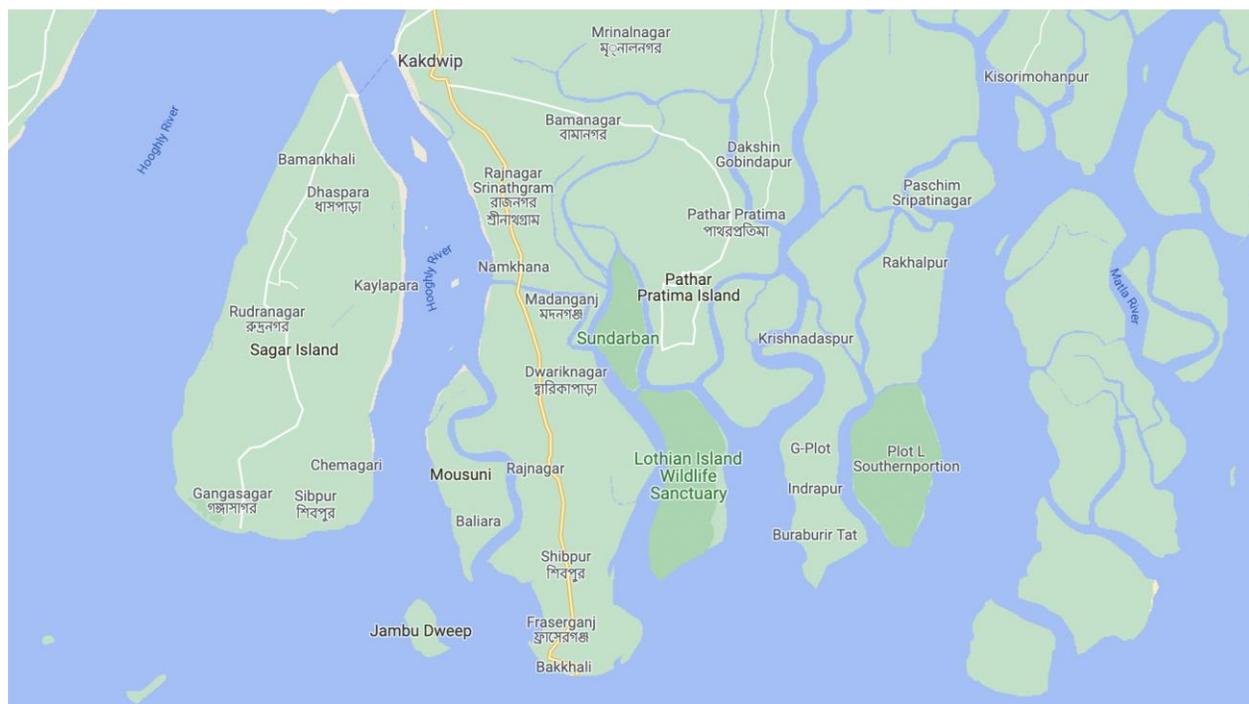


Fig: 1, Location of Sagar Island, Credit: Google Maps

About 40000 families inhabit 47 villages of Sagar spread over 504 sq. km of area. Population of Sagar in 2021 is 262,926, literate people are 156,476 out of 87,052 are male and 69,424 are female. Total workers are 84,881 depends on multi skills out of which 62,016 are men and 22,865 are women. Total 13,785 Cultivators are depended on agriculture farming out of 12,055 are cultivated by men and 1,730 are women. 14,463 people works in agricultural land as a labour in Sagar, men are 12,508 and 1,955 are women<sup>3</sup>.

<sup>2</sup> <https://doi.org/10.3390/w14050823>

<sup>3</sup> [https://www.indiagrowing.com/West\\_Bengal/South\\_24\\_Parganas/Sagar](https://www.indiagrowing.com/West_Bengal/South_24_Parganas/Sagar)

It has 10 gram panchayats, which are: Dhablat, Dhaspara Sumatinagar I, Dhaspara Sumatinagar II, Gangasagar, Ghoramara, Muriganga I, Muriganga II, Ramkarchar and Rudranagar. Large villages (with 4,000+ population) in Sagar block (2011 census figures in brackets) are: Ghoramara (5,193), Sapkhali (6,738), Kachubaria (7,727), Companir Char (5,262), Dhaspara (5,525), Bamankhali (4,151), Mandirtala (6,135), Phuldubi (5,731), Mahendraganj (4,559), Narendraganj (4,556), Haradhanpur (8,998), Sumatinagara (4,699), Manasadwip (2nd portion) (6,206), Kamalpur (6,602), Rudranagar (7,132), Khan Saheber Abad (6,082), Khas Ramkarer Char (7,556), Krishnanagar (8,105), Harinbari (5,455), Radha Krishnapur (5,082), Bishnupur (6,349), Beguakhali (5,683), Gangasagar (10,340), Purusattampur (6,753), Chemagari (6,564), Sibpur (9,344) and Dhablat (6,778)<sup>4</sup>.

A study was conducted in Sagar Island to understand the situation of child and women's rights in the areas of Health, WASH, Education, Protection, Livelihoods and Climate Change and challenges faced by the people, especially the children and women and its consequences on their life. Sabuj Sangha is implementing a project in 15 villages under four gram panchayats for the following reasons:

1. Sagar, also called as Gangasagar, is the single largest compact island in the Sundarbans
2. Sagar represents almost the entire livelihoods spectrum of the Sundarbans
3. Sagar is facing severe threat from soil erosion, breach of embankment, loss of landmass and biodiversity and rising sea level
4. The literacy rate of Sagar is 80% and among them 70% of the women is literate. Therefore, adapting to new ideas and interventions may be easier
5. The selected block is the most vulnerable to natural calamities and climate change
6. The people displaced from the disappeared islands (such as Ghoramara) and other areas submerged due to rising sea level have been rehabilitated in Rudranagar Gram Panchayat
7. Rudranagar GP is also home to the endangered Lodha tribe

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<sup>4</sup> [https://en.wikipedia.org/wiki/Sagar\\_\(community\\_development\\_block\)#cite\\_note-census2011-12](https://en.wikipedia.org/wiki/Sagar_(community_development_block)#cite_note-census2011-12)

# Study Methodology

An extensive desk research has been conducted using various secondary data sources along with primary source of information. A census survey of 16,896 households have been conducted in 15 villages in four Gram Panchayats of Sagar block in South 24 Parganas district. The survey was conducted during the month of February to April 2022 by 53 enumerators, who visited the households and conducted the interviews using mobile based digital data collection application.

Following were the areas of inquiry in the study:

- i. Basic demographic profiles of the household
- ii. Education
- iii. Health
  - a. Awareness on COVID-19 appropriate behaviour and vaccination status
  - b. Healthcare-seeking behaviour
- iv. WASH
  - a. Access to WASH facilities and usage pattern
  - b. Menstrual hygiene- awareness and practice
- v. Child Protection
  - a. Child protection related issues and awareness on the reporting mechanism
  - b. Awareness and use of Government schemes
- vi. Climate change
  - a. Result of climate change
  - b. Incidents of disasters and Awareness on the risk reduction mechanism
- vii. Livelihood
  - a. Existing options
  - b. Willingness to shift towards alternative livelihoods
  - c. Perception on the use of agro-forest land

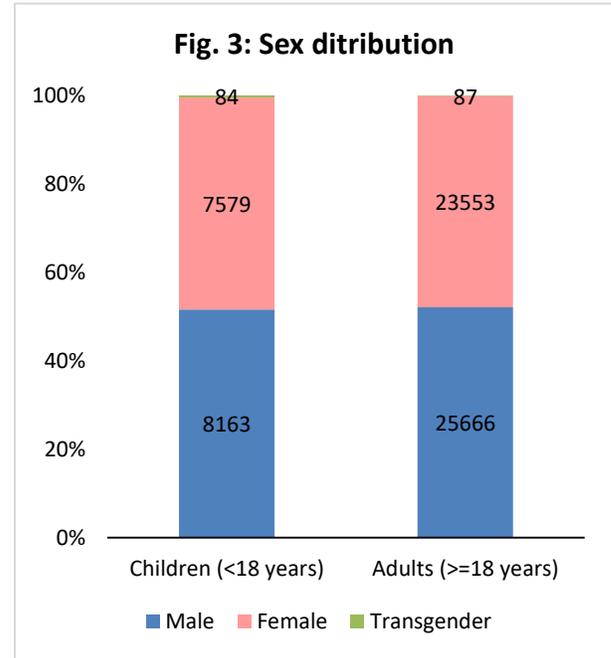
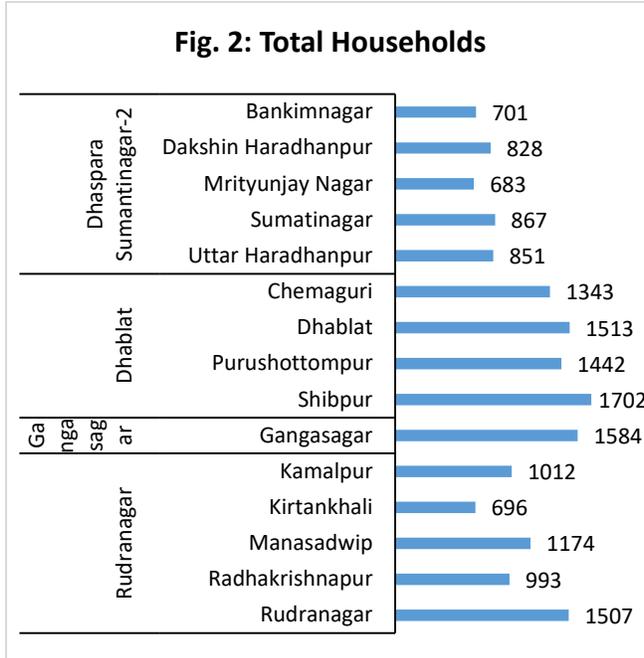
**Quality control:** The enumerators were trained on the tools extensively along with hands on practice. The supervisors conducted monitoring through spot checks and back checks (about 5% of the total survey records) during the data collection.

