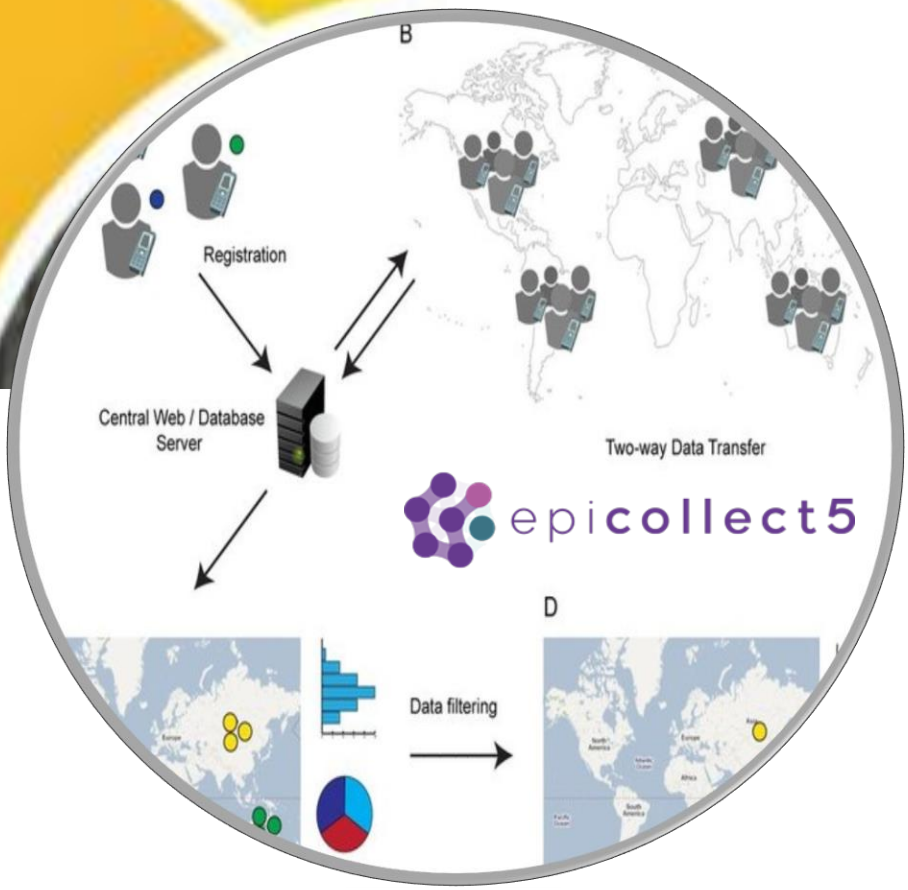
Government of the People's Republic of Bangladesh
Ministry of Housing and Public Works
URBAN DEVELOPMENT DIRECTORATE (UDD)



Final Report
with
Recommendation on planning with Social Justice

Socio-Economic and Other Surveys Package -4
Under
Preparation of Payra – Kuakata Comprehensive Plan Focusing Eco Tourism (PKCP)"

Consultant

GEOMARK LIMITED

House –33(1stFloor), Road –12
Pisciculture Housing Society
Mohammadpur, Dhaka-1207

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Final Report with Recommendation on planning with Social Justice Package-4 Under "Preparation of Payra – Kuakata Comprehensive Plan Focusing Eco Tourism (PKCP)

August, 2020

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Executive Summary

Various socioeconomic factors such as income, expenditure and religious beliefs, healthy habits, relaxation, occupation patterns, social connections and regulations, social status etc. have a significant impact on the overall development of the area. From this survey, some socioeconomic factors were found that are directly related to the socioeconomic status of the survey area.

For the purpose of this survey, latest online technologies were integrated to ensure time management efficiency and data reliability. Epicolect-5 and Kobo Toolbox online based data collection software were used to collect data from the field with geo-co-ordinate values. After conducting the survey, the data were extracted and necessary analysis has been performed. The results of the analysis have been displayed later in this report.

In the report, it has been found that 18% of the population is illiterate and 3% of the total residents are highly educated. Although in Galachipa Upazilas 82% people are educated, highly educated people are rarely seen. Therefore, there is still a need for improvement in the area's education. 40% people only primary pass and 20% are junior secondary pass.

Because most women are responsive to their profession as a housewife, the largest percentage of women in Galachipa Upazila. Single-family type was the common type of family in the Upazila, where the percentage was 83% single and 17% joined family. The maximum family members were aged between 30-50.

The distribution of religion in the Galachipa Upazila is roughly 90% Muslims, 10% Hindus.

In the survey it is found that 1.45% of residents in the Galachipa Upazila earned less than TK5,000 per month, and in the survey area only 3.99% earned more than TK50, 000 per month. 26.56% of the residents expressed that their income was within TK15, 000 and 23.57% of the respondents stated that their income was within TK20, 000.

Most of the expenditures are related to food expenditures in the Galachipa Upazila, 43% of the food expenditure was lower than TK 5, 000 but house rent expenditures were zero taka about 92% because they live in their own houses. Most of the residents in the survey area said that they spend Tk 1, 000 for transport purpose per month. 29% people said that they spend 2000tk for education purpose, 35% of people spend TK2000 for health purpose. In Galachipa Upazila, 72% of the respondents were with zero savings. Less than TK 5,000 saves 24% 2% of respondents managed to save higher than TK 5, 000. Only 1% are capable of saving higher than TK20, 000 per month.

Residents of Galachipa Upazila said that they have different types of problems like 53% of the respondents said that their canals have been encroached and banks of the river needs to be protected. 84% said that their environment is changing day by day so steps need to be taken to create environmentally friendly situation. 97% of respondents said that they have no regular entertainment source. In Galchaipa Upazila last year, 38% of the respondents were suffering from various diseases Database shows that 81% of children attend school. 50% of the respondents stated that the height of the embankment should be increased. 55% of respondents said that they have access to pure drinking water during the Cycloneperiod. 78% of the respondents stated that they have good arrangement for rainwater harvesting. 84% said that their sanitation was healthy.

In this survey, data have been collected in the prescribed format and the required number of samples were fulfilled. In this report some analysis and visual presentations using maps and statistics have been provided to summarize the results of the survey.

In Rangabali Upazila, it is found that more than 35% of the population is illiterate and 1% of the total residents are highly educated. Although in Rangabali Upazila 65% people are educated at certain level, highly educated people are rarely seen. Therefore, there is still need for improvement in the area's education

In Rangabali Upazila, 85% of family were single type family and 33% of the population aged between 40-50. The distribution of religion in the survey area is roughly 97.9% Muslims, 1.7% Hindus and 0.3% Buddhists.

From the survey it has been found that 21% of residents in the Rangabali Upazila earns less than TK10, 000 per month, only 3% earned more than TK50, 000 per month. 50% of the residents said that their income was between TK10, 000 to TK20000 and 26% of the respondents stated that their income was more than TK20, 000.

Most of the expenditures are related to food expenditures in the Rangabali Upazila, where 22% of the food expenditure was less than TK 5, 000. About 92% of the respondents said that they live their own house, with only 7% residents in the survey area said that they have to pay house rent. 31% of the respondents said that expenditure for education purposes was less than TK 1,000. 53% of respondents spend less than TK1000 on health care.

In the Rangabali Upazila 53% of the respondents were found with zero savings. 38% of the respondents saves less than TK 5,000. 3% of respondents managed to save less than TK10,000. Only 1% can afford to save higher than TK20, 000 per month.

People from Rangabali Upazila said that they have different types of problems such as 55% of the respondents said that their canals have been encroached and banks of the river need to be protected. 93% said that their environment is changing day by day so steps need to be taken to create environmentally friendly situation. 99% of respondents said that they have no regular entertainment source. In Rangabali Upazila last year, 25% of the respondents were suffering from various diseases Database shows that 66% of children attend their school.

In Rangabali Upazila, 89.9% of the respondents stated that the height of the embankment should be increased. 90.8% of respondents said that they have access to pure drinking water during the cyclone. 90% of the respondents stated that they have good system for rainwater harvesting. 52% of them said that their sanitation facility was healthy.

In this survey, data have been collected in the prescribed format and the required number of samples were fulfilled. In this report some analysis and visual presentations using maps and statistics have been provided to summarize the results of the survey.

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Chapter 1 Introduction

Physical Plan aims to improve the living condition of the residents of the area for which such a plan has been prepared. In order to ascertain the felt needs, expectations and the level of prevailing services it is necessary to conduct socio-economic surveys. Socio-economic Survey provides the socio-economic profile of an area as well as attitudes/aspirations of the residents which help the planners to decide on the requirement of land for different uses as well as level of services that needs to be ensured and incorporated in the plan document. The TOR provides for survey households of the project area to get information on the following aspects

- **Demographic information**: Age, sex, growth rate, household size, migration, etc.
- Religious Group, Religious status.
- **Education Status**: Primary, secondary, higher & others
- **Occupation Pattern**: Government, private, business, farming, labor and others
- **Income Level**: Lower, medium and higher (income range)
- **Ownership Pattern**: Land ownership information, type of dwelling houses etc.
- **Land Value**: Low land, ditch land, built-up & buildable land etc.
- **Health Facilities**: Type of facilities in hospital, private clinic and dispensary etc.
- **Recreation facilities**: Type of facilities (Active and Passive).

Data from both the secondary and primary sources will be utilized to accomplish the specified objectives of the study.

1.1 Background

The proposed project would be prepared on a regional development perspective considering the region as a part of whole of Galachipa and Rangabali Upazila containing 17 unions.

Upazila Name	Union Name
Galachipa	Amkhola
	Bakulbaria
	Char Biswas
	Char kajal
	Chiknikandi
	Dakua
	Galachipa
	Gazalia
	Golkhali
	Kalagachia
	Panpatti
	Pourasabha
	Ratandi Taltali
Rangabali	Bara Baisdia
	Chalitabunia
	Char Montaz
	Chhota Baisdia
	Rangabali

Chapter 2 Linkage of Survey output with Development Plans

2.1 Strategic Plan for Payra Kuakata Coastal Region at Regional Level

The survey firm would assist in preparing Regional Plan for Payra Kuakata Coastal Region would be prepared for 20 years according to the guidelines form: National policies, Formulated and integrated different sectorial strategies at regional level, spatially interpreted sectoral strategies at sub regional level, formulated Conservation Plan at regional level and formulated Development Plan.

It is also necessary to figure it out the economic disparity by using "shift-share analysis" or "input-output analysis" technique among the zilas and Upazilas within each district for drawing the future socio-economic development scenario. The Plan would also study on the following component at regional level of Payra-Kuakata Coastal Regions:

- Land Study:
- Review existing Land use and Development Plans, Upazila Plan Books.
- Change in Land Category and Land Use after FCD
- Assessment of change in land use after construction of major infrastructure
- Settlement Pattern
- Hinterland, Location and level of major facilities at sub regional level
- Hierarchy of settlements within the sub region
- Identification of major criteria of the settlements
- Hydrology:
- Local rivers: Hydrodynamic, Morphological, Geomorphologic development
- Impact of FCD and FCDI at sub regional level
- Environmental studies:
- Related Environmental Policies, Acts and Laws (in regional planning study)
- Environmental Procedures and Guidelines (in sub regional planning study)
- Economic, Social, Biological and Physical Environment at regional level
- Hazard management:
- Review on guidelines on Hazard management at sub regional level
- Hazard mapping considering natural hazards: Flood, water logging, drainage congestion, salinity intrusion according to guidelines on Hazard and Risk management at sub regional level
- Water Resource Management

- Agriculture water management at sub regional level
- Domestic water management at sub regional level
- Transport Studies (Rail, road, and water)
- Overview of the Existing Transport Situation
- General Situation of Road Infrastructure
- Situation of Road Transport (Passengers)
- Road Transport (Goods)
- Water Transport
- Major Traffic Generating Centres and Areas of Congestion
- Traffic Flow Characteristics
- Road Transport Services
- River Traffic Situation
- Travel Pattern
- Road Network Development
- Situation of Rural Transport
- Location of key point installation at sub regional level
- Strategic Issues to be addressed in planning the Future Transport System
- Population Study
- Spatial distribution of population and its changes since 1991
- Study on Basic services (major urban area):
- Housing,
- Sanitation
- Communication
- Energy
- Education
- Health
- Economic Activities:
- Agriculture
- Industry
- Fisheries
- Forestry
- Disparity analysis
- Anthropological and Ethnographical Study

- Livelihood Study of local people
- Ethnographical Study
- Heritage, Archaeology and Tourism management
- Potentials of Tourism in the sub region
- Planning Tourism for the sub region
- Linkage of Tourism to Recreation and Sports
- Potential Sites of Heritage
- Archaeological sites

2.1.1 Scope of Socio-Economic Survey in Strategic Plan for Payra Kuakata Coastal Region at Regional Level

In Socio economic survey, we'll study the cultural behavior, demography, livelihood pattern, Economic aspects, living environment, facilities like shopping, medical, recreational, etc. this survey also includes questionnaire on disaster damage.

All these knowledges are important to make a successful Strategic Plan for Payra Kuakata Coastal Region at Regional Level.

2.2 Sub- Regional Structure Zoning Category

In order to promote and protect public safety welfare by (i) minimising adverse effect resulting from the inappropriate location or use of sites and structures, (ii) conserving limited land resources and encouraging their efficient use, sub-regional structure plan would be prepared at upazila level. To carry out the purposes and provisions of the project as they apply within the context of the Sub-regional Structure Plan, the following land zoning category would be followed:

- Main flood flow zone
- Sub flood flow zone
- Critical ecological zone
- Wetland
- Forest
- Agricultural land
- Urban area
- Rural settlements
- Forest settlements

- Industrial moderate hazards
- Industrial low hazards
- Water supply protection zone
- Restricted flood protection reserve
- Restricted military / public safety
- Restricted road / rail/ utility reserve
- Restricted special

2.2.1 Scope of Socio-Economic Survey in Sub- Regional Structure Zoning

For regional level plan it is important to consider socio economic aspects of the region. Because to prepare an effective regional level plan, it is a key component to analyze the life style and social behavior of the people living in the region as the success of any development depends on adoptive capability of the people.

Socio Economic study can open a broader window to interact with people and gathering knowledge on people's perspective, their life style, their economic condition, their tradition, norms, as well as their activity, expenditure, education, household information etc.

Though, the questionnaire survey will be based on limited sample not the entire population of the region, still it can produce a complete picture based on reliable, well distributed and representative number of samples.

We strongly believe that the findings from our Socio-Economic study will be beneficiary for the Sub- Regional level plan as well.

2.3 Conservation Plan

Major Land use pressure is heavily depending on the ecosystems and resources of the existing nature. Land-use conflicts and clearly unsustainable uses may be found in planning areas. There is a clear need for broad-based, multi-sectoral and long-term development management, including community-based initiatives in sanitation, biomass preservation and collective management of natural resources, including more detailed priorities such as ecosystem preservation of fisheries habitat, maintenance of biological diversity and productivity, forestry management, containment of saltwater intrusion and population risk management. Also needed are institutional and regulatory actions.

Contrary to some current impressions, conservation and economic development are not conflicting ideas. In fact, well-planned conservation-oriented development will add to the general economic and social prosperity of a coastal community, while bad development will

sooner or later have a negative effect. With innovative management based upon sustainable use, communities may be able to achieve a desirable balance without serious sacrifice to either short-term development progress or longer-term conservation needs. In broad sense Conservation Plan would cover ecology and environment, land forms: forest, wetland, rivers and agricultural land, Major infrastructures, area of archaeological/ anthropological interest.

2.3.1 Scope of Socio-Economic Survey in Conservation Plan

People living in a specific region has the best understanding on their surroundings. It is important to consider what people are thinking about the problems and benefits of their existing condition. They are well aware about what to keep and what to remove, and what to improve. In the socio-economic study, we included questionnaire about the environment and disaster, migration pattern and reason behind them, Occupation and income pattern, land use change etc. which will partially aid the knowledge on ecology and environment, land forms etc.
Other survey includes the area of archaeological/ anthropological interest.

2.4 Components of Planning Structure

Components of the Planning Structure are:

2.4.1 Regional Plan

Regional Plan will be prepared for next 20 years. The plan will provide guide line for landuse and infrastructure for the next 20 years. This plan will be prepared under the guidelines of national police policies and strategies from sectoral agencies at regional level. The principal components of such plan are as follows:

(1) An inventory of existing physical, demographic, social, economic, infrastructure, Topographic, Ecological, Hydrological, Environmental, Geological, Hydro-geological and related features.
(2) An analysis of the major existing problems
(3) Identification of major constraints and Opportunities/ Potentialities of the region
(4) Consideration of national policies and policies from sectoral agencies

The regional plan would cover up to the year 2035 with the content and meaning of the National policy of planning guideline commission and guidelines laid in the Seventh Five Years Plan. Vision 2021, Perspective Plan 2020, Poverty Reduction Strategy Paper (PESP), National Water Management Plan (NWMP), Coastal Zone Management Programme, Wetland Protection Act, Environmental Laws, Forest Act, Economic Zone Act, The Building Construction Act, 1952 etc.

The Regional Plan would include studies on:

(1) Land Study
(2) Hydrology: Hydrological study based on the secondary data-set of the Upazilas and connecting rivers (Hydrodynamic characteristics, morphological characteristics, Dominant Hydrodynamic and Morphologic process, Conceptual Model of Dominant Hydro morphologic process, Impact of FCD in the area)
(3) Environmental studies
(4) Hazard/Disaster management: Flood, water logging, drainage congestion, salinity intrusion and cyclone, Earthquake, tsunami, tidal surge, river and coastal erosion, drought etc.
(5) Water resource and Coastal Zone Management
(6) Transport Studies (Rail, road, and water)
(7) Population Study
(8) Study on Basic services (major urban area)
(9) Economic Activities
(10) Forest Resources including Flora and Fauna
(11) Anthropological and Ethnographical Study
(12) Heritage, Archaeology and Tourism management

The purpose of a Regional plan is to prepare an indicative plan considering seven upazilas of Payra-Kuakata Coastal Region as a whole in an integrated and comprehensive manner to lessen the uncertainty about what presently exists and what is likely to happen in future and to provide a basis for different agencies, public and private, to proceed on the basis of a common goal by providing a framework for overall development.

Components:

- Translation of outputs of upper stages of planning in more specific terms:
  - ❖ Settlement: Rural and urban
  - ❖ Transportation infrastructure: Road, rail, water, air
  - ❖ Infrastructure: All sectors of both physical and social depending on local condition
- Requirements:
  - ❖ Final Delineation of :
    - ➢ Agriculture
    - ➢ Non-agriculture: urban, rural and special (both natural and man-made)

- Sensitivity to flood and drought
- Sensitivity to manmade and natural disasters specially earthquake.

Output:

- Conservation plan (primary, secondary and tertiary tidal and flood plan; and predicted different hazard scenario including cyclone, tidal surge, tsunami, earthquake hazard)
- Delineation of the structure of different infrastructures: Point, Linear and Area
- Interpretation of proposal of upper level policies
- To guide long term growth and development
- To provide basis from coordinating decision, development action within the urban area
- Provide guidance for development control
- Framework for local plan
- Focus planning issues of the urban area to the govt. and public

Composite Structure Plan reflects the complexity of the area.

Scale: R.F. 1: 50000 or as per justified scale

Period: 20 Years

2.4.1.1 Scope of Socio-economic Survey in Regional Plan

For regional level plan it is important to consider socio economic aspects of the region. Because to prepare an effective regional level plan, it is a key component to analyze the life style and social behavior of the people living in the region as the success of any development depends on adoptive capability of the people.

Socio Economic study can open a broader window to interact with people and gathering knowledge on people's perspective, their life style, their economic condition, their tradition, norms, as well as their activity, expenditure, education, household information etc.