**Ethical considerations:** Consent was taken from each respondents before proceeding for the survey interviews.

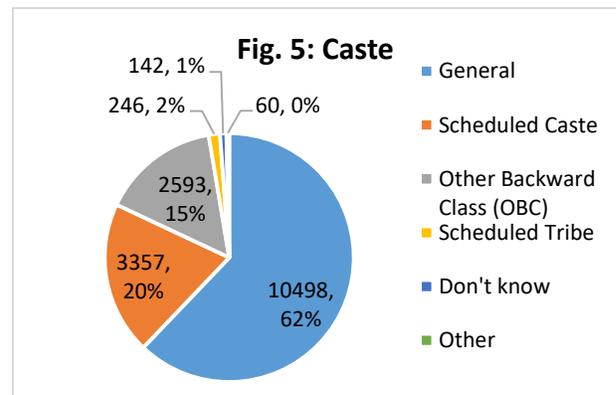
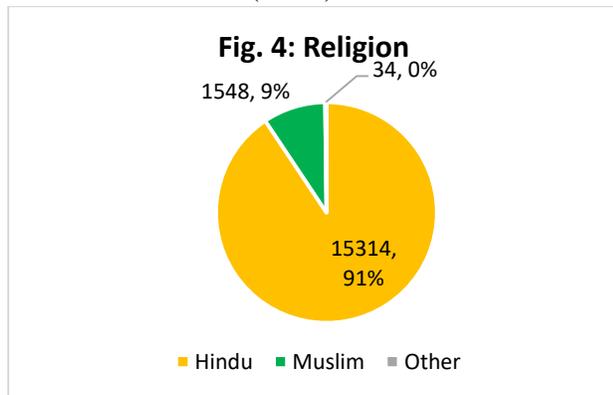
# Key Findings

## i. Demographic Profile:

A total of 16,896 households (Fig. 2) were surveyed which have 65,132 members. Out of 65132 people, 15,742 (24.3%) were children aged below 18 years.



Majority (90.6%) of the population are Hindu and 9.2 percent population are Muslim, and rest 0.20 percent population include Sikh, Christian, etc. (refer Fig. 4). Sixty two percent of the population belong to general category (refer Fig. 5), followed by 20 percent in Scheduled caste, 15 percent in Other Backward Classes (OBC).

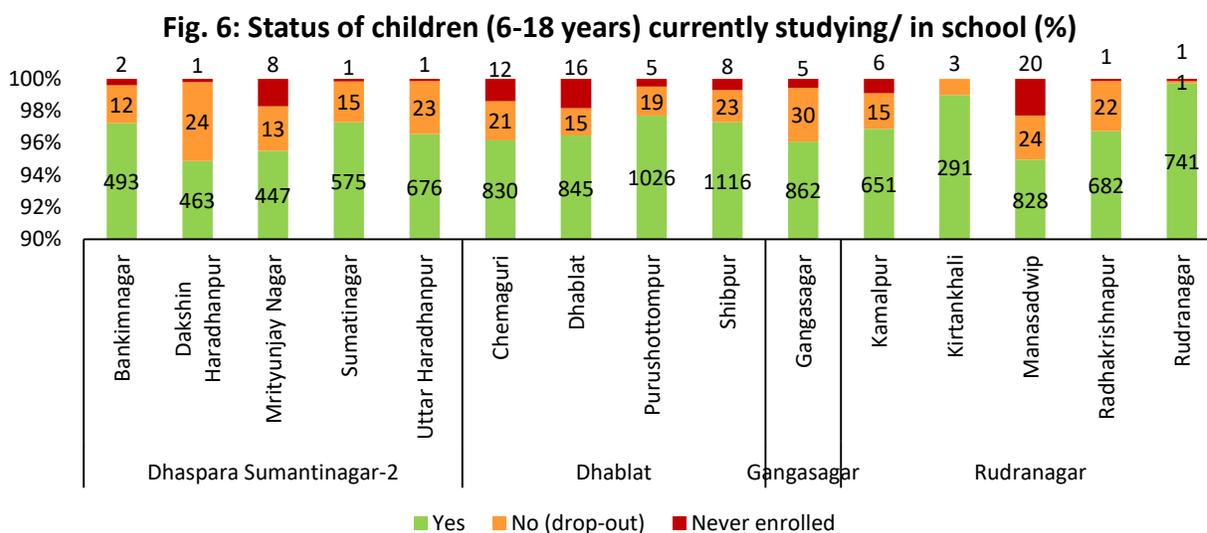


Among the respondents, majority (95.5%) were married, 1.4% were unmarried and 3.1% were divorced or separated or widowed. Two-third (63.3%) of the respondents have completed elementary education (up to class VIII) and only 3.6 percent respondents have completed graduation or above; 10.5 percent respondents have never been to school.

## ii. Education:

About 63 percent (two-third) of the respondents have studied up to elementary level (Class I to VIII), 16.5 percent have studied till secondary level. Another 9.7 percent respondents have completed higher secondary or above. About 10.5 percent respondents have never been to school.

A total of 10,873 children aged between 6-18 years were found during the survey in these 15 villages. About 97 percent of them were studying in schools, whereas 260 children were found to be dropped out and 87 children were found who had never been enrolled in the school (refer Fig. 6). About 20 percent



respondent/ families did not find any difficulty to support to continue studies of their children however around 80 percent of them face some difficulties to support their children to continuing their studies. Two in every three respondents informed that they could not afford educational expenses (tuition fees, copy books, text books, pen/ pencils, travel costs), about 17 percent informed that school was far-off and road to school was unsafe and insecure. Another 17 percent respondents raised their concerns that their children were mentally upset or shocked due to the impact of COVID-19 pandemic and were not keen to go back to the schools.

83% respondents there is no mechanism available during the emergency situation to continue their children's education

According to 83 percent respondents there were no mechanism available during the pandemic situation to continue their children's education in the villages, while rest of the respondents could find some alternative mechanisms that include community/ neighbourhood schooling, education camp/ session in Flood Centres or special education sessions run by the NGOs.

## iii. Health:

### a. Awareness on COVID Appropriate Behaviour (CAB) and Vaccination status:

About 19 percent respondents have knowledge and understanding on complete set of COVID Appropriate Behaviour, i.e., wearing masks, social distancing, hand washing and avoid touching face, nose and eyes and 78.4 percent respondents have some knowledge on the CAB. It was also found that 3 percent (458) respondents, mostly from Mrityunjay Nagar village in gram panchayat Dhaspara

Sumantinagar-2 (349 out of 458) didn't have any understanding CAB. We derived to this interpretation after using the following questions with the group w.r.t. precautions from COVID:

1. Not touching eyes, nose and mouth unless hands are sanitized
2. Maintaining a physical distance of at least six feet (2 Gaj ki Doori)
3. Using mask properly to cover nose, mouth and chin at all times when people are outside
4. Wash hands frequently and thoroughly with soap and water or use sanitizer

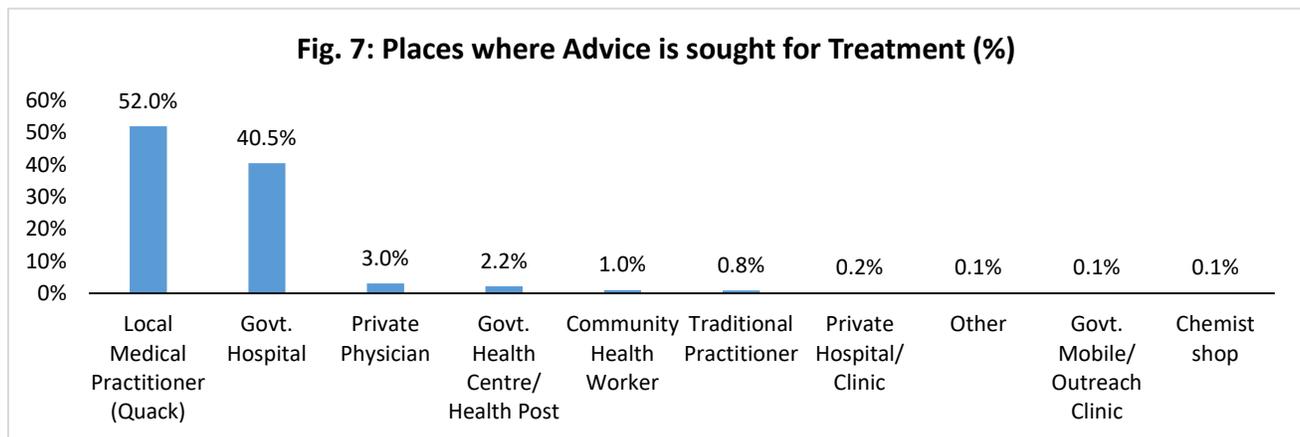
It was found that only 6 percent respondents were aware about all the above points, although 71 percent respondents were able to recall using mask properly to cover nose, mouth and chin at all times. About one-fourth (25.3%) of the respondents informed that any of their family member, who had migrated to another state for job or livelihood or any business, returned to home during the COVID-19 time after losing their job or shutting down the business.

Only 19% respondents have knowledge on the complete set of Covid Appropriate Behaviors (CAB) i.e., wearing masks, social distancing, hand washing and avoid touching face, nose and eyes.

**b. Healthcare-seeking behaviour:**

There are primary healthcare centres in each of Sagar Island's gram panchayats. At the primary healthcare centers a host of rudimentary medical activity take place, such as the administration of polio vaccines to children, pre- and post-natal care etc. Complicated pregnancies, deliveries, surgeries or any serious illnesses could not be dealt here due to lack of infrastructure or facilities. People living in the delta island of Sundarbans are often referred by the local doctors to the hospitals in the mainland for critical care and support during health emergencies. People need to cross the river by boat since these remote region is yet to be connected by roads or bridges. Delays are common since travel by a boat is not permitted in bad weather, because of the danger of boats capsizing. Delays happen during good weather conditions as well, especially when the tide begins to ebb and the water level become very low when boats get stuck on the riverbed/ mud. The adverse impact of salinity in water and soil was evident, causing skin infections or other water-borne diseases which shoot up significantly after cyclones or flooding when the region gets inundated by saline water.

More than half (52%) of the families visit local medical practitioners (quack) generally for seeking medical advice or medical treatment. About 40.5 percent go to government hospitals (refer Fig. 7).



## iv. Water, Sanitation and Hygiene (WASH):

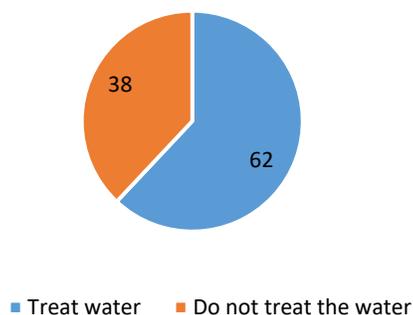
### a. Access to facilities and usage pattern:

About 14 percent households have improved source of drinking water as piped water/public tap is the main source of drinking water to the families. About 85 percent households have tube well or borehole as the main source of drinking water, which has a higher possibility of getting contaminated during monsoon, flooding. During disaster situations, tube well or borehole is the main source of drinking water for most of the respondents.

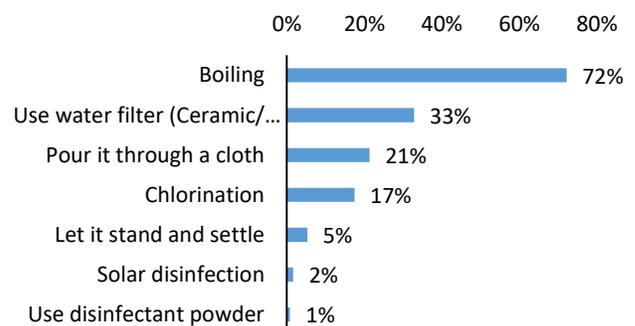


Nearly two out of every five households (38%) did not treat drinking water (refer Fig. 8). Out of those who treated water before drinking, majority of the respondents (72%) used boiling method (refer Fig. 9) followed by water filter (33%).

**Fig. 8: Drinking Water Treatment at Household (%)**

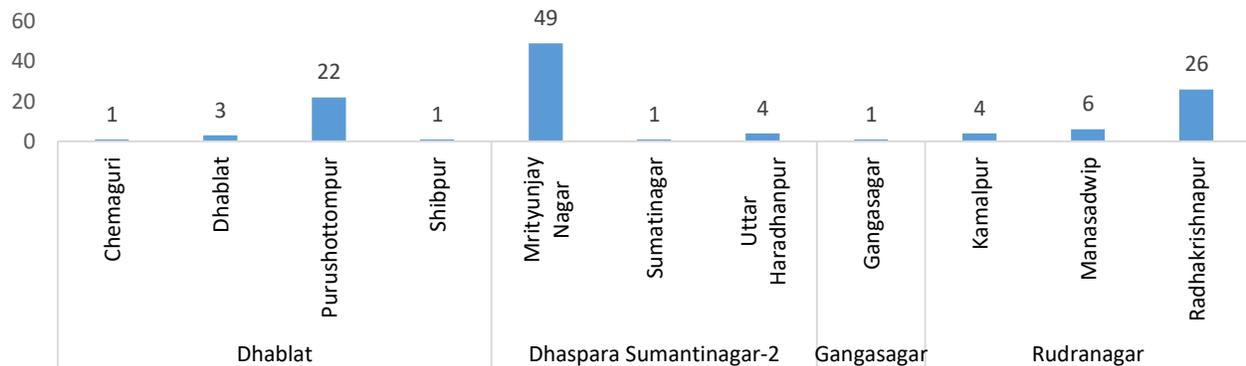


**Fig. 9: Treatment of Drinking Water (%)**



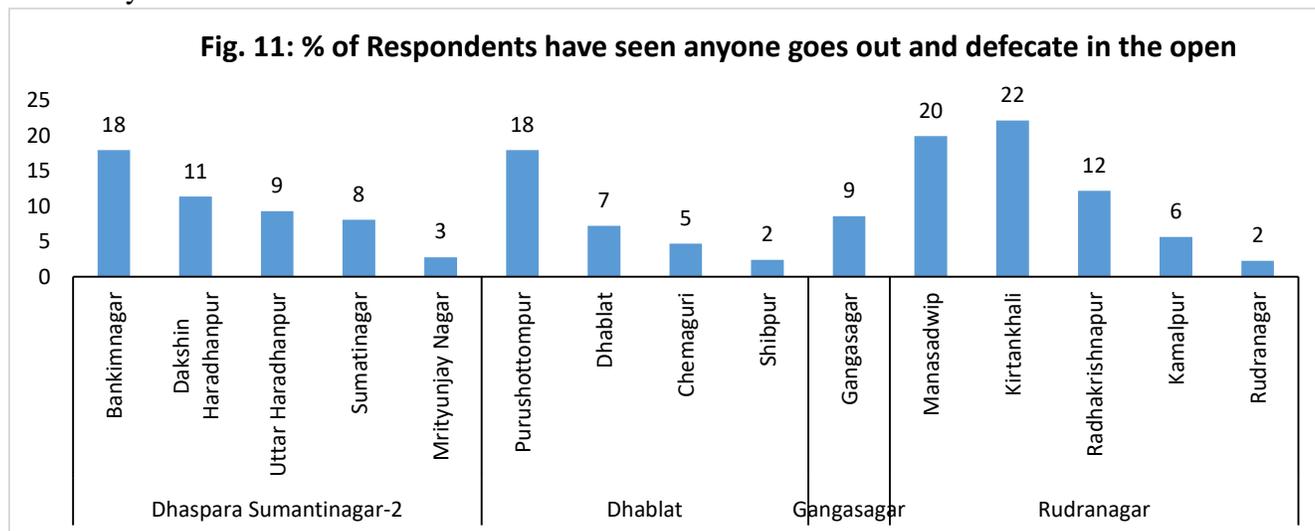
About 97 percent respondents found to be aware on how to store the drinking water. People in the region usually use earthen pots or plastic containers for storing drinking water, which are visibly clean with no algae. Only few of them (about 10%) were aware that the container should have a cover with a tap or narrow spout/mouth (e.g., opening is 3 cm or less) for drawing the water, it should be kept at a height that puts it beyond the reach of children/ animal and one should use ladle to take out water.