Though, the questionnaire survey will be based on limited sample not the entire population of the region, still it can produce a complete picture based on reliable, well distributed and representative number of samples.

We strongly believe that the findings from our Socio-Economic study will be beneficiary for the Regional Plan as well.

2.4.2 Structure Plan

a) The term **Structure Plan** is derived from British planning practice but has been internationally adopted.

b) The principal components of such a plan are:

- An inventory of existing physical, demographic, economic, social and infrastructure features.
- An analysis of the major existing problems.
- An estimation of trends and changes likely in future (for the next 20 years).
- The identification of the major constraints on and opportunities for development.
- Consideration of the major development options and policies.
- An indication of the most suitable areas for such development.
- The identification of the priorities in each sector and the major activities needed to implement the development strategy.

The structure plan concentrates on the broad structure of the seven *Upazilas* and is not concerned with the details of physical layout or individual development details which cannot be implemented until the later stages of the planning period. In those areas and sectors where action is anticipated or proposed within a relatively short time however, more detail may be needed than is provided in the structure plan. Such appropriate level of detail is provided in the action plan.

The Structure Plan for the seven *Upazila* for 20 years. It would cover up to 2031 with the content and meaning of the development policy of Planning Commission and guidelines laid in the Poverty Reduction Strategy Paper (PRSP), National Water Management Plan (NWMP), Coastal Zone Management Project (CZMP), Disaster Management Plan, Comprehensive Disaster Management Programme, Wetland Protection Act, Environmental Laws, Forest Act etc.

The Structure Plan would include studies on:

- Hydrological study on the of the seven *Upazila* and connecting rivers (Tidal Characteristics, Hydrodynamic characteristics, Morphological characteristics, Geomorphologic development, Dominant Hydrodynamic and Morphologic process, Conceptual Model of Dominant Hydro morphologic process, Impact of FCD in the area)
- Disaster management: Flood, water logging, drainage congestion, salinity intrusion and cyclone, Tidal Surge, Earthquake, Tsunami, Costal erosion etc.
- Water Resource Management
- Land Study: Change in Land Category and Land Use after FCD
- Livelihood Study (pattern before and after FCD)

- Settlement Pattern (before and after FCD)
- Population Study
- Housing, Water supply and Sanitation
- Communication, energy, education and health
- Agriculture and fisheries
- Transport system (road and water)
- Ecology, Environment and impact of climate change

These sectoral studies would provide planning guidelines for land use and physical infrastructure. Land use, physical feature and spot level survey would be carried over the whole project area (detail would be provided in the TOR).

The seven *Upazila* suffer from impact of climate change, flood, drainage congestion, salinity intrusion, cyclone, tidal surge as well as social, environmental, water resources conflicts in land use and water use. Polderaisation made the situation much more complicated. As the FCD and FCDI projects raised conflicts in land/water use, there is a need for a legal instrument in order to regulate land use in a manner that would encourage orderly urban and rural settlements in accordance with the strategic policies of the Structure Plan. This is in order to promote and protect public safety welfare by (i) minimising adverse effect resulting from the inappropriate location or use of sites and structures, (ii) conserving limited land resources and encouraging their efficient use. To carry out the purposes and provisions of the project as they apply within the context of the Structure Plan, the following land zoning category would be followed:

- Tidal zone
- Main flood flow zone
- Sub flood flow zone
- Critical ecological region
- Water supply protection zone
- Mixed use planned zone
- Mixed use spontaneous zone
- Tribal settlements
- Rural settlements
- Industrial low hazards
- Restricted flood protection reserve
- Restricted military/public safety
- Restricted road/rail/utility reserve

- Restricted special
- Height Restriction Zone for (e.g. Civil Aviation)
- Spring and Neap tide zone
- General tourist zone
- Exclusive Tourists and Recreation zone for foreign tourists
- Trade and Commercial zone
- Fish Processing and Fishing Village zone
- Resources Forest zone and So, on

Components:

- Translation of outputs of upper stages of planning in more specific terms:
  - ❖ Settlement: Rural and urban
  - ❖ Transportation infrastructure: Road, rail, water, air
  - ❖ Infrastructure: All sectors of both physical and social depending on local condition
- Requirements:
  - ❖ Final Delineation of :
    - ➢ Agriculture
    - ➢ Non-agriculture: urban, rural and special (both natural and man-made)
- Sensitivity to flood and drought
- Sensitivity to manmade and natural disasters specially earthquake.

Output:

- Conservation plan (primary, secondary and tertiary tidal and flood plan; and predicted different hazard scenario including cyclone, tidal surge, tsunami, earthquake hazard)
- Delineation of the structure of different infrastructures: Point, Linear and Area
- Interpretation of proposal of upper level policies
- To guide long term growth and development
- To provide basis from coordinating decision, development action within the urban area
- Provide guidance for development control
- Framework for local plan
- Focus: planning issues of the urban area to the govt. and public Composite Structure Plan reflects the complexity of the area.

Scale: R.F. 1: 10000 or as per justified scale

Period: 20 Years

2.4.2.1 Scope of Socio-economic Survey in Structure Planning

People living in a specific region has the best understanding on their surroundings. It is important to consider what people are thinking about the problems and benefits of their existing condition. They are well aware about what to keep and what to remove, and what to improve. In the socio-economic study, we included questionnaire about the environment and disaster, migration pattern and reason behind them, Occupation and income pattern, land use change etc. which will partially aid the knowledge on ecology and environment, land forms etc.

2.4.3 Urban Area Plan (UAP)

UAP of urban settlements of Kalapara upazila like Kuakata, Kalapara Upazila Town, Khepupara, Keranipara, Misripara and Amkholapara; and Amtali Upazila Town, Taltoli upazila Town and other urban area of Amtali, Pathorgata, Barguna sadar Upazila and Galachipa Upazila including newly created Rangabali Upazila and would guide land use and infrastructure within the area potential for urban settlements within next 10 years. The UAP would emphasise over already defined areas.

Component:

- Landuse
- Population
- Infrastructure (Transport, Drainage & flood protection, water supply, sewerage, sanitation and solid waste, electricity etc.)
- Shelter and Housing
- Disaster including cyclone, tidal surge, tsunami, earthquake
- Other provision

Output:

1. Explanatory reports based on field survey and projections covering following aspects:
    - Demography
    - Agriculture
    - Economy
    - Transport
    - Drainage, Water Supply and Sanitation
    - Environment

- Housing
- Social facilities
- Utility services
- Industry
- Land Use & Settlement, etc.

2. Development Control Report on Landuse and Infrastructure development

Scale: R.F:1:3960 or as per justified scale

Period: 10 Years

2.4.3.1 Scope in Urban Area Plan

Socio Economic study can open a broader window to interact with people and gathering knowledge on people's perspective, their life style, their economic condition, their tradition, norms, as well as their activity, expenditure, education, household information etc.

Though, the questionnaire survey will be based on limited sample not the entire population of the region, still it can produce a complete picture based on reliable, well distributed and representative number of samples.

We strongly believe that the findings from our Socio-Economic study will be beneficiary for the Urban Area Plan as well.

2.4.4 Detailed Area Plan (DAP)

DAP is a separate planning document for urban areas and major growth centers covering the first five (5) year period of the structure plan. It examines the content of the structure plan and contains more detailed and more limited range of subjects than the structure plan. It provides a detailed guideline of the area. Detailed area plan contains use and resection for each plot. Restricted and permitted use for each plot is described in a detailed area plan.

Scale: R.F:1:990 or as per justified scale

Period: 5 Years

2.4.4.1 Scope in Detailed Area Plan

Socio Economic study can indicate that until a Detailed Area Plan is prepared for a sub-area, land use management functions will be exercised through the policies, guidelines and principles found in the Structure Plan and Urban Area Plan. However, without DAP efficient land management would not be possible. We strongly believe that the findings from our Socio-Economic study will be beneficiary for the Urban Area Plan as well. In the socio-economic

study, we included questionnaire about the environment and disaster, migration pattern and reason behind them, Occupation and income pattern, land use change etc.

2.4.5 The Development Control Plan for National and Regional Highway Corridor

Corridor Development Plan would cover the areas outside the urban areas under **Payra-Kuakata Coastal Region** along with the national and regional highway of the **Region to prohibit ribbon development**. The planning period for the component is 10 years. The plan would emphasize over retaining efficiency of the national highway. Content (with thematic map) of The Development Control Plan for Highway Corridor will be the similar or revised version (where necessary) of The Urban Area Plan.

Scale: R.F:1:3960 or as per justified scale

Period: 10 Years

2.4.6 The Rural Plan

The Rural Plan is the guideline for the land use control for the rural areas for next 10 years except the urban area and highway corridor area. The plan would emphasize over retaining the characteristic of the rural part of the project. It also provides guide line for necessary physical & social infrastructure which may needed for sustainable rural development particularly for rural growth centres. The main concern of this plan is to preserve the agriculture land as much as possible. Content (with thematic map) of Rural Plan will be the similar or revised version (where necessary) of The Urban Area Plan.

Scale: R.F:1:10000 or as per justified scale

Period: 10 Years

2.4.6.1 Scope in Rural planning

In rural area, it is important to understand the lifestyle and income pattern of the people living there. Socioeconomic survey is the best way to know them.

2.4.7 Sectoral Plan

Sectoral Plan will cover the detailed plan for different sector/sectoral agency (such as drainage plan). This will need detail study and will give recommendations and proposal for different sectors.

Scale: R.F:1:7920 or as per justified scale

Period: 10 Years

2.4.8 Contingency Plan

Contingency Plan will be prepared for a time of 20 year under the time frame of structure plan. This will include the proposal regarding emergency respond. This will help the govt. organization to respond effectively while emergency.

Scale: R.F:1:3960 or as per justified scale

Period: 10 Years

2.4.9 The Action Plan

The Action Plan is a separate document covering each five-year period of the structure plan. It examines, in the context of the structure plan, those items that might be implemented in this period subject to its priority appraisal and thus contains more detail on a more limited range of subjects than the structure plan. It tries to provide the seven *Upazila* with guidance in deciding between priorities.

The action plan consists of parts, a summary of resources available, project selection and project evaluation. The analysis of available resources looks at the past availability of funds, insofar as this is possible for such a recent institution as an *Upazila* and attempts to assess funds likely to be available for the seven *Upazila* themselves for development in the action plan period. Project selection summarizes existing guidelines as they affect five-year plans and lists the criteria used in selection before identifying priorities in each sector and proposing projects to address these priorities. Project evaluation looks at projects, which might be locally funded over the five-year period, given budgetary and other constraints, looks at projects which cannot be locally funded but which might be considered by national agencies operating locally and makes preliminary assessments of larger scale projects, which would need larger investment. The purpose of a plan is to lessen uncertainty about what presently exists and what is likely to happen in future and to provide a basis for different agencies, public and private, to proceed on the basis of a common goal by providing a framework for overall development.

Main features:

- Strategy of structure plan
- Detail basis for development control (development activities)
- To provide basis for coordination of both public and private sector
    - To bring local and detailed planning issues before the public and involve the local community in planning stage
- Set out policy of selected area

- Local contextualization of structure plan
- Describe a map specific proposal
- Fixation criteria for laying down development control necessary to establish locally appropriate standard

The objective of the action plan is to evaluate those projects, which should be implemented during the first five years life of the structure plan. It thus contains more detail on a more limited range of subjects.

Components: The objective of the action plan is to evaluate those projects, which should be implemented during each five-year life of the structure plan. It thus contains more detail on a more limited range of subjects. It consists of four parts:

(i) *Project Selection:* This consists, basically, of the actions listed for the first five-year period in the implementation chapter of the structure plan. While the importance of maintenance has been stressed throughout the structure plan, maintenance activities by themselves, except where they form a part of a development project, are not included in the action plan.

All the projects listed are needed in the first 5-year phase. Their selection is based on a variety of criteria. These include the maintenance of existing provision levels, the need to develop new areas and to address the worst problems. In other instances, they are the first increment in meeting standards selected for the year 2031. There are however financial restraints, which mean that priorities have to be established even for such a small list. After the projects have been evaluated therefore, availability of resources is considered and some priorities drawn.

(ii) *Project Evaluation:* Project evaluation is done for the projects, which might be locally funded, and for those unlikely to be locally funded but which are the responsibility of a Ministry or another central agency. Ideally, funds would be made available for implementing priority projects following evaluation. This unfortunately is not the case but the evaluations will assist the local agencies in deciding upon priorities for using local development funds and in pressing for action by national agencies.

The evaluations vary according to information available but overall are more qualitative than quantitative. They cover the following aspects:

- Nature of project
- Location
- Justification (why project needed)
- Approximate cost including maintenance element

- Beneficiaries, direct and indirect
- Agency responsible
- Risk/difficulties/problems anticipated

(iii) *Analysis of Resources:* Though most of the development that takes place will be carried out by private individuals, the single most important developer is likely to be the Paurashava /*Upazila* followed by other public agencies. This analysis looks at the past availability of funds (insofar as this is possible) and assesses the sum likely to be available for development during the action plan period. This can only be done for the local agency's funds, as it is not possible to estimate how a ministry or central agency's fund is apportioned between various towns, as other priorities in other areas are not known. Proposals can however be made on their own merit and the appropriate agency and action identified.

(iv) Establishing Priorities: It is worth repeating that all the actions/projects selected and evaluated are required to bring about development along the lines advocated in the structure plan. Nevertheless, constraints make it difficult to carry out all these activities in even such a small program. Where possible, therefore, priorities are recommended. It is the funding authority concerned, which should decide upon priorities, but the evaluations can assist in this decision.

There are limits also to recommending priorities. They can only be made within sectors e.g. construction of road A favored over road B and not between sectors e.g. between clinic A and school B. It may however be pointed out that the absence of one precludes the other e.g. a road to develop a new area is needed before a school should be provided in that area. Even within a sector, while the relative importance of projects can be assessed, priorities cannot be recommended if the source of funding is different.

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- Scale: R.F. 1:990 or as per justified scale
- Period: 5 Years

2.4.9.1 Scope in action area Plan

In the socio-economic study, we included questionnaire about the environment and disaster, migration pattern and reason behind them, Occupation and income pattern, land use change etc. which will partially aid the knowledge on ecology and environment, land forms etc.

Chapter 3 Reconnaissance survey and activity

3.1 Overview

Reconnaissance survey has done to clarify the brief survey of the study area that can provide the assessment team with valuable information to help plan the field data collection. After a meeting between Project Director (PD) and Project manager (PM) with the consult have done reconnaissance survey.

Figure 3-1 Meeting with Mayor at Galachipa Paurasava

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3.2 Team Member of the reconnaissance survey

1. ANM Safiqul Alam (Shaheen), Managing Director, Geomark Ltd.
2. Howlader Nazmul Huda, Planner
3. Imran Hossain, Surveyor
4. Md. Ariful Islam, Data and Documentation Officer

3.3 Meeting with Local Stakeholders

In the reconnaissance survey several meetings were held with the following stake holders

1. Assistant Engineer, Municipality
2. Assistant Engineer, Galachipa & Rangabali Municipality
3. Meeting with Local people
4. Meeting in tea stall

3.4 Major Findings of the Reconnaissance Survey

Several times the physical plan have been done in this area, especially in the municipality area, but none of those plans have been implemented. Industrial development should be in a proper manner by maintaining rules and regulation to protect the livable environment. Lack of infrastructure, drainage, waste disposal point etc. are the major problems of in the municipality area but rural road condition is good. The railway line is unprotected in most of the junction.

3.4.1 Basic Information of the Study area

The population is 380,000 where Population density is 764 per sq. km. in a literacy rate of 52.01%. The basic information of Galachipa & Rangabali is given bellow which have been collected from secondary sources.

Table 3-1 List of institution of the project area

SL No.	Name	Number
1.	Govt. Primary Schools:	145
2.	Madrasas	36
3.	Hat Bazaars	34
4.	Post Offices:	30
5.	Govt. Hospital:	1; with 50 beds.
6.	Private Clinic	5
7.	Non-government secondary school	46
8.	Non-government college	6

Source: BBS 2011

Table 3-2 Small scale industries

SL No.	Name	Number
1.	Rice mill	154
2.	Handy cottage industry	340
3.	Husking crafts	167
4.	Pottery	65

Source: BBS 2011

Table 3-3 Number of growth center, hat /bazar, poultry farm, dairy farm, nursery, horticulture center, brick kiln

SL No.	Name	Number
1.	Growth center	20
2.	Hat /bazar	38
3.	Poultry farm	44
4.	Dairy farm	9
5.	Nursery	30

6.	Horticulture centre	0
7.	Brick kiln	12
8.	Decorator service	90

Source: BBS 2011

Table 3-4 Occurrence of river erosion during the years 2008-2011

Year	**River erosion**	**Storm**
2008	Yes	No
2009	Yes	Yes
2010	Yes	No
2011	Yes	No

Source: BBS 2011

3.5 Meeting with Stakeholders and Project Area during Reconnaissance Survey

The survey firm have conducted reconnaissance survey including Focus Group Discussion, Tea Stall Meeting etc.; meeting with the local public representatives including Mayor of the municipalities, UP chairman, counsellor etc.

3.6 Meeting with Municipalities

There are two municipalities (Galachipa & Rangabali) in the Galachipa & Rangabali Upazila. By discussion with the municipality member and official it is found that there is a lot of problem in plan implementation. Lack of infrastructure like-road, water supply, electricity etc. is a common phenomenon. In the present situation Galachipa & Rangabali Upazila might be a virtuous economic hub in the economic development of Bangladesh and they are very much enthusiastic for the Galachipa & Rangabali Upazila Development Plan.

3.7 Tea Stall Meeting at in front Galachipa Paurasava

During reconnaissance survey a tea stall meeting was done to understand the people perception about present situation of the study area.

Table 3-5 List of people joined in tea stall meeting

Sl	Name	Address	Phone No.
01	Md. Boshir Ahmed	4 no. Word, B Galachipa Paurasava	
02	Md. Jasim Uddin	5 no. Word, Galachipa Paurasava	
03	Md. Sarwar Hossen	2 no. word, Galachipa Paurasava	
04	Mohammad Hossen	9 no. word, B Galachipa Paurasava	
05	Md. Sujon	Vill. Ratandi	

3.7.1 Tea Stall Meeting Output

Local people are very much concern with development. Government has developed an industry in this region that are affecting the local environment. Development should be in a proper manner so more job opportunity created. The local market should be developed.

Figure 3-2 Tea stall meeting at Horidevpur Bazar, Golkhali Union

3.7.2 Focus Group Discussion Output

Most of the people are concern with road, drain, pure drinking water in the municipality area. Planning should be in a participatory way so that local people can be benefited.

Chapter 4 Methodology

4.1 Data Collection

Socio-Economic and Other related survey (Urban and rural economy, social space studies, education, as specified in the ToR) is collected through smart technology and manpower. And secondary data is collected from different authentic sources.

4.2 Survey Equipment

Socioeconomic and others data is collected through online communication device (tablet) compatible format (apps) Kobo toolbox which have been already developed in consultation with UDD planner and project Director (PD).

4.3 Sample Size Delineation

House -hold sample survey is done using the approved Questionnaire based on specified Questionnaire format indicated in TOR. Sample size is minimum 30 questionnaire each Ward level and 30 no. of each union level of Galachipa and Rnagabali Upazilas.

4.4 Sampling Design

The sampling design in this case is taken as a stratified two-stage cluster sampling method. At first stage, the project area is divided into Urban and Rural part then further the urban part is divided into grid (200mX200m) and rural part is divided into 16 Union boundaries. In further, household of urban or rural area is selected randomly.