**Fig. 10: Number of Households do not have Toilet Facility**



About 91.7 percent households found to have their own toilets at home, 6.7 percent households use shared toilets with other households and less than 1 percent households use community toilets. About 0.8 percent (118) respondents stated that they are yet to have an access to any toilet facility (refer Fig. 10).

About 9.4 percent respondents (1,596) informed that they have seen anyone goes out and defecate in the open in their village, within one week prior to the survey. The below chart (Fig. 11) depicts village wise scenario where the respondents have seen anyone goes out and defecate in open within one week prior to the survey.



One should wash hands during the following critical times to maintain hand hygiene:

1. After going to the toilet
2. After attending to a child who has defecated
3. Before preparing or serving food to a child or before feeding the child
4. Before taking food/ eating.

About 30.5 percent respondents were found to be aware of at least 3 critical times of handwashing and only 6 percent respondents were found to be aware of all critical times of handwashing. About 40 percent of the households reportedly have water and soap for handwashing whereas, 57 percent household have only water for handwashing.

#### b. Menstrual hygiene- Awareness and practice:

Questionnaire on awareness and practice towards menstrual hygiene was administered with the girls and women 15 to 49 years of age. About 94 percent women were found to be aware about menstrual cycle, out of these, seven percent girls and women opined menstruation as a curse or disease. About 78.3 percent girls and women used to use unhygienic method of menstrual absorbent (rag or pieces of cloth, etc.), whereas 21.6 percent girls and women found who use sanitary napkins, reusable sanitary pad or menstrual cups. Girls and women used to get the materials for their menstrual hygiene from family members or shops/ vendors most of the times. More than half (58.5%) of the respondents found to believe that, one should clean a cloth by water and soap after use during menstruation, about 45 percent respondents believe that, one should dispose of sanitary the napkins properly by burning it, throwing it in Pad disposal bins/ Dustbin or Garbage/Dump yard. More than half of the respondents were found to believe to throw the used sanitary

Only 21.6% girls and women use sanitary napkin, reusable sanitary pad and menstrual cups during their menstrual period.

napkins into drain or toilet. Only half of the respondents were aware that during menstruation one should consume diversified food items like fruits, leafy green vegetables, fish, meat and eggs, etc.

About 35 percent girls and women make decisions by themselves about the materials they use during the menstrual cycle (to absorb or catch menstrual blood) whereas 13 percent respondents need to consult their mother or husband to take decisions. For half of the respondents, the decision was taken by the elders in the family; mostly by the mother or the husband. About 51 percent respondents reached out to Govt. frontline workers (ASHA, ANM) to discuss or get advice on menstrual health hygiene in past three months and 41 percent respondents sought advice or discussed with their parents and friends.

About 65.4 percent girls and women use rag or piece of cloth as absorbent during their menstrual period as the same is easily available, easy to use, can be used for longer period and most of them couldn't afford a better options than this.

## **v. Child Protection:**

### **a. Child protection related issues and Awareness on the reporting mechanism:**

Although child trafficking is not a major issue in these villages, 2.6 percent respondents informed that they have heard of any incident of child trafficking in their village in last one year. About 19.4 percent respondents of Kirtankhali village (GP: Rudranagar), 6.8 percent respondents of Manasadwip village (GP: Rudranagar), 4.4 percent respondents of Bankimnagar village (GP: Dhaspara Sumantinagar-2) and 3.5 percent respondents of Gangasagar village (GP: Gangasagar) have heard of any incident of child trafficking in their village in last one year. In last 3 years, about 18 percent respondents observed either their relatives (immediate family or extended family) or people in their neighbourhood got married before 18 years. About 66 percent respondents of Uttar Haradhanpur village (GP: Dhaspara Sumantinagar-2), 53.5 percent of respondents of Dakshin Haradhanpur village (GP: Dhaspara Sumantinagar-2), 38 percent respondents of Bankimnagar village (GP: Dhaspara Sumantinagar-2), 33 percent respondents of Purushottampur village (GP: Dhablat) and 22.7 percent respondents of Dhablat village (GP: Dhablat) have informed about such incidents. About 5 percent of the respondents also informed that some of their relatives would get married in next six months whose age was below 18 years (28% respondents of Gangasagar village of GP: Gangasagar, 16% respondents of Bankimnagar village of GP: Dhaspara Sumantinagar-2, 13% respondents of Kirtankhali village of GP: Rudranagar).

92.8 percent respondents opined that child labour is not a serious issue in their village. On the contrary, 30.5 percent respondents informed that their child was engaged in at least one of the following activities during the last week preceding the survey:

- i) Running any kind of business
- ii). Doing work for cash or kind (excluding household chores)
- iii) Working as a domestic worker outside his/her home
- iv) Working in his/her household plot, farm, vegetable garden or helped in growing farm produce or in looking after animals for the household (agriculture, animal husbandry, cattle grazing, and fisheries) or supported parents in the family business.
- v) Doing construction or major repair work outside of his/her home.

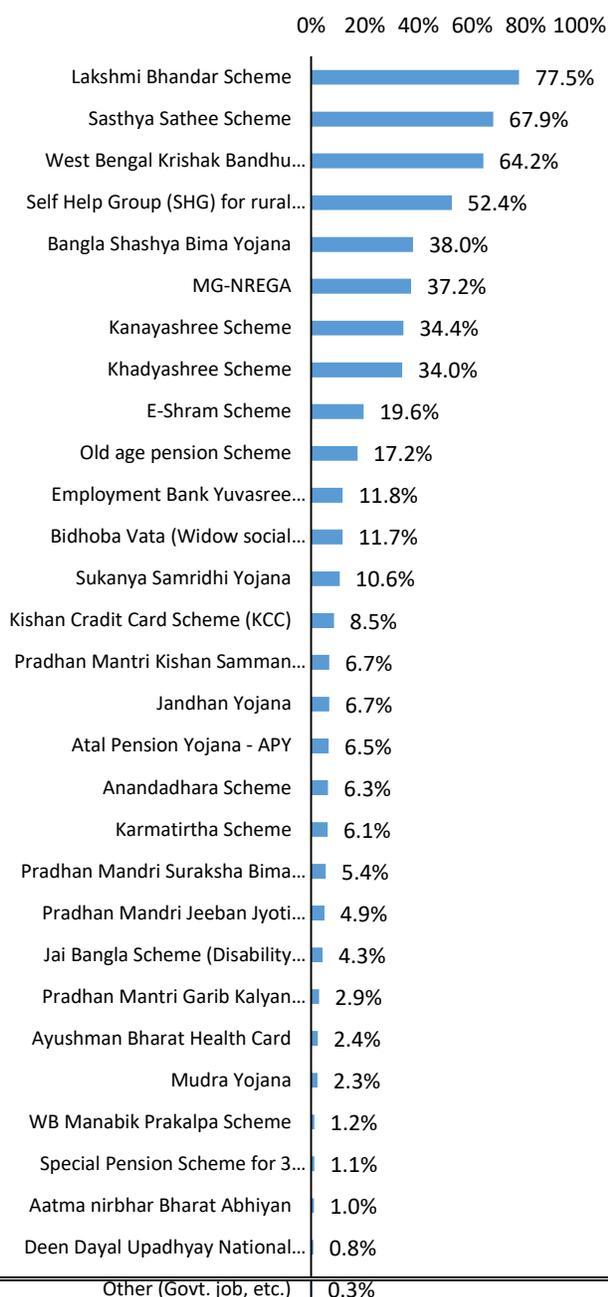
One in every four households, children were engaged in some form of work in their household's plot, farm, vegetable garden or helped in growing farm produce or in looking after animals for the household

(agriculture, animal husbandry, cattle grazing, fisheries) or supported parents in the family business. About 38 percent of the respondents in Radhakrishnapur village (GP: Rudranagar) and 25 percent of the respondents in Bankimnagar village (GP: Dhaspara Sumantinagar-2) informed child labour is a serious issue in their village. Only less than 1 percent respondents were aware of existence of any Village Level Child Protection Committee (VLCPC) and active Child/ Women Helpline number in their villages.

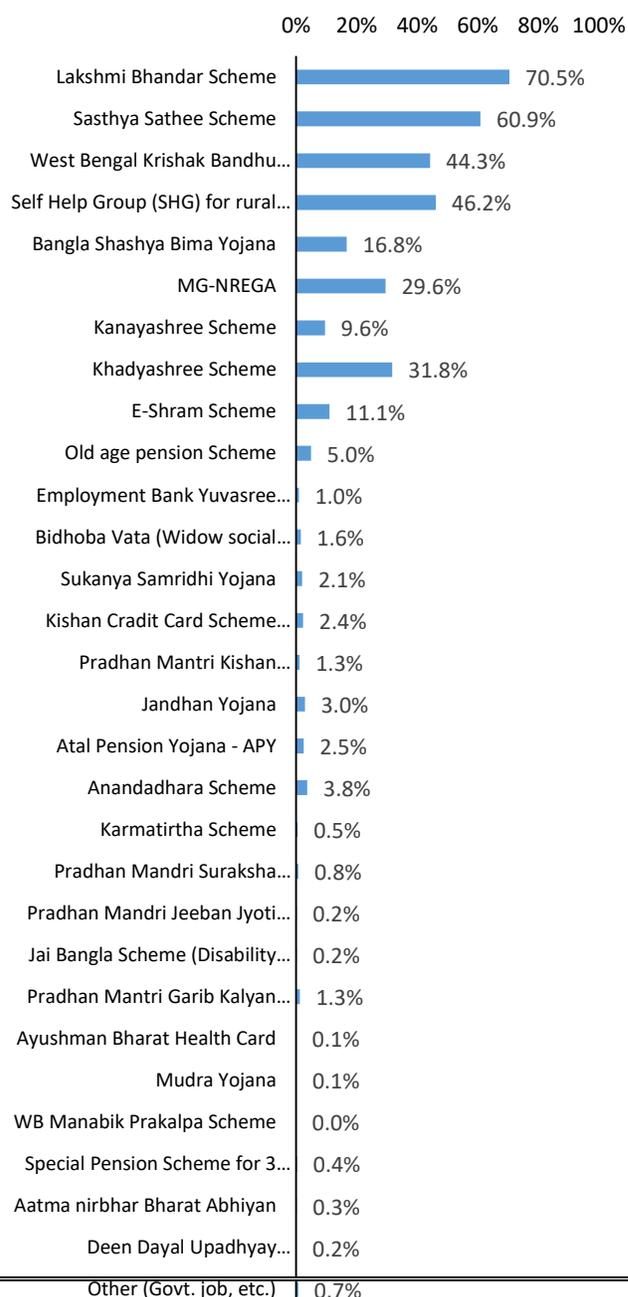
### b. Awareness and use of Government Schemes:

The study captured the level of awareness on the central and state government sponsored welfare schemes and the access of the respondent to such schemes. Fig. 12 below shows that more than 50 percent respondents were aware about Lakshmi Bhandar Scheme (78%), Sasthya Sathee Scheme (68%), West Bengal Krishak Bandhu Scheme (64%) and Self-Help Group (SHG) for rural women (52%). There are some instances (refer Fig. 13) where despite awareness of the schemes, few respondents have accessed it, e.g., Bangla Shashya Bima Yojana (44%), Kanayashree Scheme (28%), E-Shram Scheme (57%), Sukanya Samridhi Yojana (20%), Jandhan Yojana (44%), Atal Pension Yojana – APY (39%),

**Fig. 12: Awareness (N= 16896)**



**Fig. 13: Availed (N=16896)**

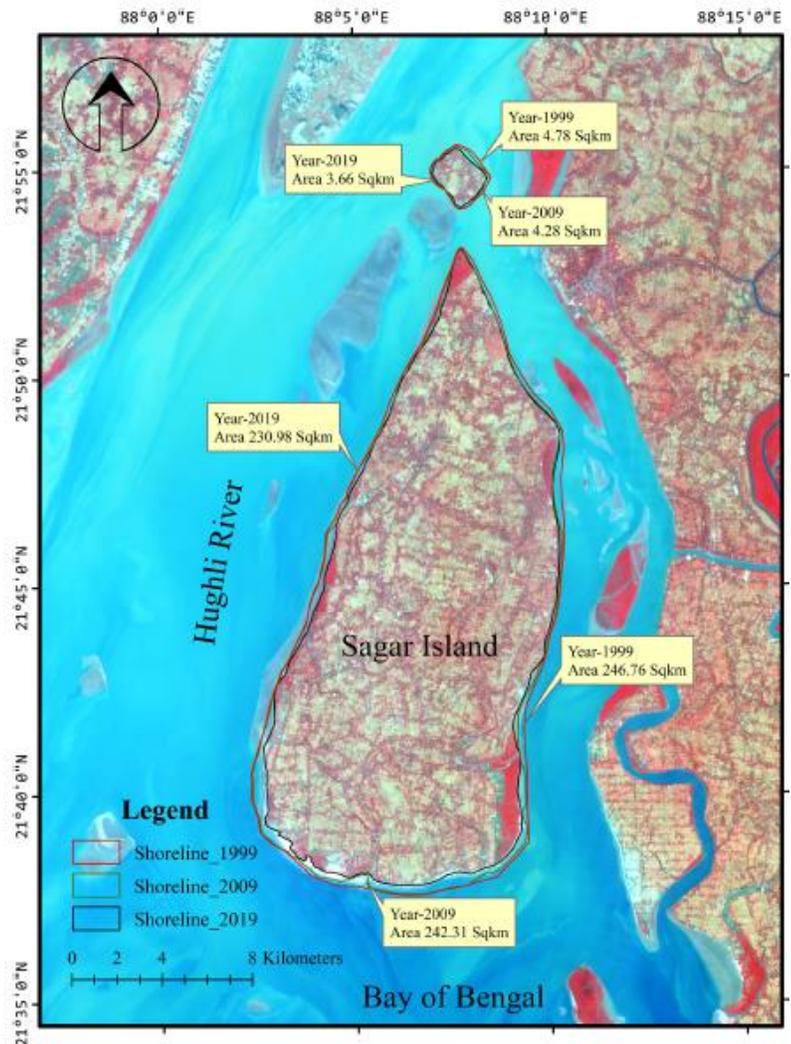


## vi. Climate change:

### a. Results of climate change:

Sagar block is the home to more than 20,000 tidal refugees from other islands and about 8,000 to 10,000 families live on the fringes of water. Despite having rich biodiversity and natural resources, these islands are inhabited by some of the world's poorest people where due a very fragile ecosystem, climate vulnerability plays determining role in vital socio-economic indicators like productivity, food security, poverty, livelihood, migration, and sustenance<sup>5</sup>. Cyclone and flood is the most common disaster situation in these villages.

Fig. 14: Area changes in Sagar Island 1999 to 2019

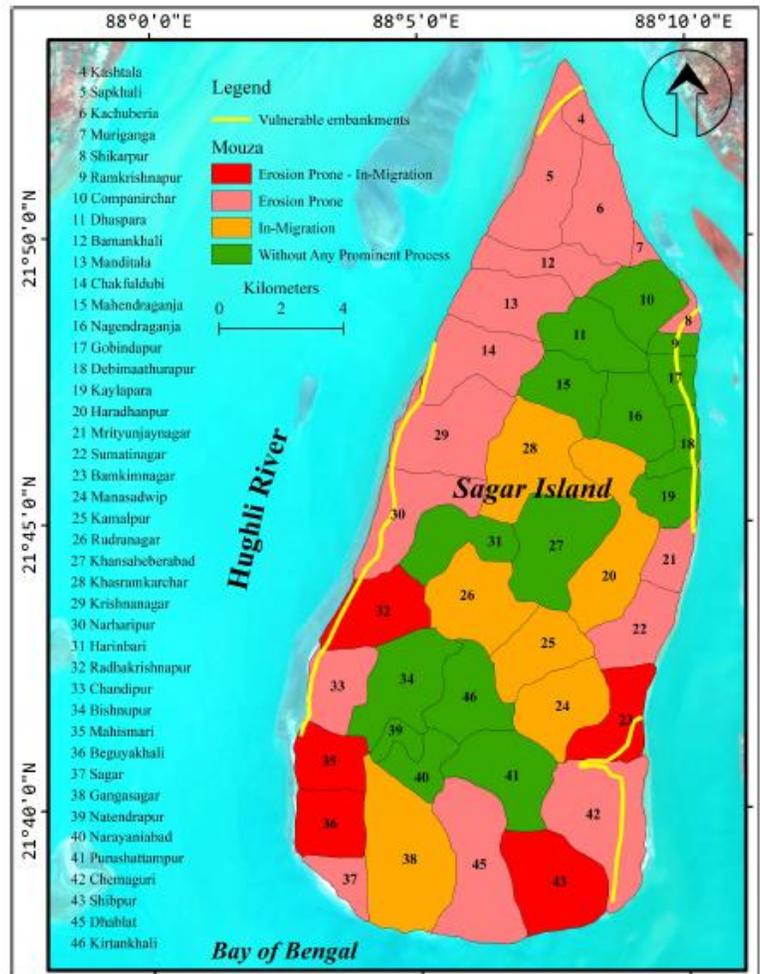


<sup>5</sup> Taloor, A.K., Kumar, V., Singh, V.K., Singh, A.K., Kale, R.V., Sharma, R., Khajuria, V., Raina, G., Kouser, B., Chowdhary, N.H., 2020. Land use land cover dynamics using remote sensing and GIS techniques in western Doon valley, Uttarakhand, India. In *Geoecology of Landscape Dynamics 2020*, 37–51 (Springer, Singapore).