4.4.1 Sample size Calculation:

$$n_h = (z^2)(r)(1-r)(f)(k)/(p)(\check{n})(e^2)$$

n_h is the parameter to be calculated and is the sample size in terms of number of households to be selected;
z is the statistic that defines the level of confidence desired;
r is an estimate of a key indicator to be measured by the survey;
f is the sample design effect, *deff*, assumed to be 1.2 to 2.0 (default value);
k is a multiplier to account for the anticipated rate of non-response;
p is the proportion of the total population accounted for by the target population and upon which the parameter, *r*, is based;
$\check{n}$ is the average household size (number of persons per household);
e is the margin of error to be attained.

Recommended values for some of the parameters are as follows:
The *z*-statistic to use should be 1.96 for the 95-percent level of confidence.
r = 0.05, *f=1.2, k=1.1, p=1,*$\check{n} = 5,\ e = 0.13r$*=0.007*

Therefore,
n_h = (1.96^2) (0.05) (.95) (1.2) (1.1)/ (1) (4.99) (0.007^2)
n_h = 985
The desire sample size is 1100.
But according to DPP, the sample size for total package 01 is prescribed as 1487, in which per Upazila at least 200 is taken sample from urban area and at least 200 from rural area. For two upazila, we are taking Galachipa Paurashava 200, Galachipa upazilla rural area 600, Rangabali upazilla, urban area 200, rural area 250, Total 1250 samples for Socio economic survey. For educational institution we'll take all into account, Urban and Rural Economy Survey Galachipa Upazila 100, Raqngabali Upazila 100, informal economy survey Galachipa 50, Rangabali 50.

PART – A
GALACHIPA UPAZILA

Chapter 5 Galachipa Upazila

Galachipa Upazila (Patuakhali district) area 925.1 sq km, located in between 21°48' and 22°21' north latitudes and in between 90°15' and 90°37' east longitudes. It is bounded by patuakhali sadar, bauphal and dashmina Upazilas on the north, bay of bengal and rangabali Upazila on the south, Dashmina and char fasson Upazilas on the east,' amtali and kalapara Upazilas on the west. (Wikipedia, 2018)
Population Total 238681; male 119189, female 119492; Muslim 217588, Hindu 21050, Buddhist 11 and others 32. Indigenous community such as rakhain belongs to this Upazila. (BBS, 2011)
Water bodies Main rivers Tentulia, Galachipa;' Rabnabad Channel is notable.
Administration Galachipa Thana is formed in 1873 and it is turned into an Upazila in 1983. (Wikipedia, 2018)
Main sources of income Agriculture 68.18%, non-agricultural labourer 5.41%, industry 0.40%, commerce 11.53%, transport and communication 1.19%, service 4.22%, construction 1.23%, religious service 0.25%, rent and remittance 0.18% and others 7.41%.
Main crops Paddy, pulse, betel nut, peanut, chilli, vegetables. (BBS, 2011)
Extinct or nearly extinct crops Sesame, mustard, kaun, boro paddy, sakshar-kora paddy.
Main fruits Mango, jackfruit, papaya.
Fisheries, dairies and poultries. This Upazila has a number of fisheries, shrimps, dairies and poultries. (Wikipedia, 2018)
Communication facilities Pucca road 46 km, semi-pucca road 20 km, mud road 1000 km.
Extinct or nearly extinct traditional transport Palanquin, bullock cart.
Noted manufactories Rice mill, saw mill, ice factory, welding factory.
Cottage industries weaving, goldsmith, blacksmith, tailoring, wood work.
Hats, bazars and fairs Hats and bazars are 51, fair 1, most noted of which are Galachipa Bazar, Kalagachhia Hat, Ulania Hat, Baherchar Hat, Sutabaria Dayamayee Mela.
Main exports Paddy, fish, peanut, chilli, betel but.
Access to electricityall the wards and unions of the Upazila are under rural electrification network. However, 5.19% (urban 41.05 and rural 2.49) of the dwelling households have access to electricity. (Banglapedia, 2018)
Sources of drinking water Tube-well 91.57%, pond 5.40%, tap 0.25%, and others 2.78%.
Sanitation 13.16% (rural 9.69% and urban 69.84%) of dwelling households of the Upazila use sanitary latrines and 74.92% (rural 78.74% and urban 24.14%) of dwelling households use non-sanitary latrines; 11.92% of households do not have latrine facilities. (BBS, 2011)
Health centres Upazila health complex 1, satellite clinic 4, non-government health centre 1, family planning centre 10.
The devastating cyclones of 1584, 1960 and 1970 and the flood of 1876 caused huge loss of life and damages to settlements, livestock and other properties of the Upazila.
NGO activities asa, SCI, CODEC, brac, Urban, SAP-Bangladesh, BAOPA, CEP BARD, CHDP. (Banglapedia, 2018)
Table 5-1 Galachipa Upazila Location

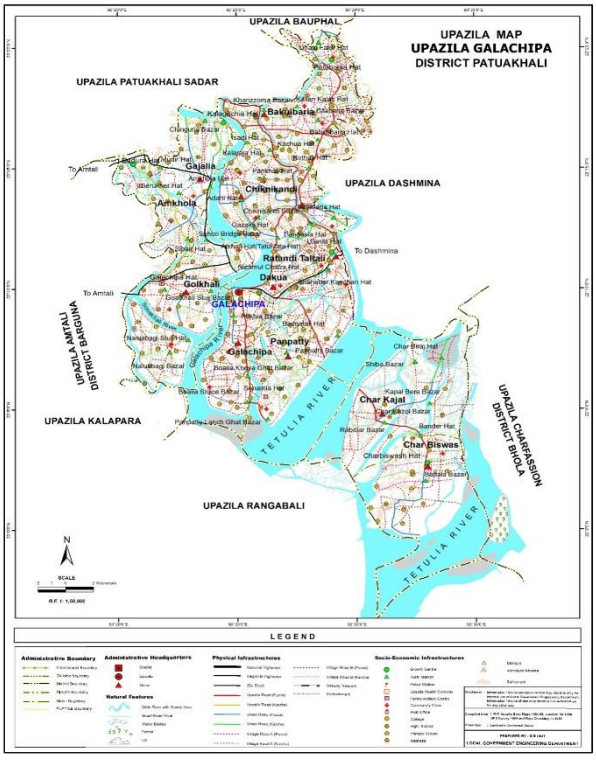
Upazila								
Municipality	Union	Mouza	Village	Population		Density (per sq km)	Literacy rate (%)	
				Urban	Rural		Urban	Rural
1	11	90	149	22301	216380	188	62.7	42.97

Municipality					
Area (sq km)	Ward	Mahalla	Population	Density (per sq km)	Literacy rate (%)
3.39	9	9	17373	5110	48.15

Upazila Town				
Area (sq km)	Mouza	Population	Density (per sq km)	Literacy rate (%)
5.13	2	4928	109	48.15

Union					
SL No	Name of union and GEO code	Area (acre)	Population		Literacy rate (%)
			Male	Female	
1	Amkhola 11	11673	14159	13973	38.78
2	Gazalia 69	-	2542	6815	45.98
3	Galachipa 67	11433	8098	7764	42.08
4	Golkhali 72	16730	14882	14844	38.17
5	Char Kajal 39	25159	11143	10214	28.82
6	Char Bisis 37	-	8892	8215	36.84
7	Chiknikandi 50	12188	7484	7522	50.52
8	Dakua 55	8017	9174	8699	46.72
9	Panpatty 78	7185	8781	8456	55.08
10	Bakulbaria 22	12792	13748	14079	43.58
11	Ratandi Taltali 94	7396	8455	8441	46.13

Source Bangladesh Population Census 2011, Bangladesh Bureau of Statistics.



Map 5-1 Galachipa Upazila Location Source LGED

Chapter 6 Data Collection and Analysis

6.1 Data collection

We have successfully completed the 818-questionnaire survey in Galachipa Paurashava. We conducted survey in other unions as well. Upazilla and union-wise data collection in represented in following tables,

6.1.1 Union/ Paurashava –wise Data collection

Table 6-1 Union/ Paurashava –wise Data collection

Questionnaire Distribution Table		
Upazila Name	**Union Name**	**Number of questionnaires surveyed**
Galachipa		818
	Amkhola	54
	Bakulbaria	50
	Char Biswas	50
	Char kajal	50
	Chiknikandi	48
	Dakua	54
	Galachipa	45
	Gazalia	50
	Golkhali	54
	Kalagachia	50
	Panpatti	60
	Pourasabha	201
	Ratandi Taltali	52
Grand Total		**818**

6.2 Data Analysis

We analyzed the data from 1105 questionnaire under the GALACHIPA Upazila. Weanalysis the various variable and found different type of problem. We analysis the Socio-Economic data of two costal Upazila. These results are following,

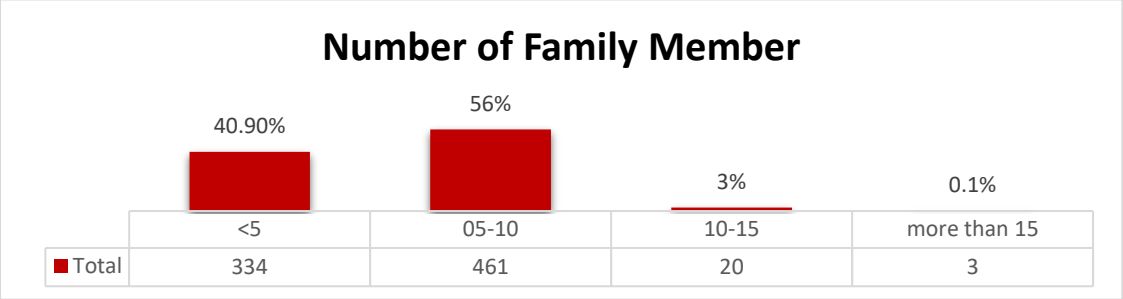
6.2.1 Basic Household information

6.2.1.1 Family Type

Family type and composition of the area of Galachipa upazila traditionally distributed in two categories which are joined and single type family. Now in recent trend of family structure of Bangladesh totally reflected in this area of Galachipa upazila, survey shows that 83% 0f the family belongs to the single type and other 17% are in joined family type.

Table 6-2 Family Type in Galachipa Upazila

Categories	Frequency	Percentages
Joined	139	17%
Single	679	83%
Grand Total	**818**	**100.00%**



Source: Geomark Ltd.

Figure 6-1 Family Type in Galachipa Upazila

6.2.1.2 Religion Type Data Analysis

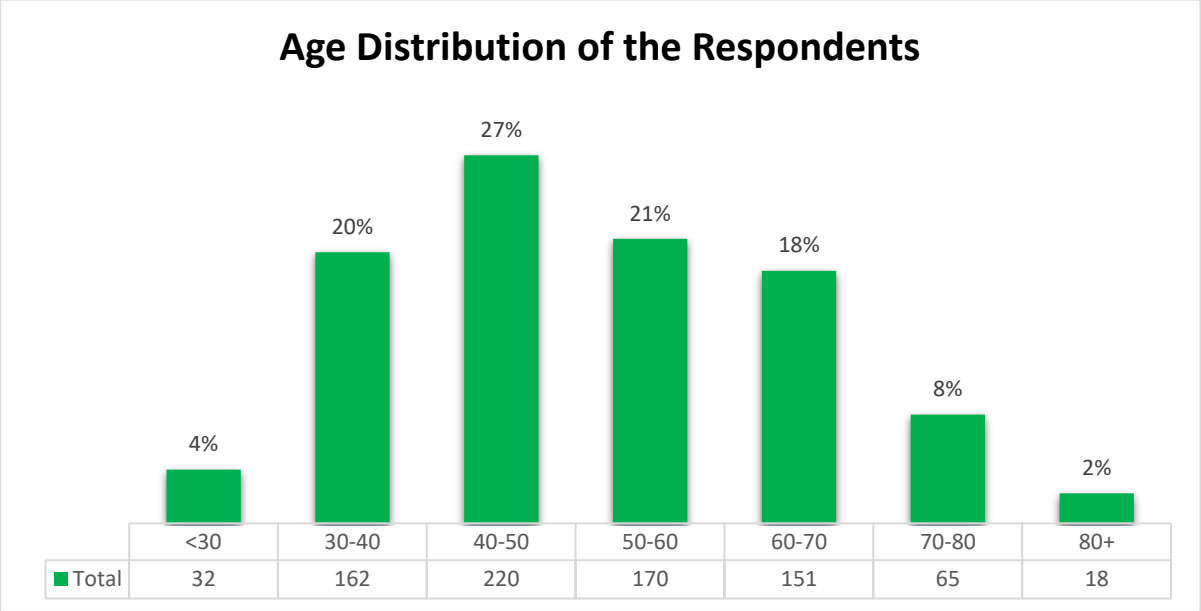
Bangladesh is a Muslim majority country and the distribution of religion in the survey area shows the same as the national wide religion distribution, respondents in the Galachipa upazila distributed into 90% Muslims and 10% of Hindu population.

Table 6-3 Distribution of religion

Religion	Frequency	Percent
Hindu	83	10%
Islam	735	90%
Grand Total	818	100

6.2.1.3 Age of the respondent

The number of dependent in children age group is not consider in this study so the age category started from the age of 30 as the respondent. In the figure 4-2, shows that the maximum 27% of the household head having the age of 40 to 50 years responding for the survey, two outlier age group combined as 6% shows minimum representing as the respondents in the Galachipa Upazila.



Source: Geomark Ltd.

Figure 6-2 Age Distribution

6.2.1.4 Sex

The majority of the respondents were male. This information does not represent the actual situation because religious and cultural factors play an important role in the rural area of Bangladesh. The survey represents the 95% male respondents and rest of respondents are female in the Galachipa Upazila.

Table 6-4 Sex of the respondents

Categories	Frequency	Percentages
Female	37	5%
Male	781	95%
Grand Total	818	100%

6.2.1.5 Education

The majority of the respondents are not highly educated, 7% of the respondents have completed their bachelor or relevant degrees and only 3% for the Masters or higher, One the other hand 39% of the respondents have the primary level education and 18% are illiterate.

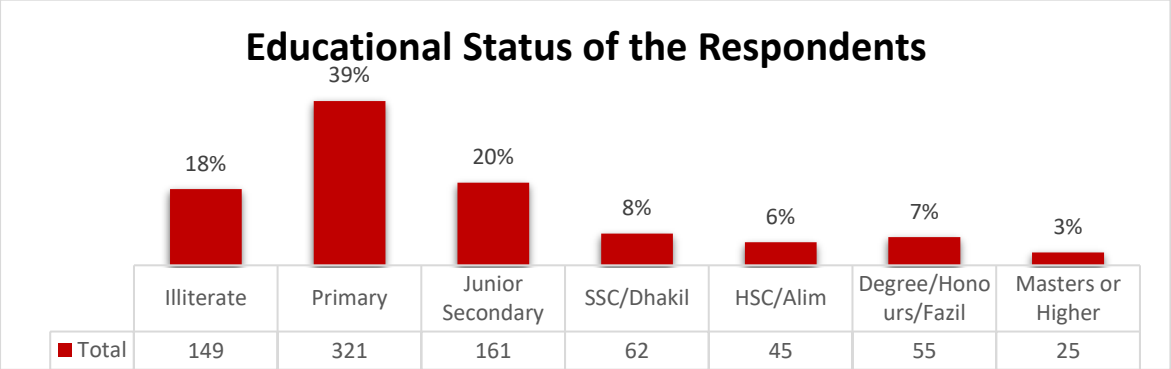
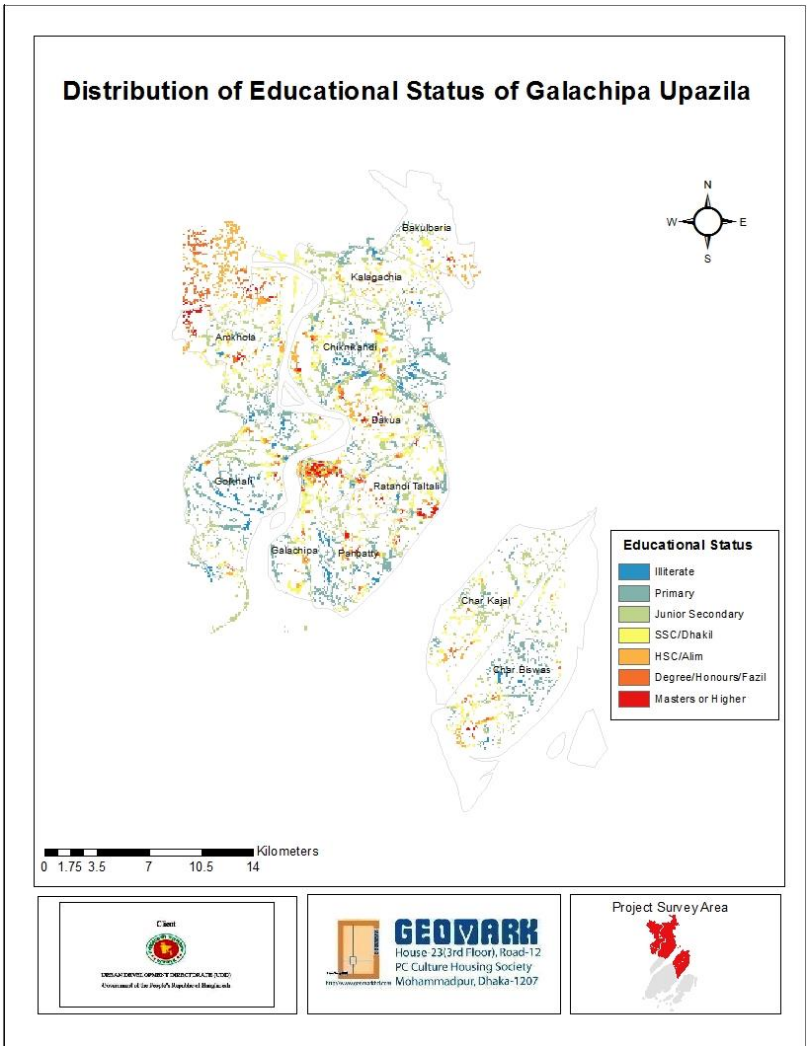


Figure 6-3 Educational Status

Map 4-1 is showing that most of the illiterate person mainly distributed across the Galachipa upazila, but Char kajol, Golkhali, Ratandi Taltoli and Amkhola union having the most of the illiterate people in the study. People with higher education were mainly found in Galachipa Paurashava.



Map 6-1 Educational Status of the Respondents

Thematic Map of Distribution of Educational Status shows that the higher respondents are mainly from Galachipa upazila and a small portion from Chiknikandi union.

6.2.1.6 Marital Status

97% of married respondents appears in the study 1,5% are unmarried and less than 2% respondents share the divorced and widow categories combined in the Galachipa Upazila.

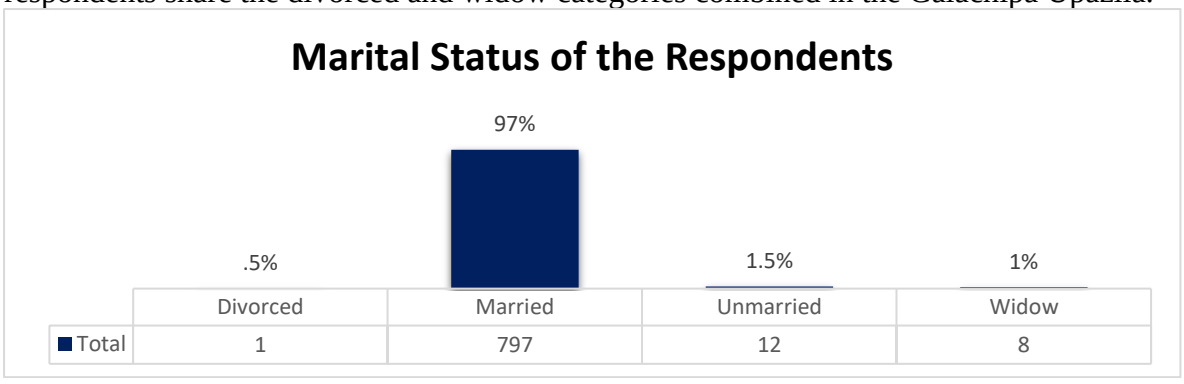


Figure 6-4 Marital Status in Galachipa Upazila

6.2.1.7 Occupation

In the Figure 4-5, exhibits that the maximum 41% respondents in the Galachipa upazila involved in the agricultural sector, 27% doing small/Medium business.

Despite the above categories some other occupation like Laboure, Government employee, Student and Teacher are also distributed in the area with having not more than 10% of each.

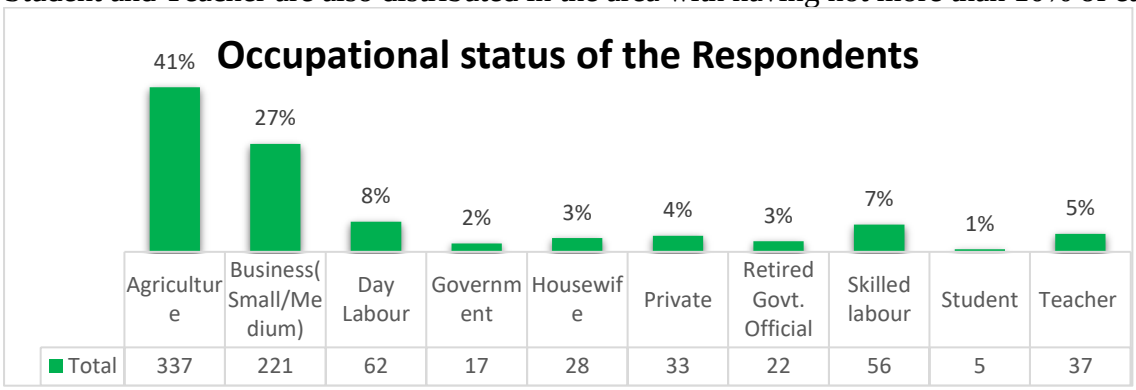
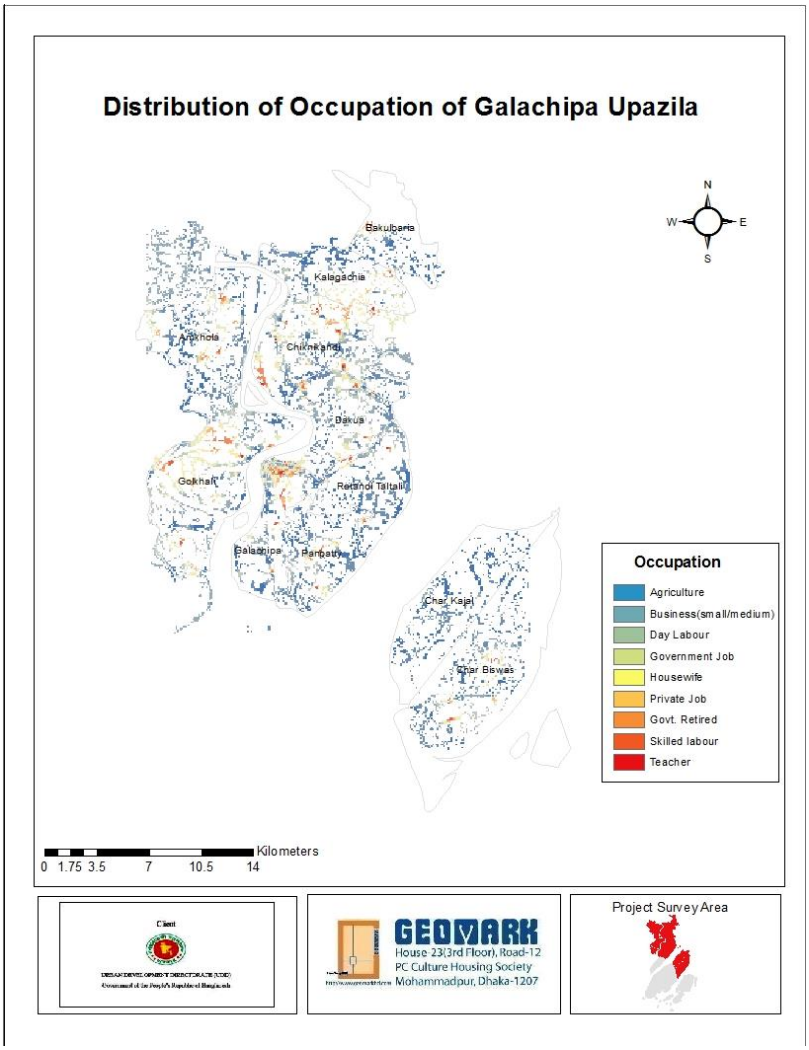


Figure 6-5 Occupation in Galachipa Upazila

According to the Thematic map given below, it shows that the respondents belongs to the occupation to the agriculture in the Galachipa Upazila is mainly scattered all over the upazila but Char Kajol and Char Biswas having the maximum number of the Agriculture based occupation.



Map 6-2 Occupational status of the Respondents

6.2.1.8 Relationship with Household Head

Our Field Surveyors went from house to house collecting information. However, they do not always meet the respondent. Sometimes they miss them and collect data from the alternative person. So, need to know about the relationship between HH and others. In most cases, the head of the family has responded to himself / herself, 48.81 % of them to be exact. The following chart present the relationship between others.

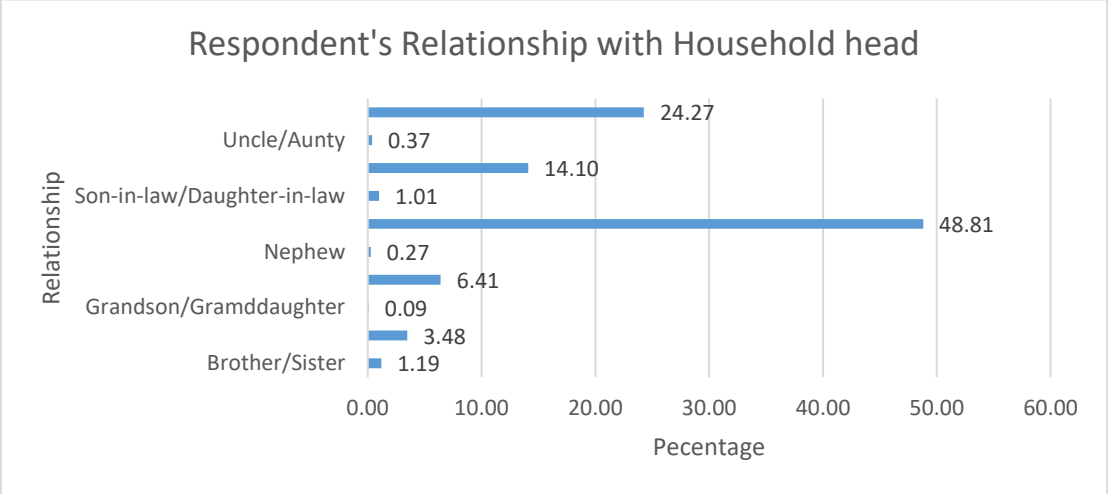


Figure 6-6 Respondent's Relationship with Household head

6.2.1.9 Family Member

Family members play an important role in the development sector. If the size of a family member is large, they can play a much greater role in society and the economy. In Galachipa Upazila, most of the family members of 3-5 members were found.

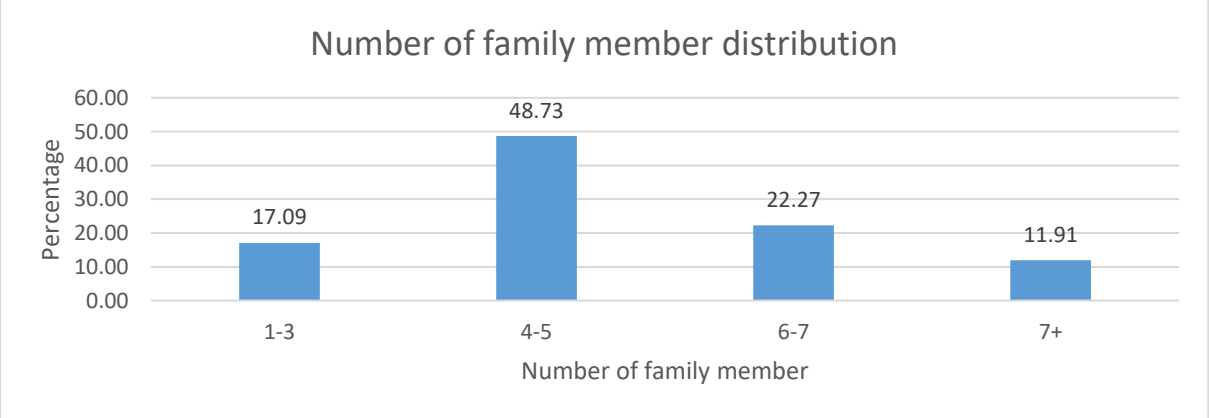
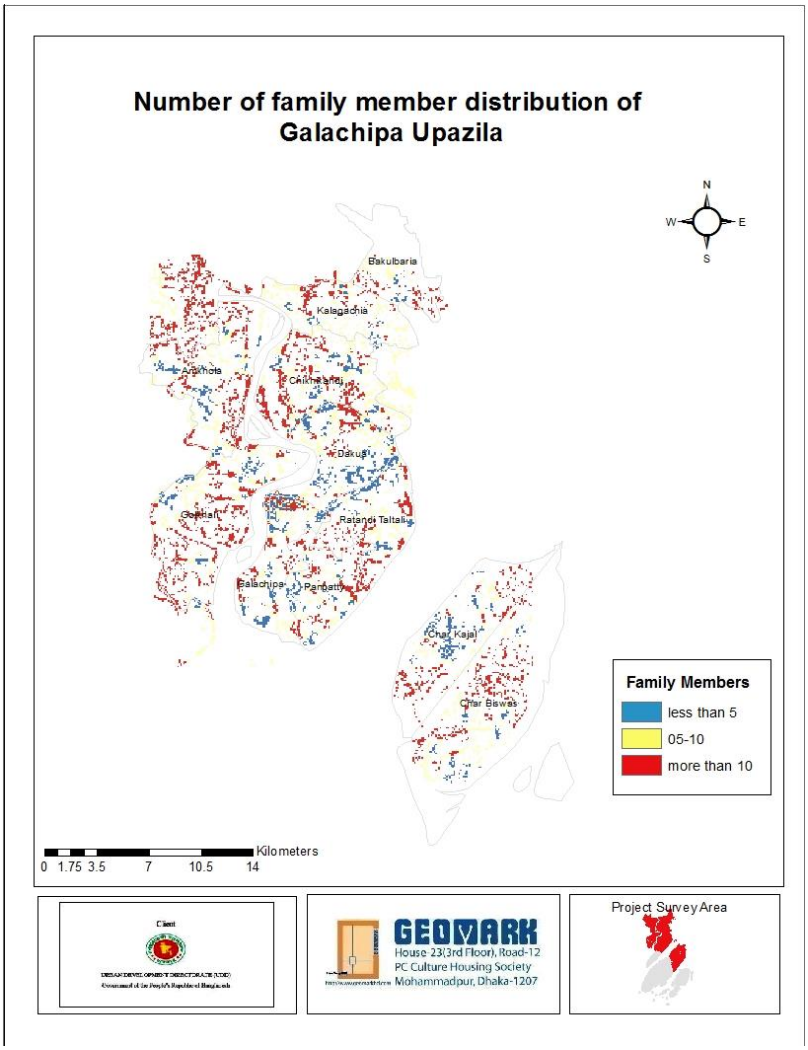


Figure 6-7 Number of family member

According to the thematic map given below shows that most of the unions in the Galachipa Upazila have maximum ratio of family with 5 to 10 family members in the family.
But Dakua union have some portion of family with family member less than five family members. On the other hand, Golkhali union shows that it having ratio of family with more than 10 family members.



Map 6-3 Number of family member distribution

6.2.2 Building Information

6.2.2.1 House Type

Because of natural disaster Like cyclone, flood and other disaster frequently hit in the coastal area of Galachipa, the house structure type is quite different from the main land of the country. Tin Shed type housing type is very common, 55% of the structure is Tin shed type, 22% of the semi pucca and only 7% house pucca in the study area.

On the other hand, 15% of the structure are katcha and only 1% having Jhupri type structure in the Galachipa upazila.

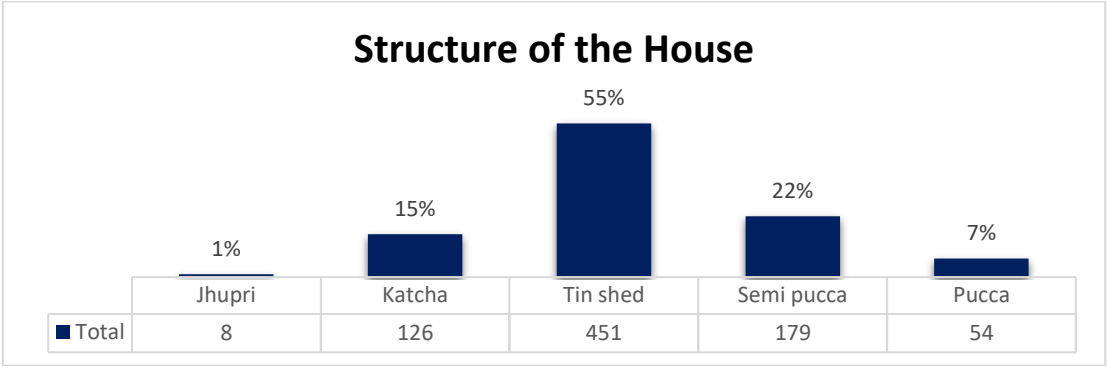
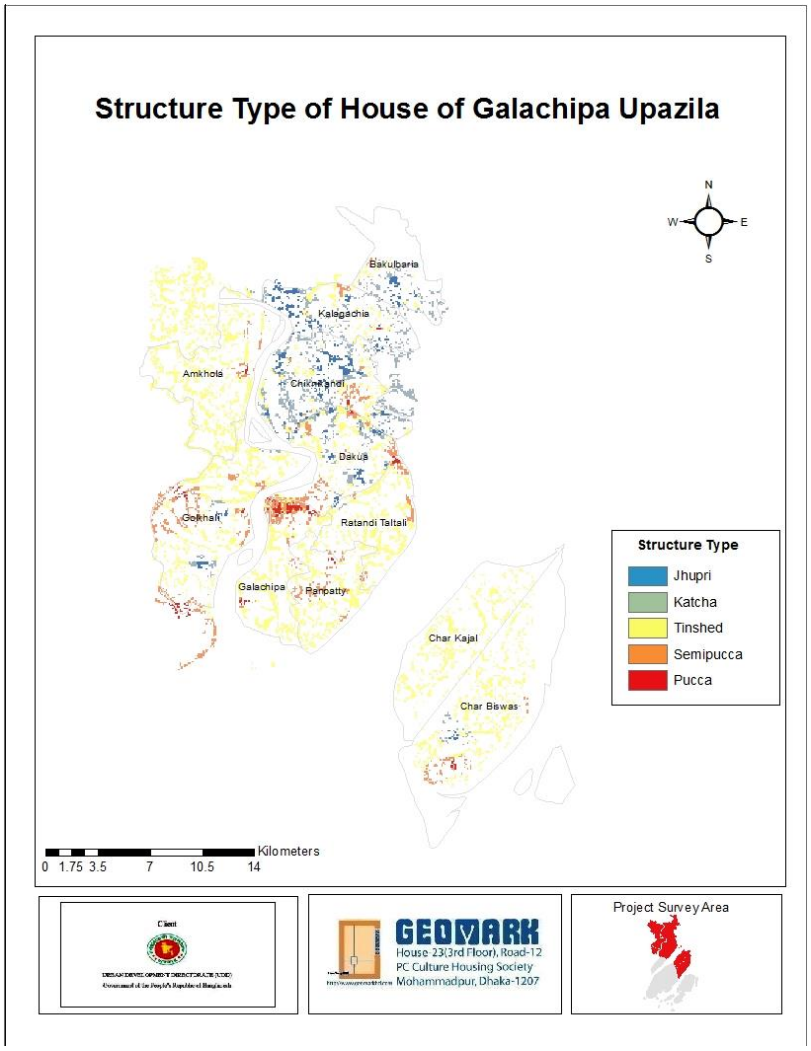


Figure 6-8 Type of Houses

Two type of structure of house dominated in the Galachipa upazila, one is Katcha and other is Tinshed. Chiknikandi, Kalagachia and Bakulbaria are the main three union where katcha structure type is most dominant, Golkhali and Amkhola union have more Tin shed structure than that of Katcha structure.



Map 6-4 Structure type of the Houses

6.2.2.2 House Construction Year

Historically, majority of the urbanization took place in between 2010 to recent days. Both in urban and rural areas, majority of the houses were constructed in between this period. So, last decade can be point out as the turning point of these two Upazila.

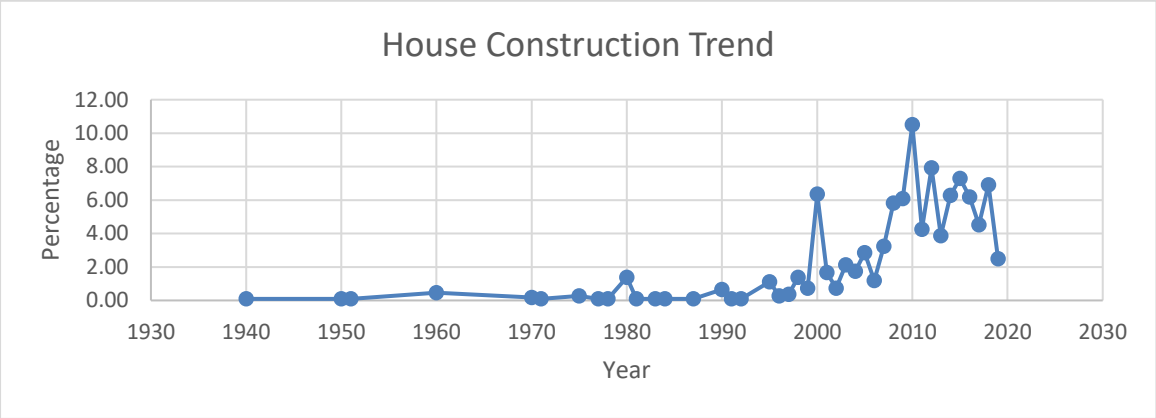


Figure 6-9 House Construction Year

6.2.2.3 Housing Rules and Regulation

Housing rules and regulations are essential for maintaining planned development. Unfortunately, most homes were built without following any kind of housing rules and laws. We can't build a home without a plan, but the reality is that our people build their home according to their own decisions. The rules have to be applied.

6.2.2.4 Design Approval

In the municipality area, there is legal authority to approve the layout or design of the house. Unfortunately, most homes were built without such approval. The villagers of Galachipa Upazila build their houses without any design. The union and the Upazila label have no design alternatives to them. The power of local authorities needs to be increased. The municipality and other local government authority may give plan or design to construction of house, but in the area only 6% of the construction built under the supervision of the Pourashava, 55% of the house constructed without any plan/design.