Sood, V., Gusain, H.S., Gupta, S., Taloor, A.K., Singh, S., 2020. Detection of snow/ice cover changes using subpixel-based change detection approach over Chhota-Shigri glacier, Western Himalaya, India. *Quat. Int.* <https://doi.org/10.1016/j.quaint.2020.05.016>.

Sagar block is facing the problem of soil erosion, breach of embankments and loss of landmass and rising sea levels. The island has already lost 30 sq. km of land over last few decades. Due to premature reclamation, parts of Sagar remain 3 meters below sea level. These areas are not well protected by embankments. Due to constant tidal actions, indiscriminate clearing of mangroves and other such reasons, the island breaches every 6 months to 2 years. The highest rates of subsidence of the island were recorded in the last 1,000 years, where the mean increased to 8.8 mm/y and a standard deviation of 7.5 mm/y<sup>6</sup>. A National Centre for Coastal Research (NCCR, 2018) report pointed out that about 210 sq. km of landmass has eroded from 1969 to 2010. Studies recorded that the sea level rose from 2.26 mm/y in 2002 to 2.9 mm/y in 2009, above mean sea level, leading to the disappearance of five islands in the last five decades and 6000 families becoming homeless (WWF, 2010). Many researchers have carried out shoreline change analysis using remote sensing and GIS. A multi-date Landsat series satellite data was authenticated with Google Earth imagery<sup>7</sup>. According to a study<sup>8</sup> the area of the Sagar Island decreased from 246.76 sq. km in 1999 to 230.98 sq. km in 2019. The change in shorelines at three points of time, 1999, 2009 and 2019 of the Island is shown in Fig. 14. The average decadal percent changes in the area of these Islands accounts for -4.45 percent for the period 1999–2009. Similarly for the period 2009–2019 it accounted for -11.33 percent. During 2009 and 2019, the shoreline and the corresponding area of the Sagar Island has reduced significantly. Some of the specific mouzas that are vulnerable to migrations due to unstable embankments are shown in Fig. 15. The specific mouzas are Chemguri, Bankimnagar, Mritunjaynagar, Debimaathurapur, Gobindabapur, Ramkrishnapur, Shikarpur, Chandipur, Radhakrishnapur, Narharipur, Krishranagar, and Chakfuldubi.

Fig. 15: Mouzas of Sagar Island



The higher sea surface temperature, delayed and irregular monsoon, transgression of sea level are essential pieces of evidence (Hazra et al., 2014). It has been observed that there has been an increase in the intensity of cyclonic storms hitting the Sundarbans between 1951 and 2010 (Mahadevia and Vikas, 2012). On 27th May 2009, severe cyclonic storm Aila rendered millions of people homeless and

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<sup>6</sup> Brown, S., Nicholls, R.J., 2015. Subsidence and human influence in mega deltas: the case of the Ganga –Brahmaputra-Meghna. *Sci. Total Environ.* 527, 362–374.

<sup>7</sup> Meraj, G., Romshoo, S.A., Ayoub, S., Altaf, S., 2018. Geoinformatics based approach for estimating the sediment yield of the mountainous watersheds in Kashmir Himalaya, India. *Geocarto Int.* 33 (10), 1114–1138

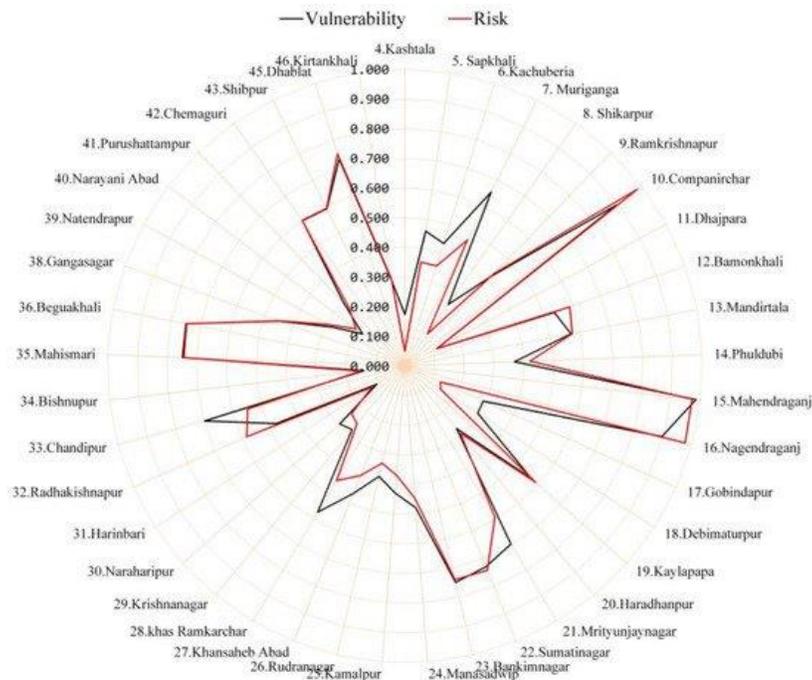
<sup>8</sup> Climate vulnerability and economic determinants: Linkages and risk reduction in Sagar Island, India; A geospatial approach, <https://doi.org/10.1016/j.qsa.2021.100038>

hundreds of hectares of land inundated with saline water. Besides, the very severe cyclonic storm Bulbul; 5th November 2019 also caused widespread destructions. It has been estimated that Aila damaged nearly 778 km embankment, reconstruction efforts gone in vain due to constant breaching.

A multi-dimensional relative ranking of 41 mouzas with spatial assessment of first (sensitivity and adaptive capacity variables- food insecurity, homeownership, and household assets), second (numbers of people without landholdings, road density, and sanitation), third (sensitivity variables- poverty, agricultural dependency), and fourth (variables of exposure- pucca house) components, indicates that most of the vulnerable communities survive in the marginal areas along the coastline.

Shibpur–Dhablat, Beguakhali–Mahismari, and Bankimnagar–Sumatinagar are at high risk, while Kachuberia, Muriganga, Candipur are highly vulnerable but at lower risk of exposure. Fig. 16 shows Mouza-level relative ranking of risk and vulnerability for Sagar Island.

**Fig. 16: Mouza-level relative ranking of risk and vulnerability for Sagar Island**

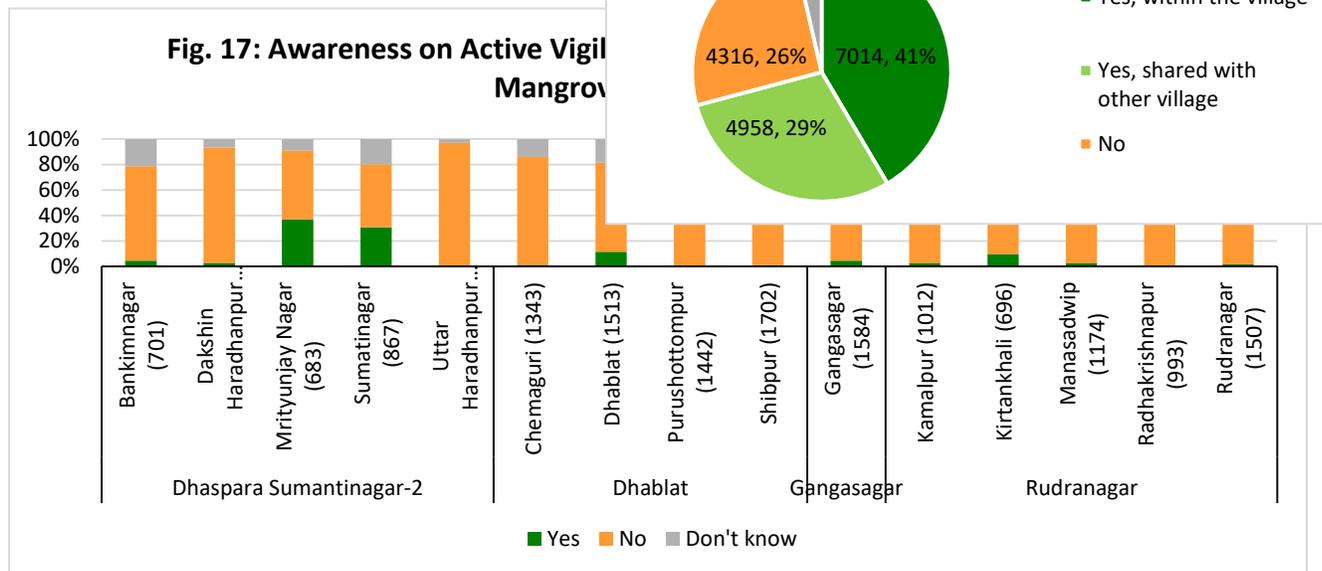


The location-specific schematic diagrams can effectively target adaptation and mitigation interventions in these geographically homogeneous villages.