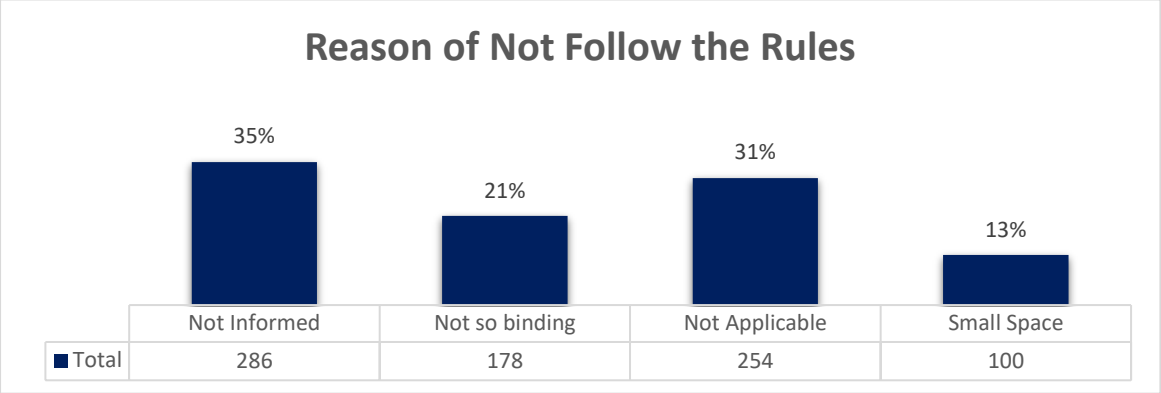
Table 6-5 Plan/Design Approval

Category	Frequency	Percentage
Yes	52	6%
No	447	55%
Not Applicable	319	39%
Grand Total	818	100%

Source: Geomark Ltd.

6.2.2.5 Reason for not following the rules to build house

Maximum people blamed that they were not properly informed about rules when it came to building their house. And for the most part, people think that because their housing parameters are too small, they don't have to follow the rules for so little space. Figure shows that maximum 35% of the house owners were not informed about the necessity of getting an approval from the Paurashava.



Source: Geomark Ltd.

Figure 6-10 Reason for not following the Rules

6.2.2.6 Ownership of flat/ House/ land

Majority of the respondents said that they are the owner of the flat/ House/ land on which they live. In Galachipa upazila almost 95.71% of the households living in their own house.

Table 6-6 Ownership of flat/ House/ land

Categories	Frequency	Percent
Yes	782	95.71%
No	36	4.29%
Grand Total	**818**	**100.00%**

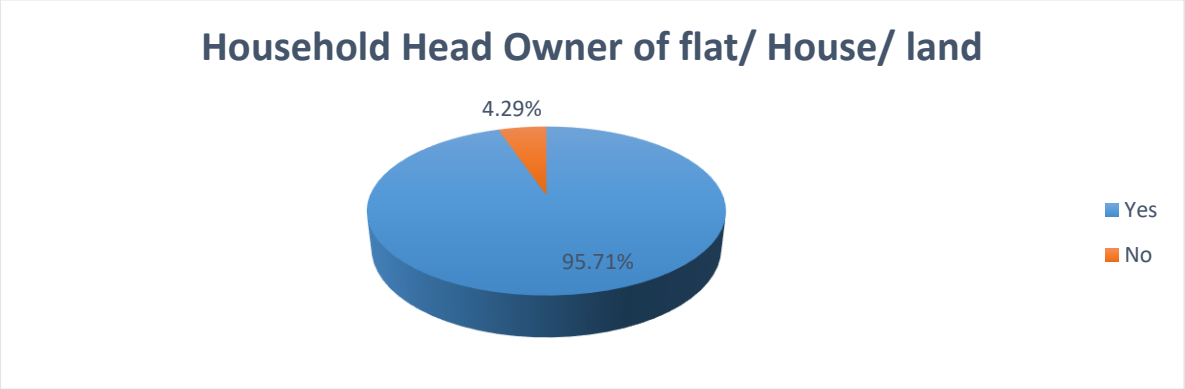


Figure 6-11 Ownership of flat/ House/ land

6.2.2.7 Number of Floor

There are a small number of paved houses are located in Galachipa Upazila. Among 7% of the pucca structure, 75% of the pucca structure having two storied and 24% of them are one storied.

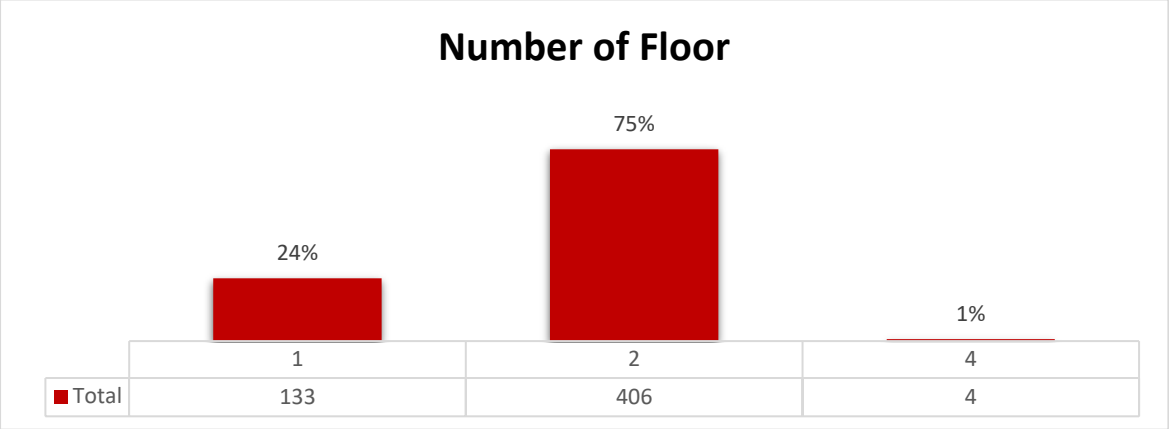


Figure 6-12 Number of floors

6.2.2.8 House Area

Total house area including yard area are categorized minimum sq.ft. 500 or less to maximum sq.ft 5000 in the study area. In the figure 3.6.3, shows that the maximum 27% of the house having the area category (1000-1500) sq.ft., 7.5% of the house having sq.ft. 4500-5000 area category and only 12% of the house constructed with the area of 500 sq. ft or less in the Galachipa upazila.

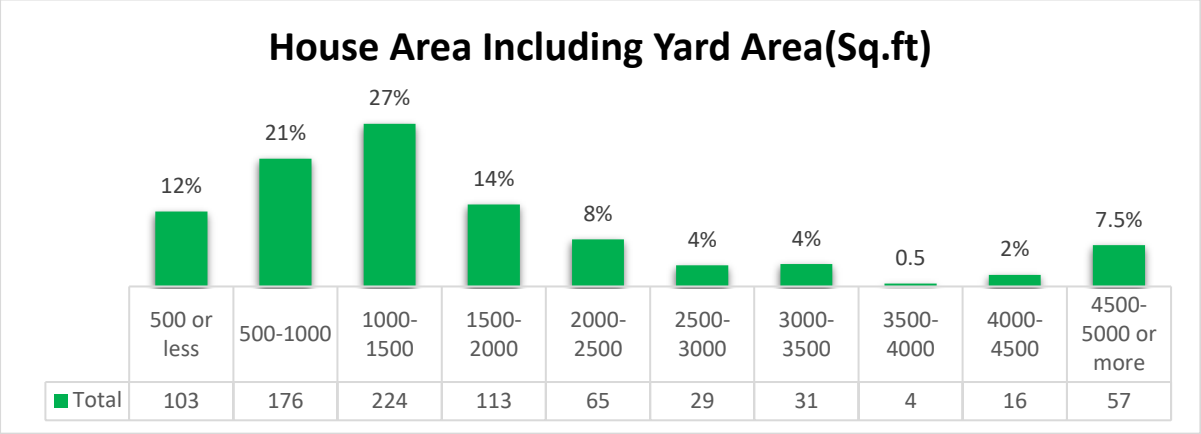


Figure 6-13 House Area Including Yard

6.2.2.9 Number of House in the Area

Survey database shows that 24% house owners own single house or building and 75% own two houses or buildings. The following chart shows the number of houses or buildings owned by individual owners in Galachipa Upazila.

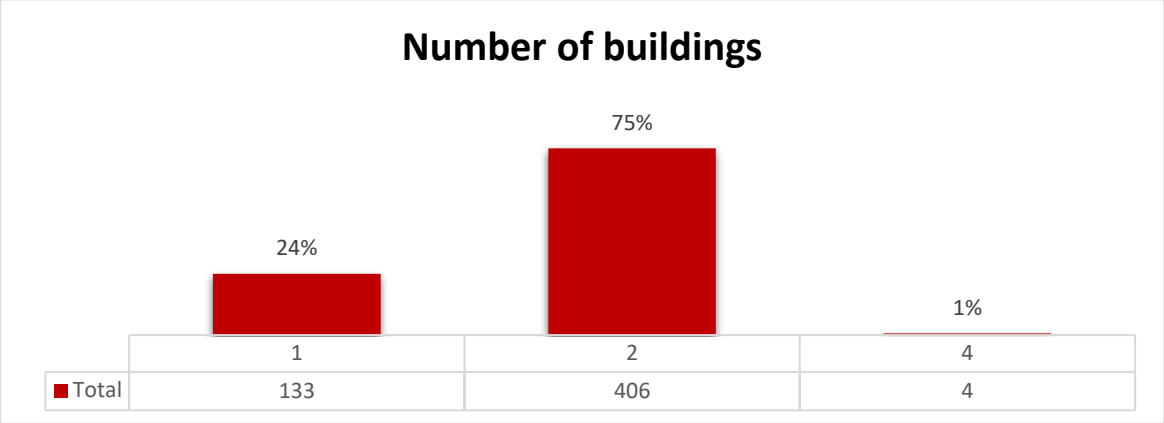


Figure 6-14 Number of House in the Area

6.2.2.10 Plinth Level

During the Cyclonetide comes with height of 20/30 feet. If the plinth level is high enough, it can prevent water from entering the house. The chart below shows the plinth height level of houses in Galachipa Upazila. Maximum 36% of the houses in the area have (01-02) ft. plinth height and 1% of the houses have plinth height more than 7 ft.

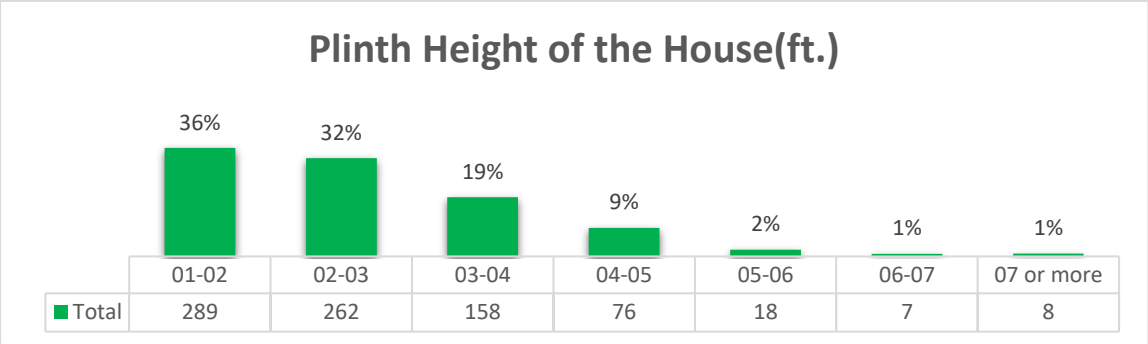
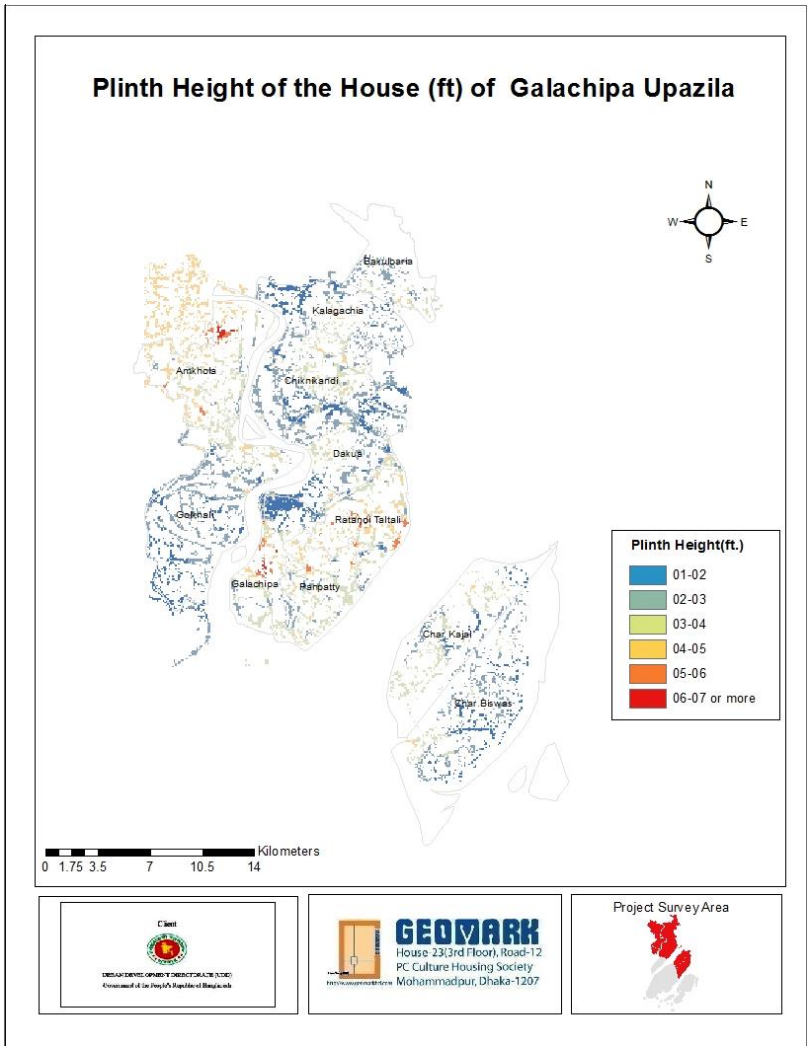


Figure 6-15 Height of plinth level

According to the Thematic map given bellow, plinth height distributed 1 foot to more than 7-foot categories, Among all the union in the Amkhola union having the most houses with plinth height more than minimum five feet high or more, also Galachipa, Panpatty and Ratandi Taltali unions have the maximum house with more than five feet plinth height in the house.
On the other hand, Golkhali and Char Biswas having the minimum plinth height in the house structure.



Map 6-5 Height of plinth level

6.2.3 Migration Status

Galachipa is a coastal Upazila, so the Cycloneis the final attraction of this Upazila. The land of this Upazila is emerging day by day and outsiders come and live here. About 85% of the respondents think that they are not local but migrated from other places.

6.2.3.1 HH Birthplace

85% of the respondents said that their birthplace is in Galachipa and 15% of people said that their birthplace is outside. Some people are born outside for different reasons. Some were born in hospitals; Some are born in their relatives' homes.

Table 6-7 Birthplace of the household head

Categories	Frequency	Percentage
No	119	15%
Yes	699	85%
Grand Total	**818**	**100%**

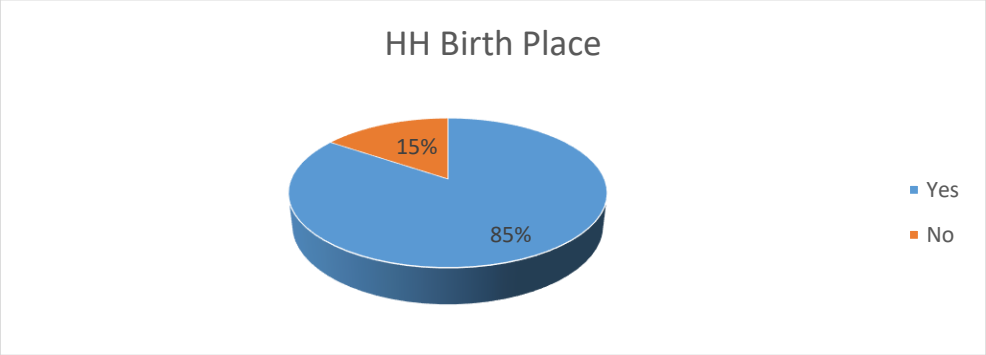


Figure 6-16 Birthplace of the household head

6.2.3.2 District Where Migrated From

Bangladesh is the most populous country so land crisis is a common issue in our country. Those who are suffering from lack of land are going to Galachipa Upazila. Galachipa is a coastal Upazila, so Cycloneis the ultimate attraction of this Upazila. The land of this Upazila is emerging day by day and the outsiders live here. Almost 76% of the migrants came from Patuakhali.

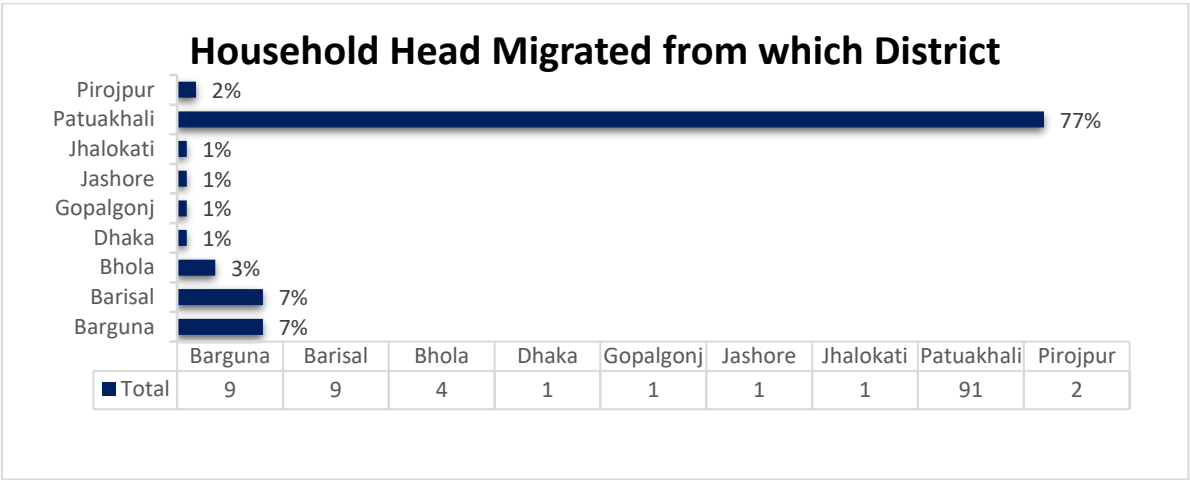


Figure 6-17 District Where Migrated From

6.2.3.3 Year of Migration

Following the chart, the existing migration situation has been presented in Galachipa Upazila. Galachipa Upazila, a sub-island of Bangladesh, was once less populated by Galchipa. Day by day they come here and live. Maximum migration (47%) occurred in the Galachipa upazila within 1990 to 2010, 5% migrants coming in the last decade, only 4% migration occurred between 1950 to 1970.