Being home to over 0.2 million people, Sagar Island, the largest Island of Sundarban, is highly susceptible to coastal erosion, cyclonic storm surges, flooding, and embankment breaching, causing loss of land, property, and livelihood that eventually lead to displacements and induced migration. Over the past two decades, residents of this fragile sinking island of this world’s largest mangrove forest have seen their homes engulfed, farmlands salinized and livelihood depleted by the rising sea.

b. Incidents of disasters and awareness on the risk reduction mechanism:

Only 4.3 percent respondents have heard of any village level task force for managing disaster in their villages. About 68.2 percent respondents informed that villagers plant mangroves sometimes or regularly and rest of the respondents (31.8%) have never seen villagers to plant mangroves. About six percent of the respondents were aware of any active vigilance committee in



their village to protect mangrove plantation, 77 percent of the respondents informed that there was no active vigilance committee in their village and 17 percent of the respondents were not aware of it (refer Fig. 17).

About 70 percent respondents are aware about the existence of flood shelter either in the village or in an adjacent village. 26 percent respondents are not aware about existence of any flood shelters in the vicinities (Fig. 18).

## vii. Livelihood:

### a. Existing livelihood options:

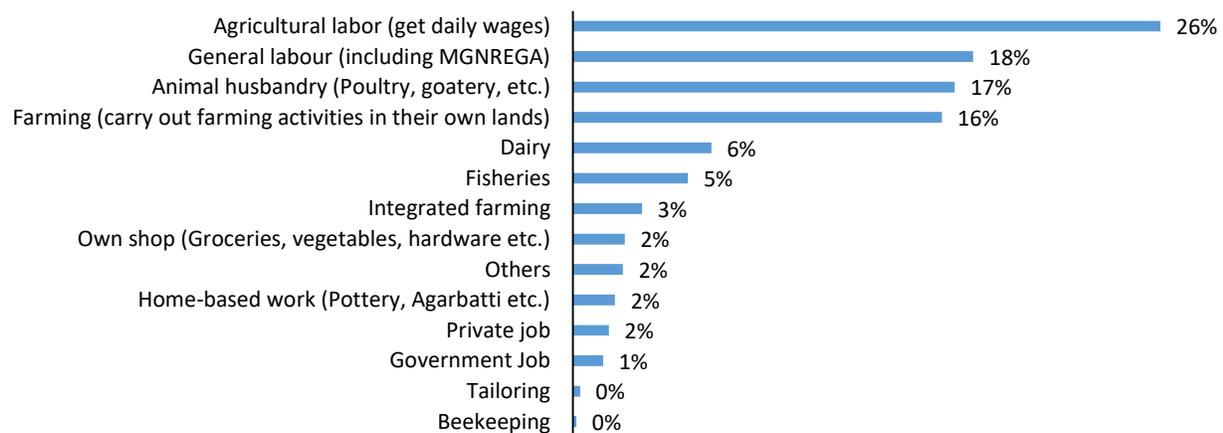
The magnitude of climate change in the area has serious impacts on economic growth. Available evidence suggests that agricultural productivity has been negatively influenced by several physical and non-physical factors, including climate change, extreme weather condition, and technological deficits<sup>9</sup>.

<sup>9</sup> Reilly, J., Tubiello, F., McCarl, B., Abler, D., Darwin, R., Fugli L., 2003. US agriculture and climate change: new results. *Climate Change* 61: 181-200. Battisti, D.S., Naylor, R.L., 2009. Historical warnings of future food scarcity caused by climate change. *Science* 323, 240-244. <https://doi.org/10.1126/science.1164363> Gornall, J., Betts, R., Burke, E., Clark, R., Camp, J., Willett, K., 2009. Agricultural productivity in the early twenty-first century. *Philosophical Transactions of the Royal Society B* 364, 315-326. <https://doi.org/10.1098/rstb.2010.0158> Haas, HD 2007. *Report of the Development Programme Paper no 34.*



Sagar block represents almost the entire livelihoods spectrum of the Sundarbans. Climate vulnerability and extreme weather events are also threatening the occupation and livelihood as the vast majority of the population are dependent on agriculture and fishing. A good proportion of the women population dwellings adjacent to the rivers and rivulets of the Sundarbans are engaged in this activity primarily to meet the demand for the spawns in the neighboring fisheries. The relatively easy money that comes to the people who catch the spawns, at the lowest end of a long chain that constitutes the shrimp trade, comes at considerable cost. Besides a high occupational hazards, health hazards, falling prey to crocodiles and small sharks, collecting seeds and seedlings has already started showing symptoms of serious ecological damage, such as a) extinction of many indigenous varieties of fishes which were abundant a few decades ago. In course of collecting the seeds, unknowingly the women destroy many other aquatic lives. b) Dwindling catches of shrimp spawns over the years due to indiscriminate collection, and c) damaging the mangrove vegetation while fishing and the consequent erosion of the embankments. These damages, taken together, paint a dark picture of future livelihood of the Sundarbans' poor. The Continuous land loss and increasing salinity diminish other exploitive alternatives like prawn seeds, honey, and other forest product collection. Widespread poverty and the lack of developmental initiatives have been turning them into daily wage laborers.

**Fig. 19: Occupations of the Household**



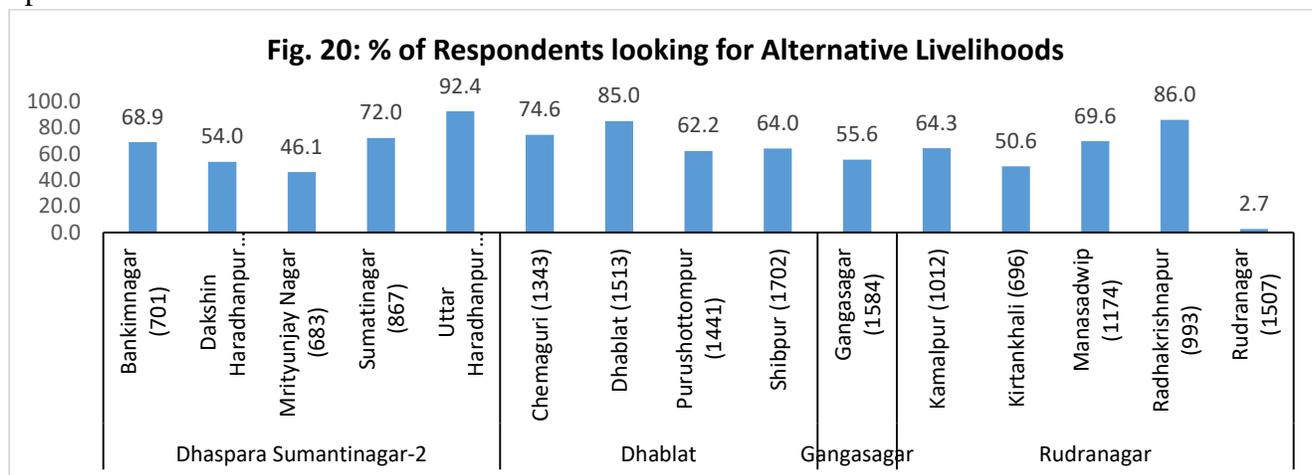
During the study, it was found (refer Fig. 19) that the income generating occupations of the households are dominated by agricultural labour (26%), followed by general labour including labour engaged in 100 days' work in MGNREGA (18%), animal husbandry (17%) and farming (16%).

**b. Willingness to shift towards alternative livelihoods:**

In the last six months preceding the survey, just after the second wave of COVID-19, about 55 percent families were not able to meet their regular expenses on food, children's education, and health-care etc. most of the time. Another 40 percent were barely able to meet their expenses but couldn't save any money. Only five percent families were able to meet the expenses of their families comfortably. During the time of this survey, more than 62 percent respondents expressed that they were looking for some alternative sources of livelihoods to compensate the deficit in the family income. The below chart (Fig.

Hertel, T.W., Rosch, S.D., 2010. Climate Change, Agriculture, and Poverty. Applied Economic Perspectives and Policy. <https://doi.org/10.1093/aep/ppq016>

20) depicts the village wise response of the respondents who were looking for alternative livelihood options.

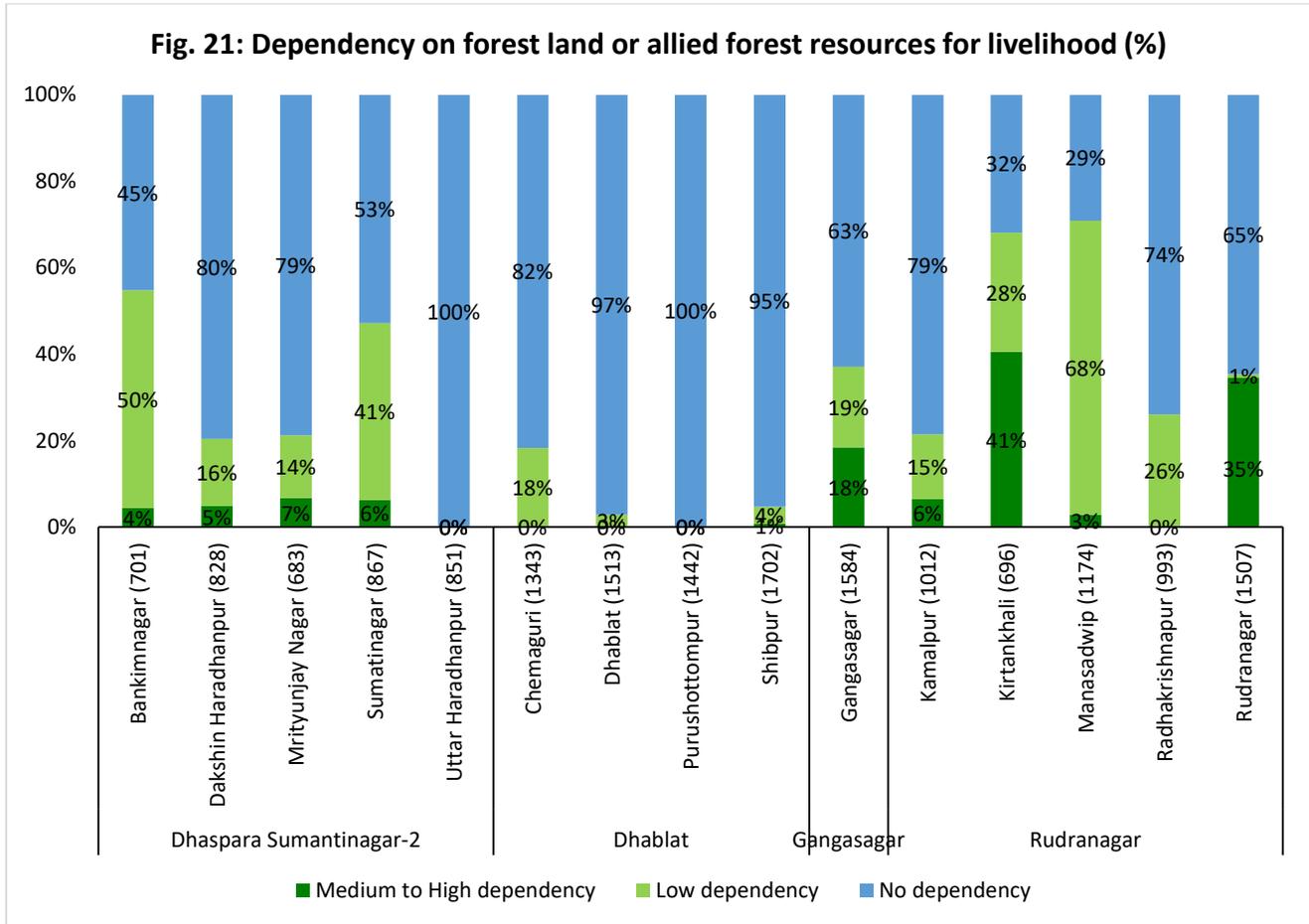


### c. Perception on the use of agro-forest land:

Three out of every four families (74.1%) did not have any dependency and 17.7 percent families had low dependency on agro-forestry or resources linked to agroforestry for their livelihood. Only 8.2 percent (1382) families said medium to high dependency on lands used for agroforestry for their livelihood (refer Fig. 21).

The major use of the agro-forest land or forest resources was for collecting dry wood (28.7%), grazing livestock on pastures of forest (19.9%), making hay (17.4%), growing crops on forestry farm land (13.8%), collecting fruits (10.3%), collecting medicinal and aromatic herbs and plants (6.6%), beekeeping (1.3%) and others (1.9%).

**Fig. 21: Dependency on forest land or allied forest resources for livelihood (%)**



Two out of every five (43%) respondents believed that agro-forests should be maintained and enhanced for economic purposes while 37 percent and 12 percent respondents believed that agro-forests should be maintained and enhanced for ecological values and social aspects respectively.

55% families were not able to meet their expenses on food, education, health, etc. post COVID-19 pandemic.

# Recommendations

The findings of this study will help adaptation strategies based on site-specific information and sustainable management for the marginalized populations living in the islands. There is a need to formulate comprehensive adaptation strategies at the policy and at the decision-making levels to help the vulnerable communities living in this island, in an extremely fragile ecosystem and need to deal with the adverse impacts of climate change as a part of their life. Based on the findings from the primary research, desk review and stakeholders' interviews, here are few key recommendations that could be reviewed and adopted by Sabuj Sangha as a long standing organisation working in the area.

1. **Construct rain water harvesting structures through pond, Mangrove Plantation, Bee Cultivation, Construction of water harvesting structure.**
2. **Restore Mangrove and Promote Mangrove Plantation:** Mangrove Plantation can play a very important role by effectively contributing to the environment on a whole through Carbon Sequestration in the area by providing oxygen, improving air quality, climate amelioration, conserving water, preserving soil, protecting embankment etc. The ongoing soil erosion can only be prevented and slowed down through large scale mangrove plantation and retaining the existing mangroves in all the villages which are facing the coastline erosion.
3. **Promote 'Diversified Livelihoods' which could adapt to the threats of climate change:**
  - i. An extensive research is important to learn, understand and identify some agro-based livelihoods which could withstand and adapt to the changing climatic condition in the island.
  - ii. Financing the women SHGs by providing seed capital as part of Community Investment Fund (CIF), so that they can take up different income generating activities.
  - iii. Promote land-shaping, kitchen gardening, integrated with pond based fish farming and duckery.
  - iv. Poultry Farming may be promoted integrating with fish farming
  - v. Bee Keeping as a popularly practiced income generating activity due to availability of natural resources; this could be promoted as an alternative livelihood option for interested families.
5. **Promote Education of children and Communities:**

In order to ensure a joyful education ambience identified Primary, Middle and High/ Higher Secondary schools, depending on the need, digital and Smart Interactive Learning Infrastructure may be established to make the teaching most effective and productive making the learning experience of the students attractive, for an e.g., Science & Math Labs, Library, Smart/ Interactive learning infrastructure (computer, audio-visuals). It is equally important to educate women in the families about their health, hygiene, entitlements to welfare schemes etc. Awareness and training of women will help to improve their participation to the work-force and contribute to improve family's economy.

**6. Install Street Solar Lights in community place, road side, school, hospital, market place, Jetty Ghats etc. to maximise the use of renewable energy and minimise the use of Thermal Power Energy.**

**7. Promote enhanced WASH facilities in schools:**

- i. Construct, renovate or improvise user friendly toilet facilities in the schools to ensure safe, secure, hygienic and healthy environment as per the requirement.
- ii. Facilitate to create improved source of uninterrupted drinking water supply
- iii. Hand pumps may be installed with high raise platform & Soak pits at vulnerable points to ensure access of safe drinking water.
- iv. Awareness for community led sanitation and installing improved home toilets under SBM scheme may be carried on.

**8. Promote Health and Hygiene:**

- i. To ensure equitable access to the health care system, by providing cost effective health services and facilities to the poor especially in rural areas, necessary steps are to be taken.
- ii. Awareness and mobilization activities through Social and Behaviour Change Communication (SBCC) may be organized. Information Education Communication (IEC) materials should be distributed to increase the knowledge level among young women and adolescent girls on various pertinent issues of Menstrual Hygiene; also to link them with various government schemes.
- iii. Medical camps may be organized to create and enhance awareness through appropriate intervention services and convergence and provide treatment to children, adolescents and adults as appropriate.