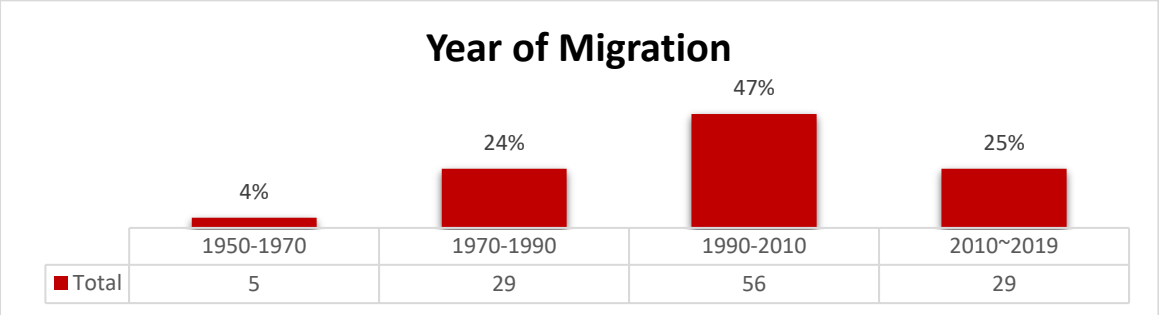


Figure 6-18 Year of Migration

6.2.3.4 Migration Pattern

People are being migrated to or from Galachipa Upazila for various reasons. Some people migrated along with the whole family, some relocated alone, some emigrated with wife. But majority of them migrated alone and the percentage was 76 %, 19% with the parents and rest of 5% with the wife. The following chart presents the migration situation of Galachipa Upazila.

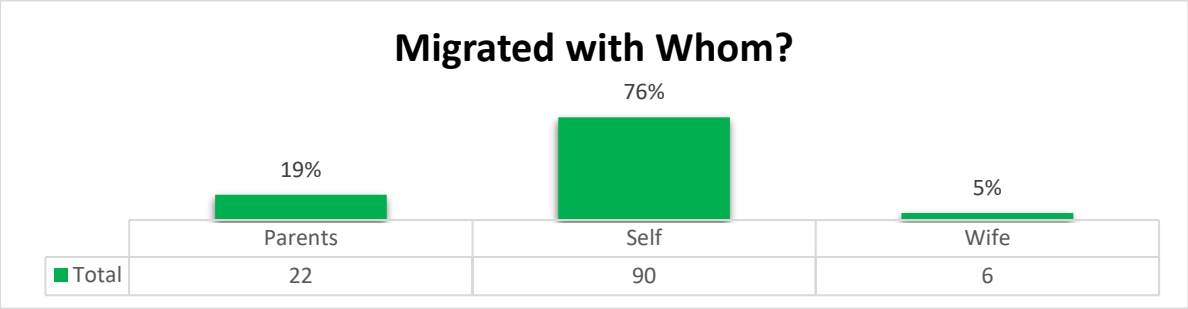


Figure 6-19 Migration Pattern

6.2.3.5 Member Staying Outside of the Locality

Most of the people are living here in Galachipa Upazila. Some are living in another district for work purposes, some are living abroad for work purposes. The chart is followed by the types of people who are out for work. Almost 80 % of the respondents opined that none of their family member is staying outside the locality.

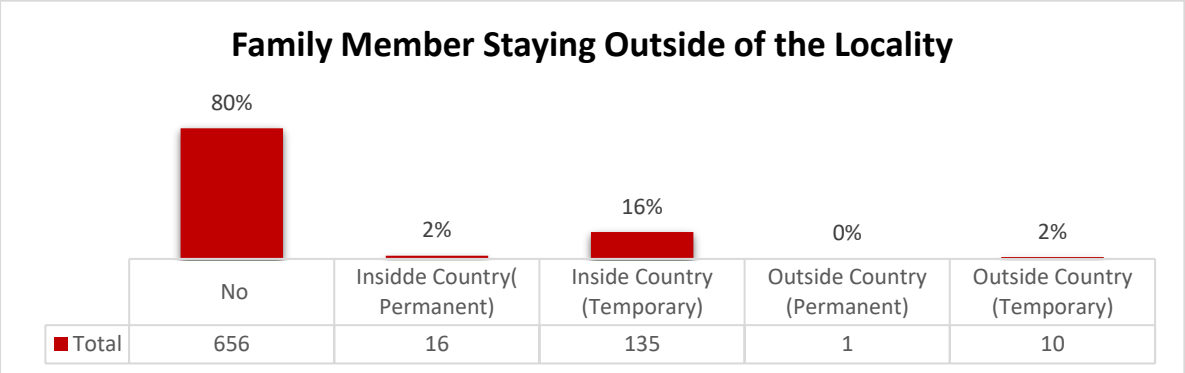


Figure 6-20 Member Staying Outside of the Locality

6.2.3.6 Reason of Migration

Migration is a common occurrence in the whole world. Every day people are migrating for different purposes. Galachipa is an organ of the earth, hence the migration of Galachipa Upazilas continues. Galatians are changing places for various reasons. The chart below presents the reasons for migrating from Galachipa Upazila. 18% people are migrating for higher education, 58% for workplace, 15% for marital purpose, 5% due to river erosion, 4% due to business purpose.

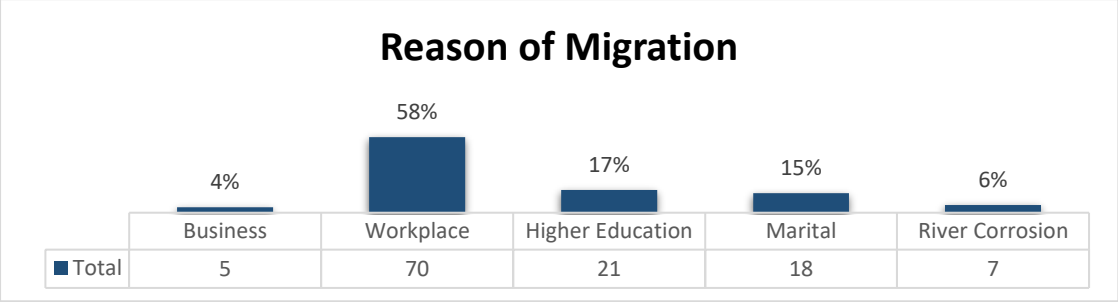


Figure 6-21 Reason of Migration

6.2.3.7 Reason of Stay Outside

Although a small portion of the family whose members are stating outside of the locality, so there are some reasons behind it.

70% of the family member staying outside from the locality because of their Job, 29% of the members for higher education and only 1% staying outside for their marriage.

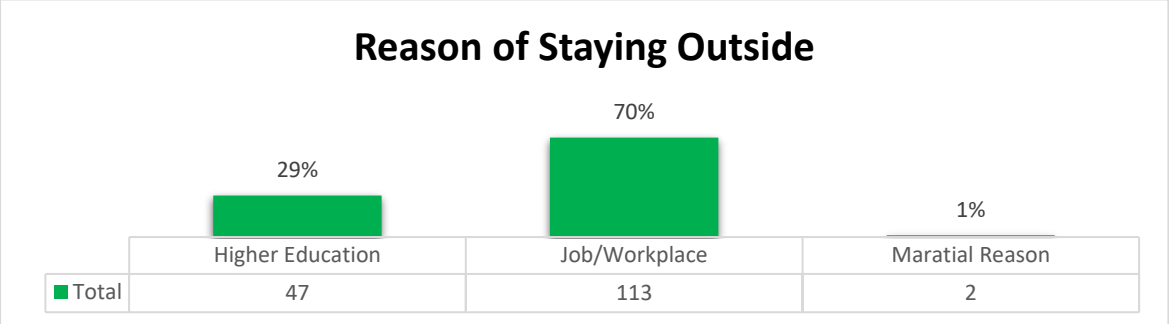


Figure 6-22 Reason for Stay Outside

6.2.4 Visit home frequency

Family members who staying outside of the locality visit home in frequent basis, maximum 95% of the family members visit minimum once between more than 30 days or within the 30 days.

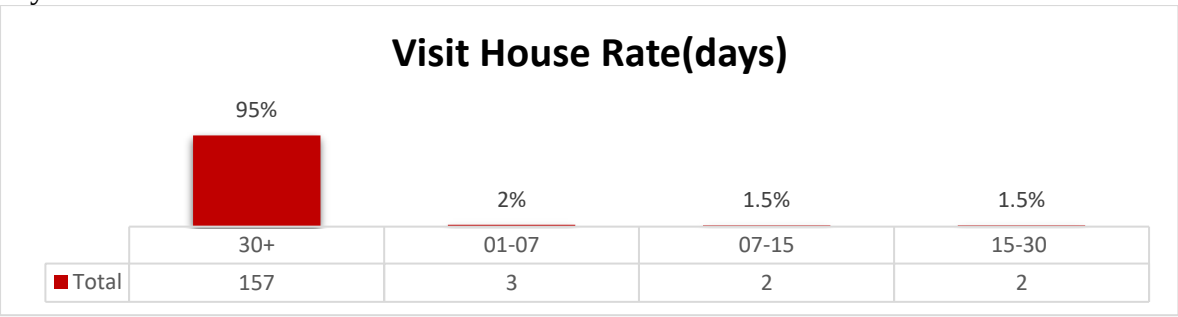


Figure 6-23 Visit Home frequency

6.2.5 Household income, expenditure and savings

6.2.5.1 Household Income

Depending on the development of income. Galachipa is a less developing area context than other Upazilas of Bangladesh. Galachipa coastal Upazila. The industrial and business sectors are not strong here. So, our database says that there is a low-income representation. Household income refers to the combined gross income of all members of a household, defined as a group of people living together, who are 18 years or older. It is used to determine the economic health of Galachipa Upazila. Following the table, the income range of the people of Galachipa Upazila has been sown. Total household income is the combination of income of HH and the other family member in the household. Figure shows that 28% of the monthly total income of house is not more than TK 10,000. Maximum percentage of total income of 52% belongs to the income category of TK 10,000 to TK 20,000 and only 2% of the total household income in the category of more than TK 50,000 monthly income in the Galachipa upazila.

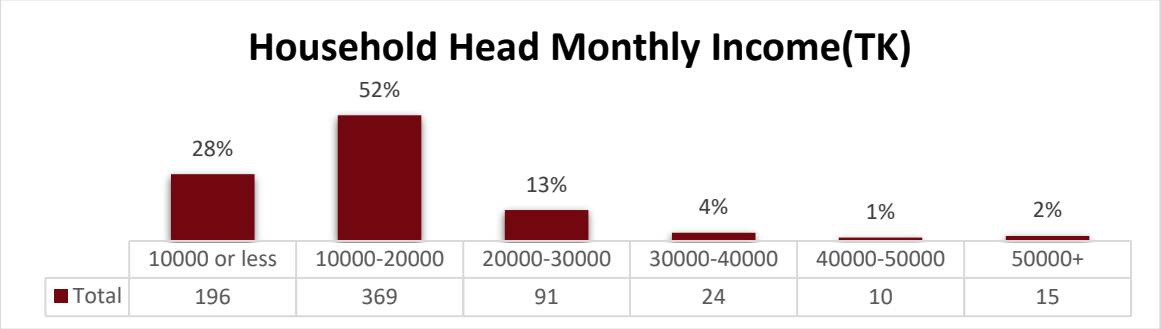
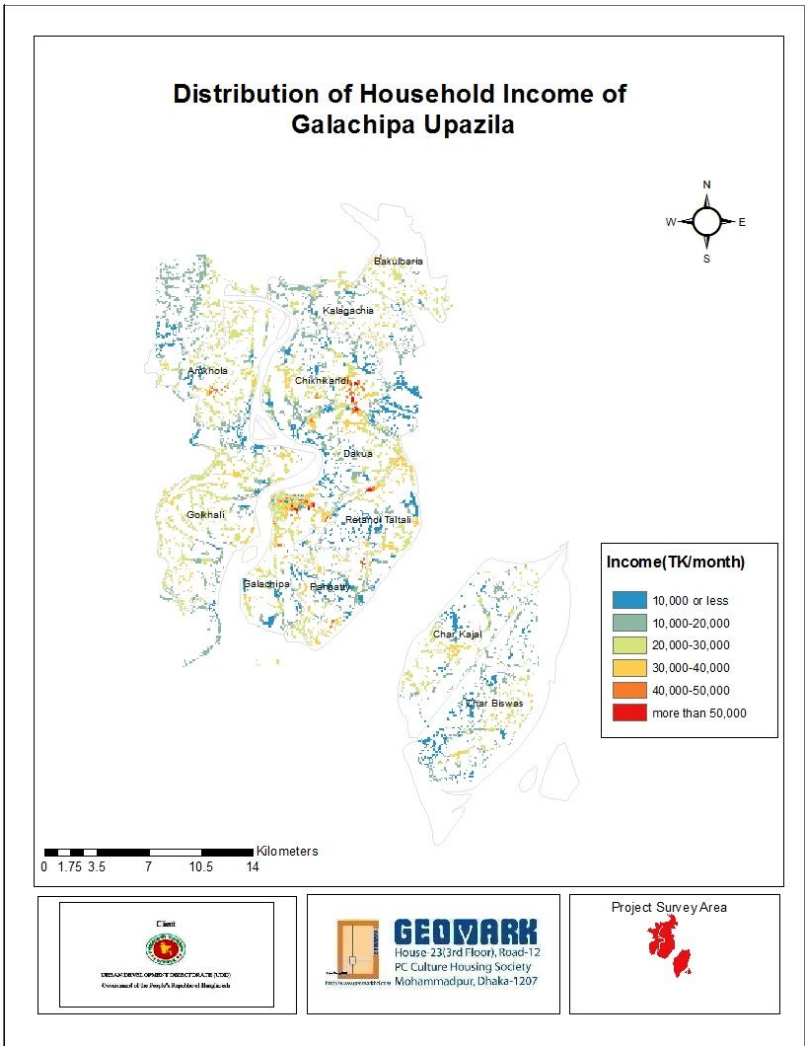


Figure 6-24 Household Income

According to the Thematic Map given bellow, total monthly income with more than TK 50,000 was found mainly in Galachipa Paurashava. On the other hand, lower income group are living mainly in Golkhali, Char Kajal and Char Biswas union in the Galachipa Upazila. In Other parts of the Upazila, income range varies from TK10,000 to TK 40,000.



Map 6-6 Household Income distribution

6.2.5.2 Household Expenditure

Household expenditure is the sum of the daily costs of residential households such as food, clothing, housing (rent), energy, transportation, sustainable products (especially cars), health expenses, retirement, and the ultimate cost to meet miscellaneous services. Following chart shows the monthly household expenses of the households living in Galachipa Upazila. Total household income reflecting the total household income in this study, following figure shows that maximum 54% of the household expenditure lies in the TK 10,000 to TK 20,000 category, 11% of the household expenses TK 10,000 or less for their total monthly expenditure and 2% of the household expenses TK 50,000 per month in the Galachipa upazila.

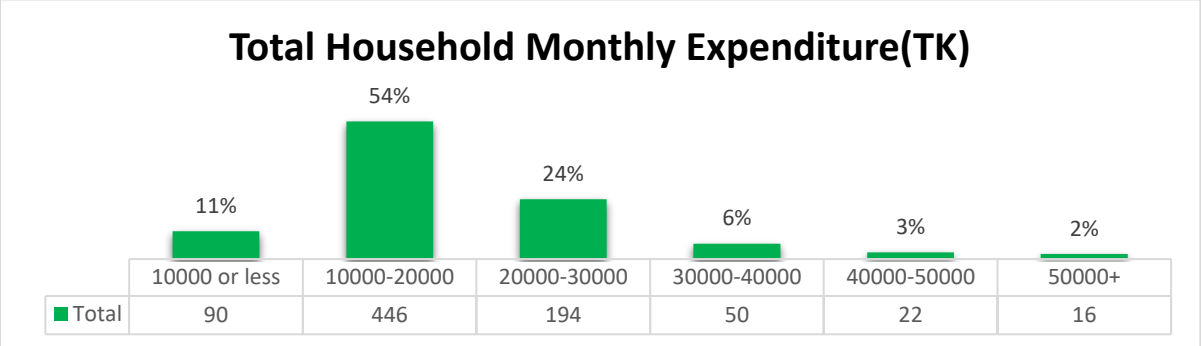
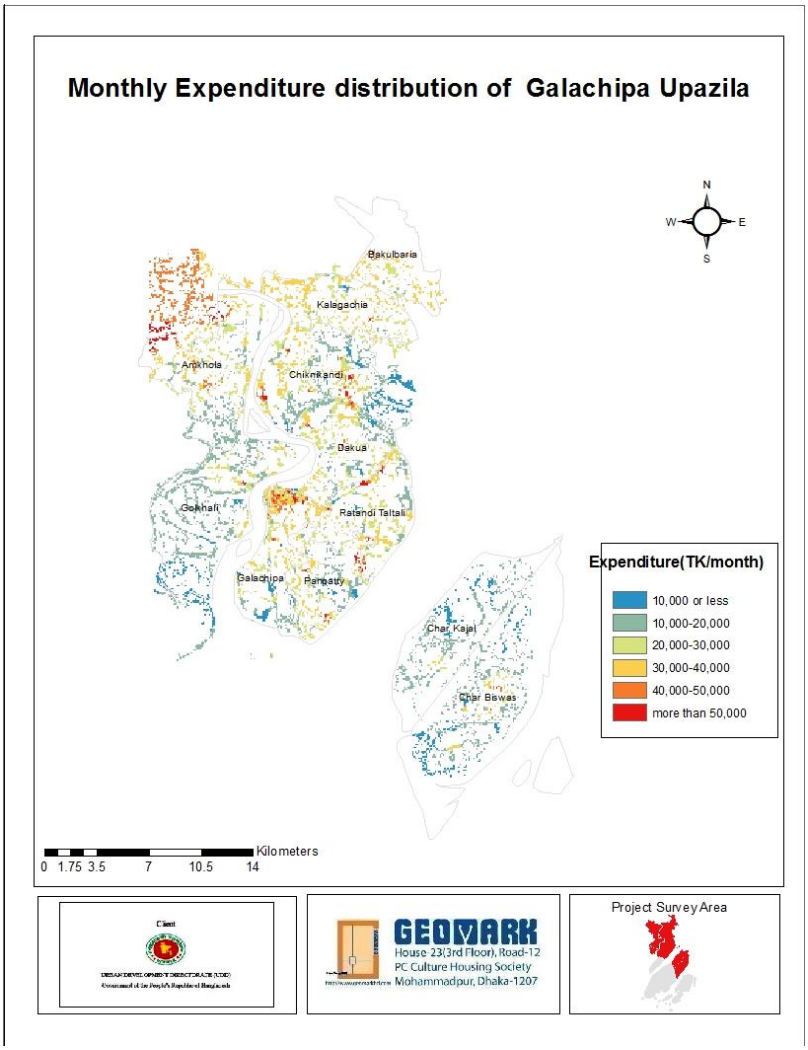


Figure 6-25 Monthly Expenditure

Monthly household expenditure depends on the monthly income, as the monthly income of the study showed that Galachipa region having the high-income oriented area so that the monthly expenditure also reflected the study. In the Galachipa union region having the high monthly expenditure with maximum TK 50,000 per month. Amkhola union with other adjacent union like Kalagachia and Bakulbaria have also the monthly expenditure with more than TK 20,000 to TK 40,000 monthly expenditure.

Char Kajal, Golkhali and Char Biswas have also the minimum monthly expenditure unions only less than TK 10,000 per monthly expenditure in the Galachipa Upazila.



Map 6-7 Monthly Expenditure distribution

6.2.5.3 Expenditure on Children

This is one of the most important issues in the lives of children. Every baby has a basic need. Spending can meet the needs of children. So, we have collected such a database. Following the chart, the children's expenditure was shown in Galachipa Upazila. 27% of the respondent households didn't have younger child, 26% of the respondent households spend less than 500 BDT per month and 24% spend 1000-2000 BDT per month on their children. We found only 4% of the households who spend more than 2000 BDT per month on their children.

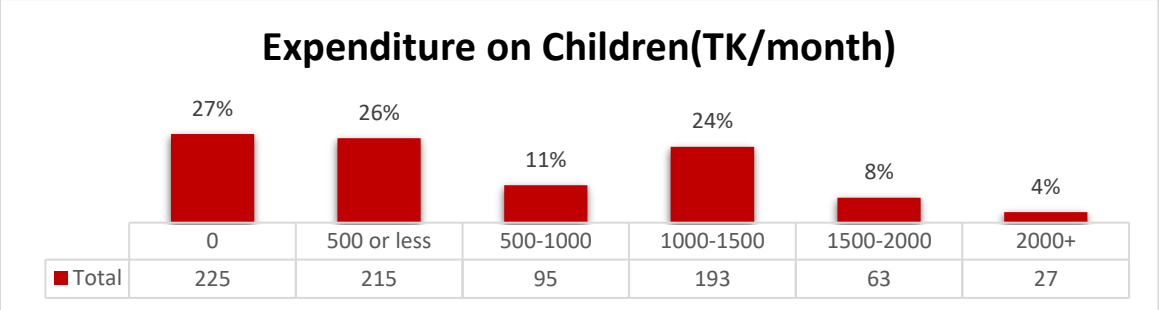


Figure 6-26 Expenditure on Children

6.2.5.4 Cloth Expenditure

The cost of clothes is an important factor in every man's life. This is the basic right of every human being. So, we collected this national data under the Galachipa Upazila. The following chart shows the expenditure of cloth in Galachipa Upazila. Almost 44% of the households spend less than 1000 BDT per month on cloth, 33% spend 2000-3000 BDT and only 1% can afford to spend more than 5000 BDT per month on cloth.

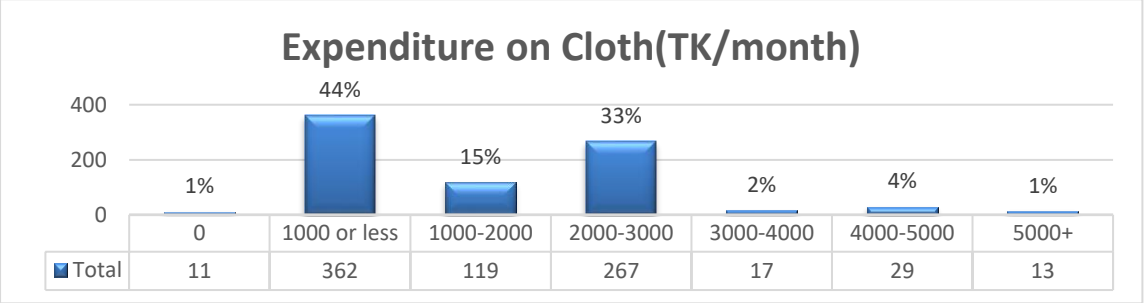


Figure 6-27 Expenditure on Cloth

6.2.5.5 Educational Expenditure

Educational right is a fundamental right for human life. Our government subsidizes this sector. It is very important for every human life. No one can live without reading, so we collect this kind of data. The chart below shows the education expenditure of Galachipa Upazila. Expenditure on education depends on mainly how many school going children belongs to the family.30% of the family spends the amount between TK 1,000 to 2,000 with approximately same percentage (25%) of the family expenditure on education of the category of TK 2,000-3,000.

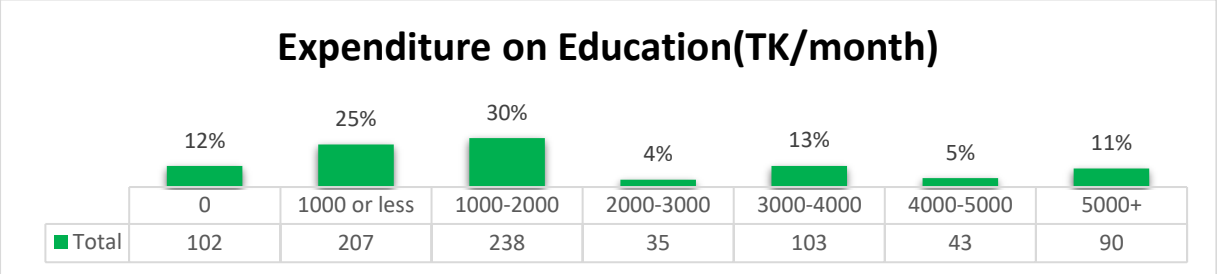


Figure 6-28 Expenditure on Education

6.2.5.6 Expenditure on Food

Food is the basic necessity of a human life. No one can live without food. So, we collect this kind of database. Food expenditure is very important for the people of Galachipa Upazila They cannot spend much money in this sector because they are very poor. The following chart shows the food expenditure of Galachipa Upazila. Almost 43% of the respondents opined the spend less than 5000 BDT on food, 37% spend 5000-10000 BDT only 1% can afford to spend more than 25000 BDT on food per month.

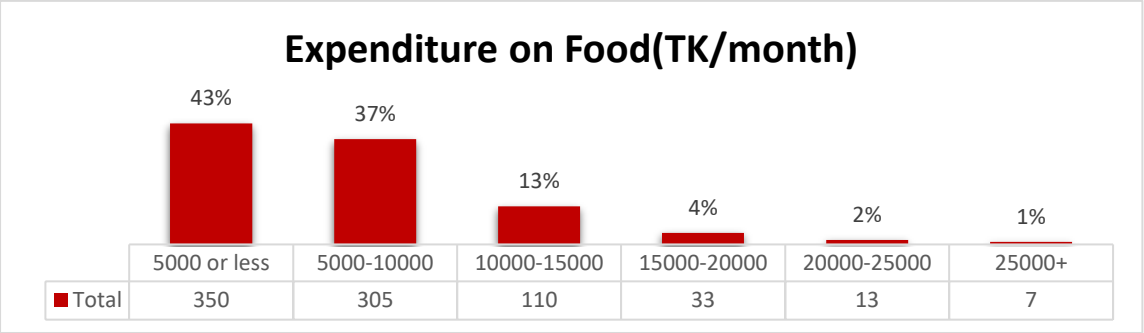


Figure 6-29 Expenditure on Food

6.2.5.7 Expenditure on Health

Health is the key to all happiness. This is the basic need of a human life. Drugs are needed for every human body. So, we collect this national database in Galachipa Upazila. Their budget is very bad in this sector, as their income is limited. The following chart shows the health expenditure of Galachipa Upazila. Almost 4% of the respondents do not expense any money for treatment or other health issues, 35% of people of the total survey expenses TK 1,000 or less money for health and maximum expenditure of TK 4,000 belongs to the 7%.

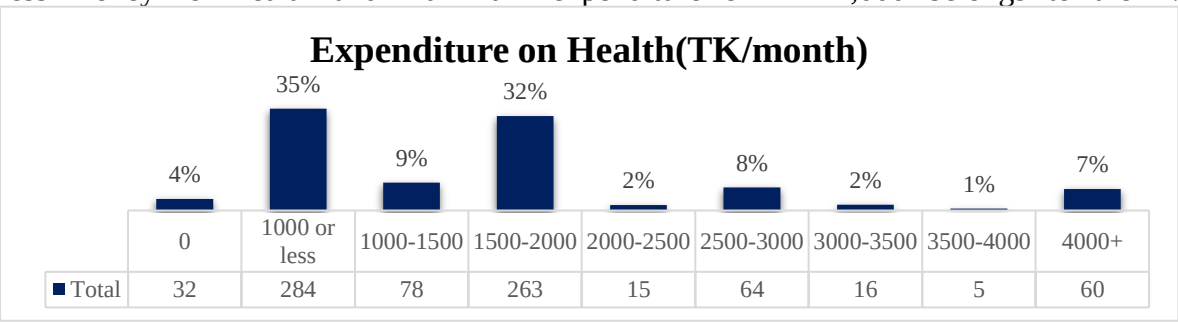
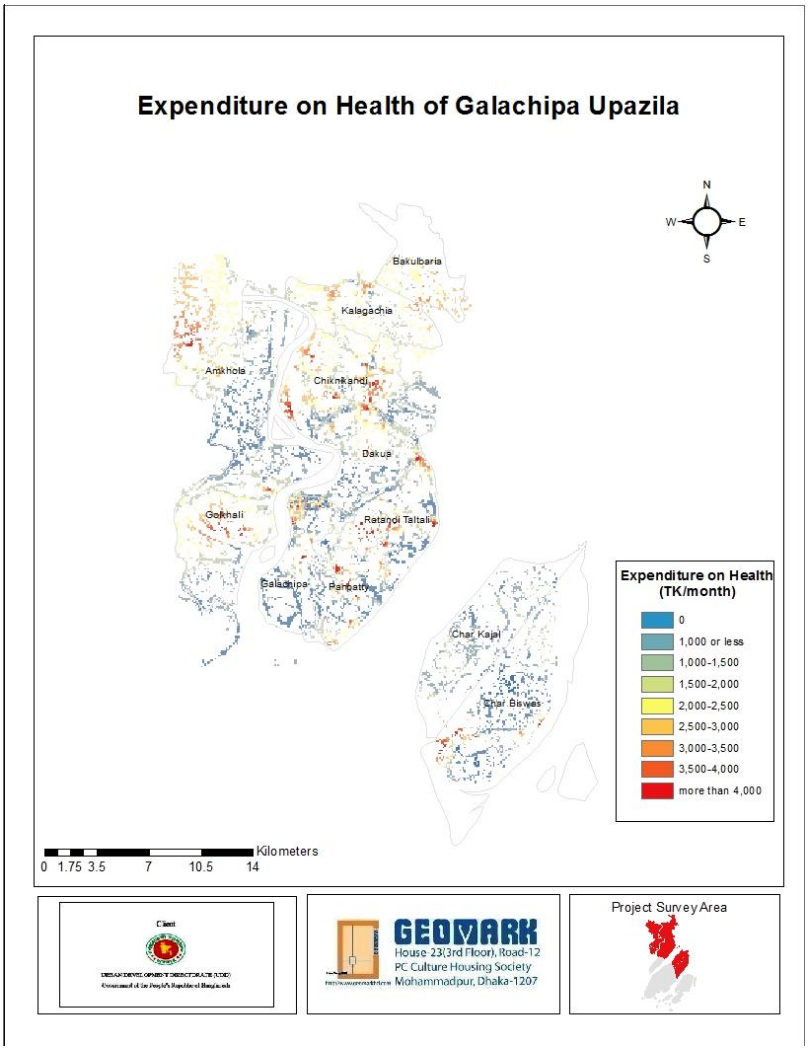


Figure 6-30 Expenditure on Health

According to the Thematic Map given bellow, Ratandi Taltali union having the most expenses for health issues with more than TK 4,000 per month and some other union like Chiknikandi,

Golkhali and Amkhola having expenses between more than TK 2,000 to TK 4,000 for the health per month.
Char Kajal and Char Biswas have the less expenses for the health which are not more than TK 1, 000 per month in the Galachipa.



Map 6-8 Expenditure on Health

6.2.5.8 Transport cost

Every person's family life requires transportation costs. The people of Galachipa sub-district are average poor and do not have a private car. Most people use public transport. They also use navigation channels for their transportation. We collect this type of data. The following chart shows the transportation cost of the people of Galachipa Upazila. Transport system in the survey mainly in the waterway, maximum 56% respondents express that they expense maximum TK 1,000 per month for the transport expenditure. Transport expenditure not exceeds the TK. 3,000 in this study.

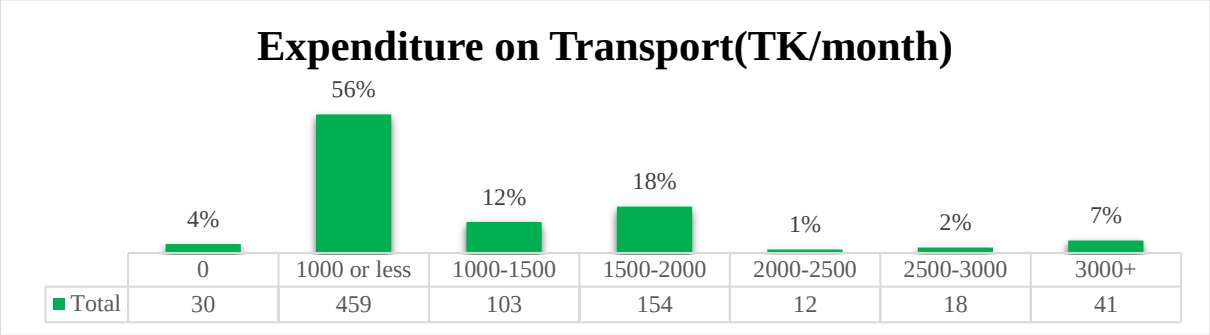


Figure 6-31 Expenditure on Transport

6.2.5.9 House Rent

The conducted in the mostly in the rural area so most of the household has their own house to live, 92% of the household has no need to expense for monthly house rent, only 0.5% household who expense more than TK 5,000 for monthly household rent in Galachipa upazila.

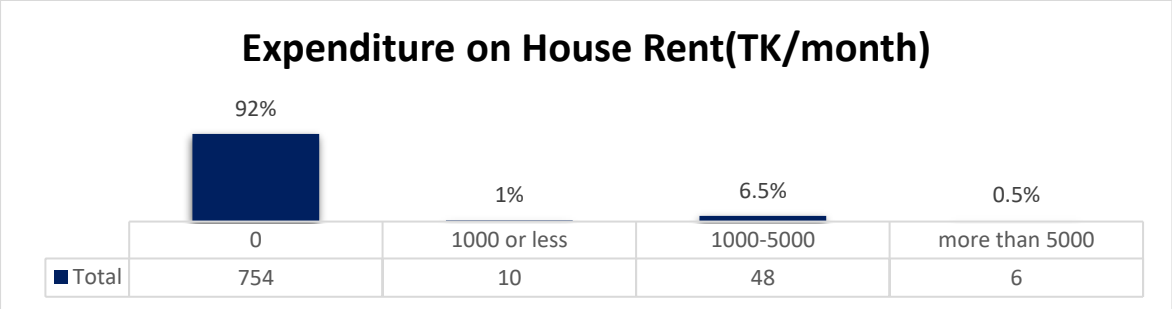


Figure 6-32 Expenditure on House Rent

6.2.5.10 Utility Expenditure

In microeconomics, the cost function is the minimum amount of money a person spends to achieve some level of utility due to the cost of a utility function and available materials. It is necessary for human life. So, we collect this kind of database. Following the chart, the existing utility costs of Galachipa Upazila are shown. In the study area of the Galachipa upazila, 40% of the family expenditure on the utility not more than TK 500, 3% of the family not expending on utility per month in regular basis. only 2% in the study observed that expending more than TK 3,000 for the utility in the study area.

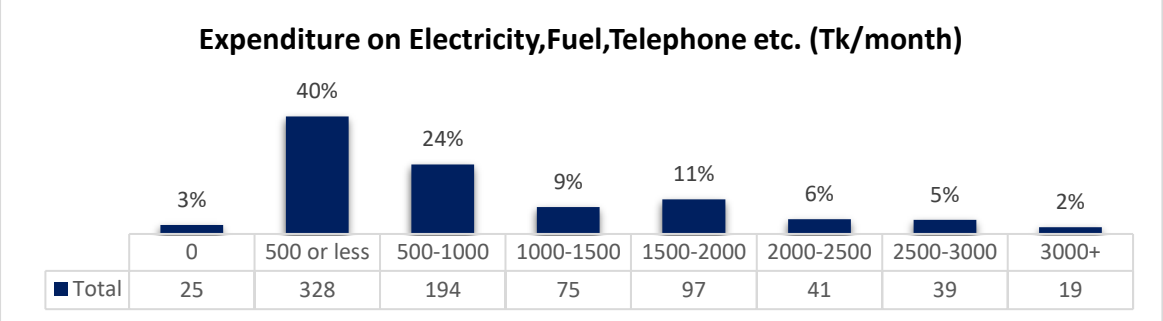


Figure 6-33 Utility Expenditure

6.2.5.11 Monthly Saving

Monthly savings directly dependent on the monthly income of the individuals, 71% of the individuals in the study shows that they are not having any savings in the monthly basis according their monthly income in the Galachipa upazila.

Monthly savings less than TK 5,000 in the study area belongs to 24% of the total,and 1.5% household have more than TK 20,000 savings in the project area.

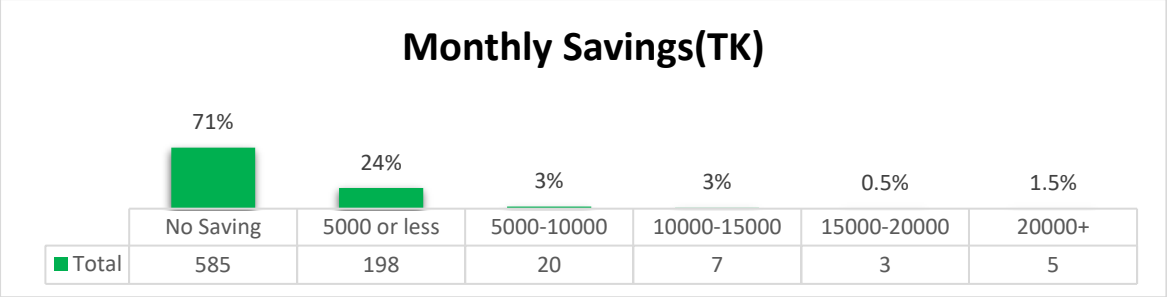


Figure 6-34Monthly Savings

6.2.5.12 Place of Savings

Everybody wants to deposit their money into a secured financial institution. Majority of the people prefer not to save their money anywhere. But small amounts of people who tends to save their money, prefer Bank or NGOs. The chart below shows the place of savings in the Galachipa Upazila. 75% of the household do not have savings place option because of they have no savings per month. only 25% of the individual save their money in regular basis, 13% of them save money in the bank 7% in the Micro credit banking system and only 5% saves their own.

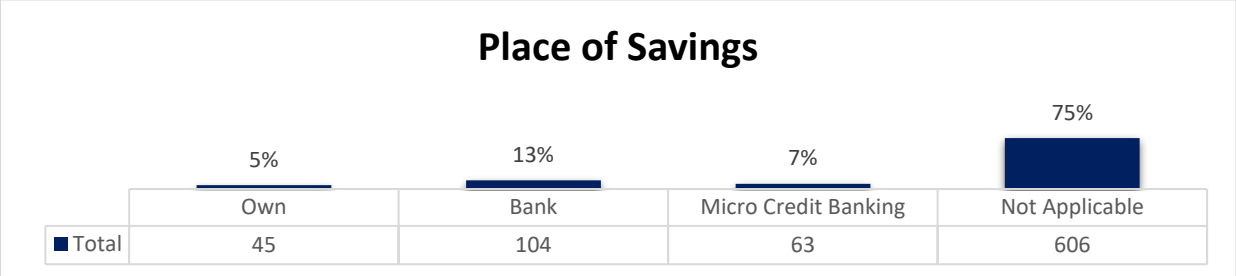


Figure 6-35 Place of Saving

6.2.5.13 Loan

Poor people are poor. They have no additional capital for a significant period of time. That is why many people get loans in times of crisis. It was an interesting fact that in the following chart, we found the ratio of borrowing and non-lending. Survey result shows that in Galachipa Upazila, almost 46% of the respondents said they took loan.

Table 6-8 Loan Status

Categories	Frequency	Percentage
No	441	54%
Yes	377	46%
Grand Total	**818**	**100%**

6.2.5.14 Source of Loan

The people of Galachipa are poor among the people of other sub-districts of Bangladesh. They cannot borrow from their neighbors because they have no power. So, they take loans from different financial institutions. Some government and some NGOs. The following chart shows the source of loan credit in Galachipa Upazila. Majority of the people (around 33%) use to take loan from the NGO ASA, Grameen bank and govt. Bank 20% each, microcredit banking 14%.

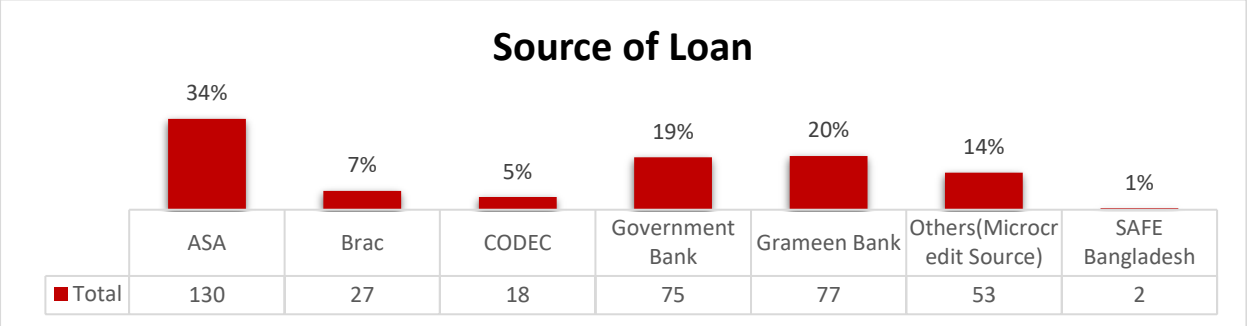


Table 6-9 Source of Loan

6.2.5.15 Monthly Installment to Pay

The Galachipa people are poor in other Upazilas of Bangladesh. Their per capita income is not high. It plays an important role in the domestic economy of Galachipa Upazila. The following chart shows the monthly installments to provide. Almost 55% respondent opined that they have to pay less than 5000 BDT per month, 27% pay around 10000 BDT and 3% have to pay more than 30000 BDT per month.

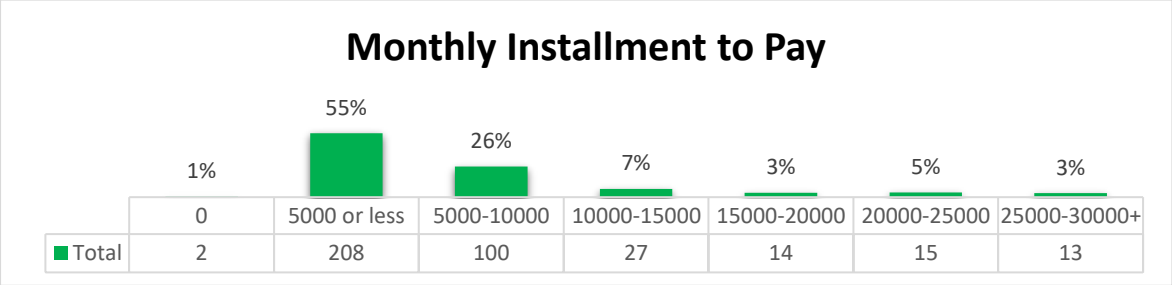


Table 6-10 Monthly Installment to Pay

6.2.5.16 Economic Base

We analyzed the economic database of Galachipa Upazilas and found that the economy of these two Upazilas is agro-based. The production and marketing of industrial products is not strong here. The service sector needs to raise the base economy. The table below presents the internal economic base of Galachipa Upazilas. According to 83% of the respondent, Agricultural production is the main economic base of the Upazila and 12% also opined that fish marketing is also an influential sector for the economy of the area.

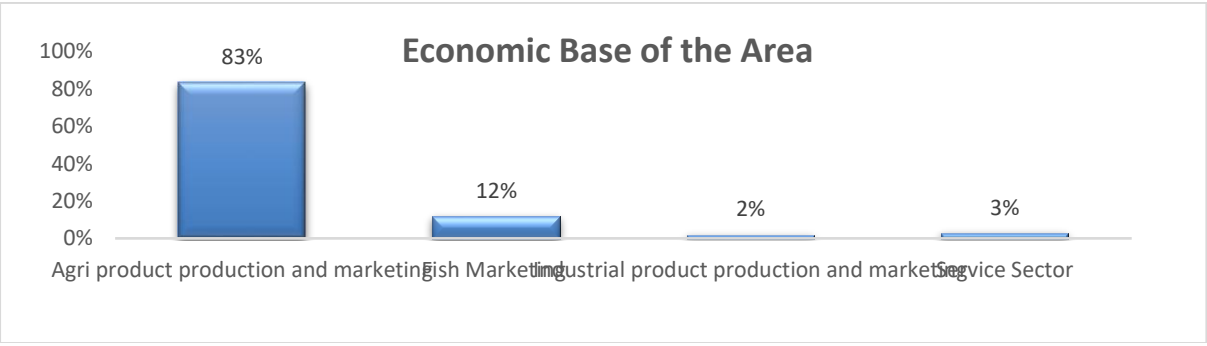
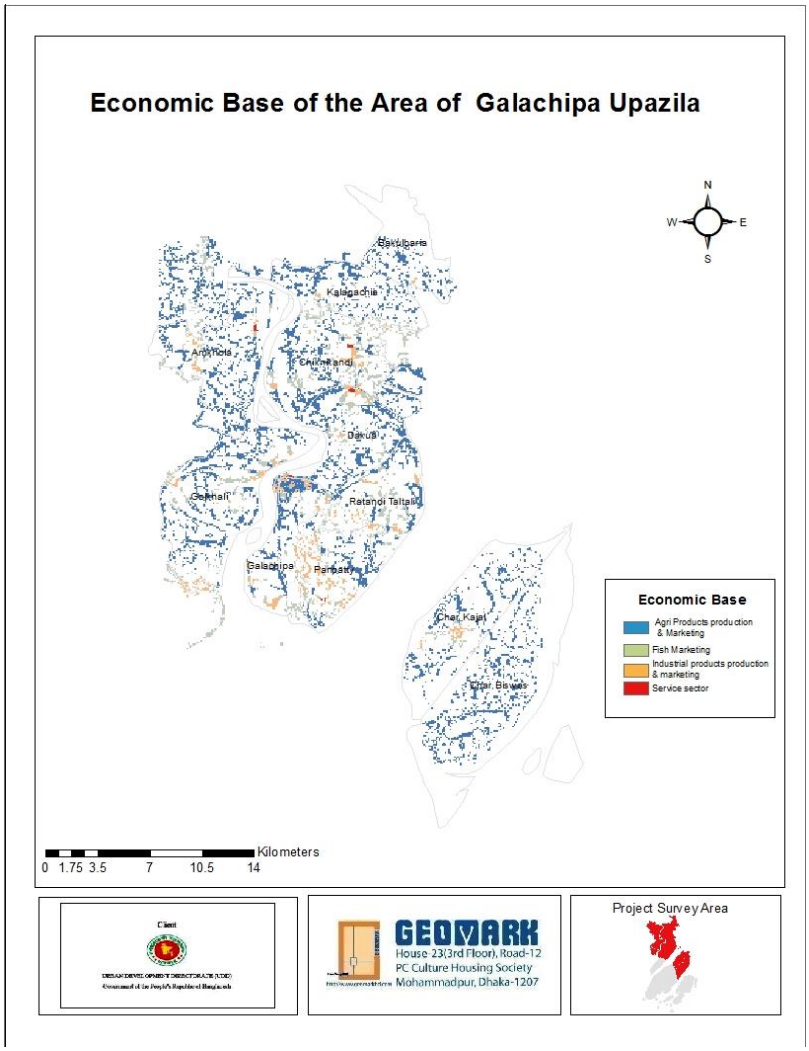


Figure 6-36 Economic Base of the Area

According to the Thematic map about the Economic Base of the Galachipa Upazila, all the union sharing the almost same economic base in the Galachipa Upazila, Agri products Production & Marketing is the main economic base for the maximum union like Char Kajal,Char Biswas, Amkhola, Golkhali and Bakulbaria.

With the Agri products economic base some other economic activities like Fish Marketing mainly in Golkhali and Galachipa also dominating as the economic base in the Galachipa Upazila. Map is given bellow.

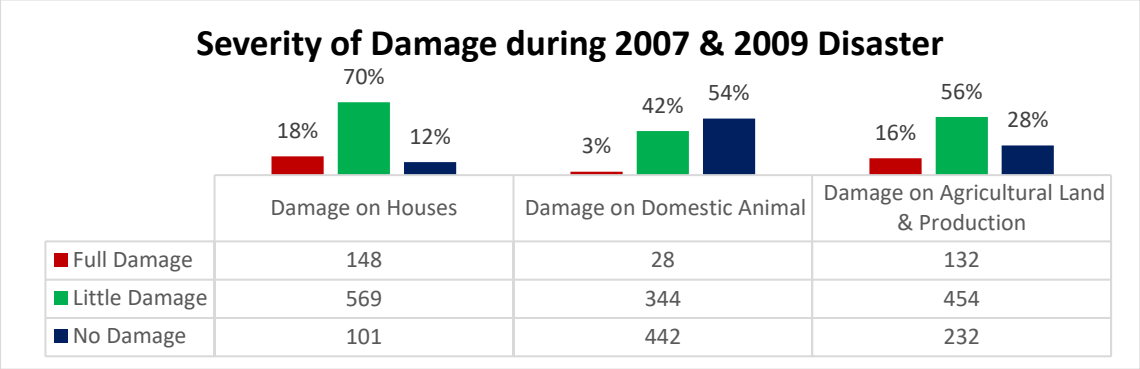


Map 6-9 Economic Base of the Area

6.2.6 Natural Disaster and Consequences

6.2.6.1 Severity of Damage 2007 & 2009 Disaster

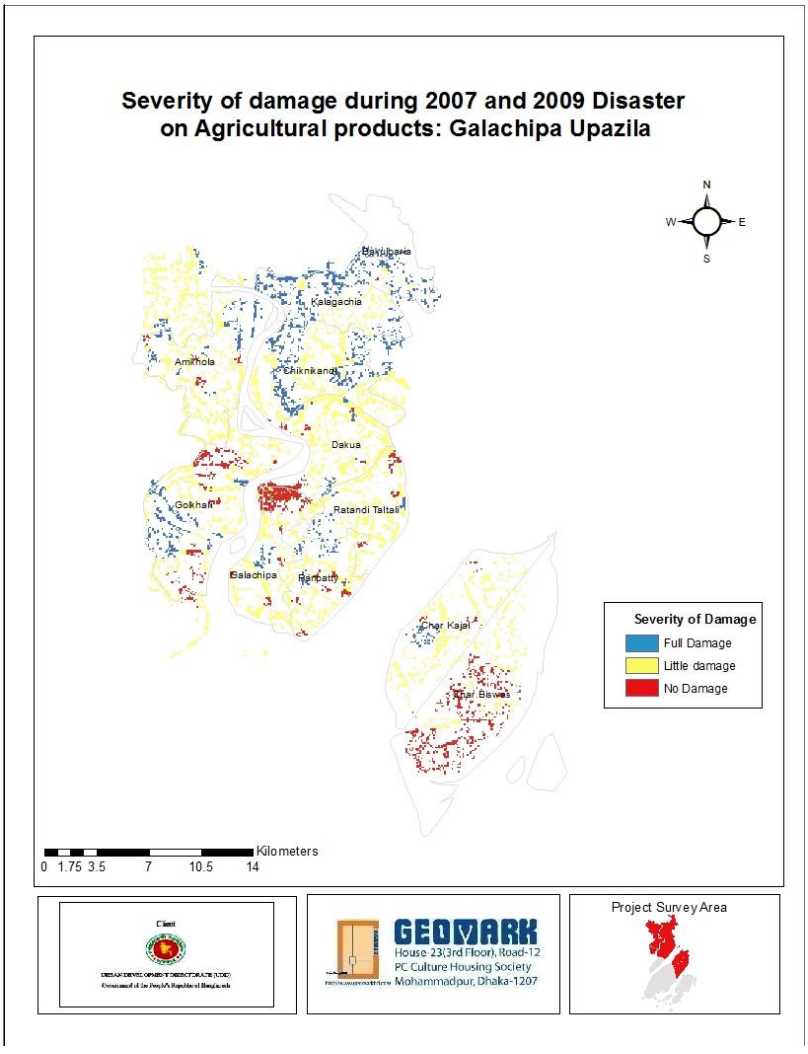
In this study severity of damage during 2007 & 2009 disaster mainly focus on the how damage on house, domestic animal and agricultural land & production. For the damage of house during the disaster figure 3.12.1, shows that 70% of the house got little damage and no damage occurred for 12% house, only 18% of the house suffer full damage during the disaster. In the counting of damage on domestic animal, the figure show that 54% of the household had no experience of damage of domestic animal, 42% had little damage and only 3% experienced full damage on their domestic animal. 56% of the agricultural land and production was damaged by the disaster during the 2007 & 2009, only 16% belongs to the full damage in that time.



	Damage on Houses	Damage on Domestic Animal	Damage on Agricultural Land & Production
Full Damage	148	28	132
Little Damage	569	344	454
No Damage	101	442	232

Figure 6-37 Severity of damage during 2007 and 2009 Disaster

The following maps showing the severity of damage during the 2007 and 2009 disaster,
Firstly, considering the damage on the agricultural land & production, only in Char Biswas and small portion of area in Galachipa & Golkhali was not affected fully, but Kalagachia and Bakulbaria are affected most in Galachipa Upazila.
On the other hand, Char kajal, Ratandi Taltali, Dakua, Amkhola had little damage on agricultural land.



Map 6-10 Severity of damage during 2007 and 2009 Disaster on Agricultural products

6.2.6.2 Level of recovery on during 2007 & 2009 Disaster

For the house damage during the disaster 2007 & 2009, in the account of recovery study shows that 28% of the house, 8% of the domestic animal and 23% of the agricultural land & production was fully recovered from damage.

Domestic animal damage during 2007 & 2009 disaster 61% of them no recovered, 49% agricultural & production also not recovered, but only 18% of the house not recovered from the disaster.

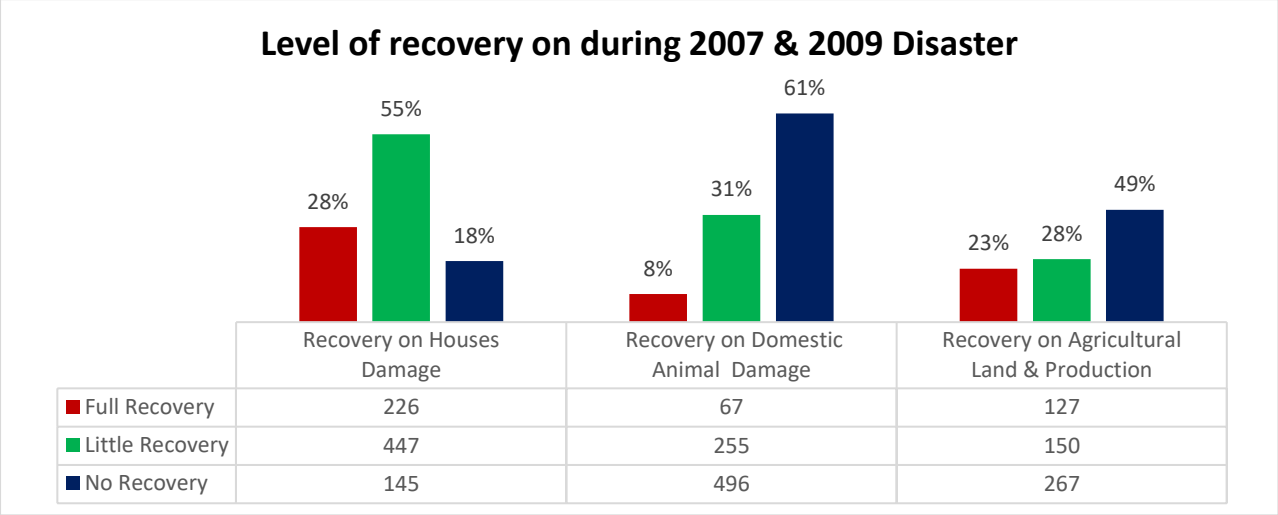


Figure 6-38 Level of Recovery on During 2007 & 2009 Disaster

6.2.6.3 Severity of Damage During 2018 Disaster

Severity of damage during 2018 shows the less damage compare with the 2007& 2009 disaster, the figure below shows that the 93% of the house, 96% of the domestic animal and 96% of the agricultural & production had no damage in the study area.

Almost every category in the study had 0% full damage during the disaster of 2018. According to the less damage in the time of 2018 disaster, the information about the level of recovery from the disaster is insufficient in this purpose.

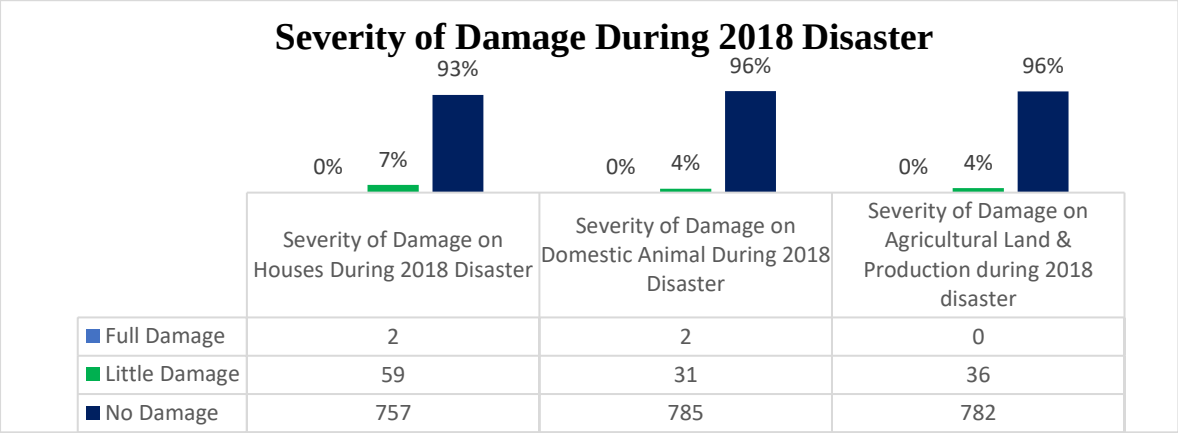


Figure 6-39 Severity of Damage During 2018 Disaster

6.2.6.4 Amount of damaged by Cyclone

Maximum time of Cyclone hit by the region in the time interval of 2005-2009 and most damage done in that time, 98% of the damage occurred in that time interval which is cost TK. 48,795,00 from year 2000 to 2019.

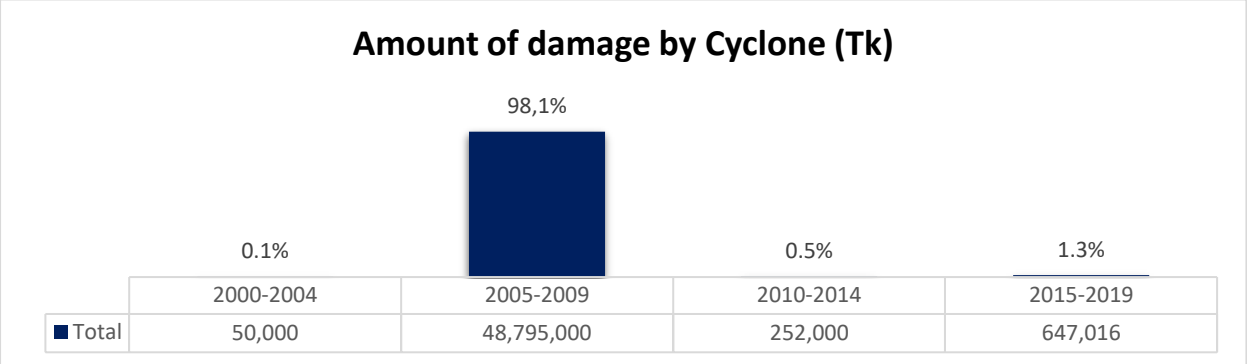
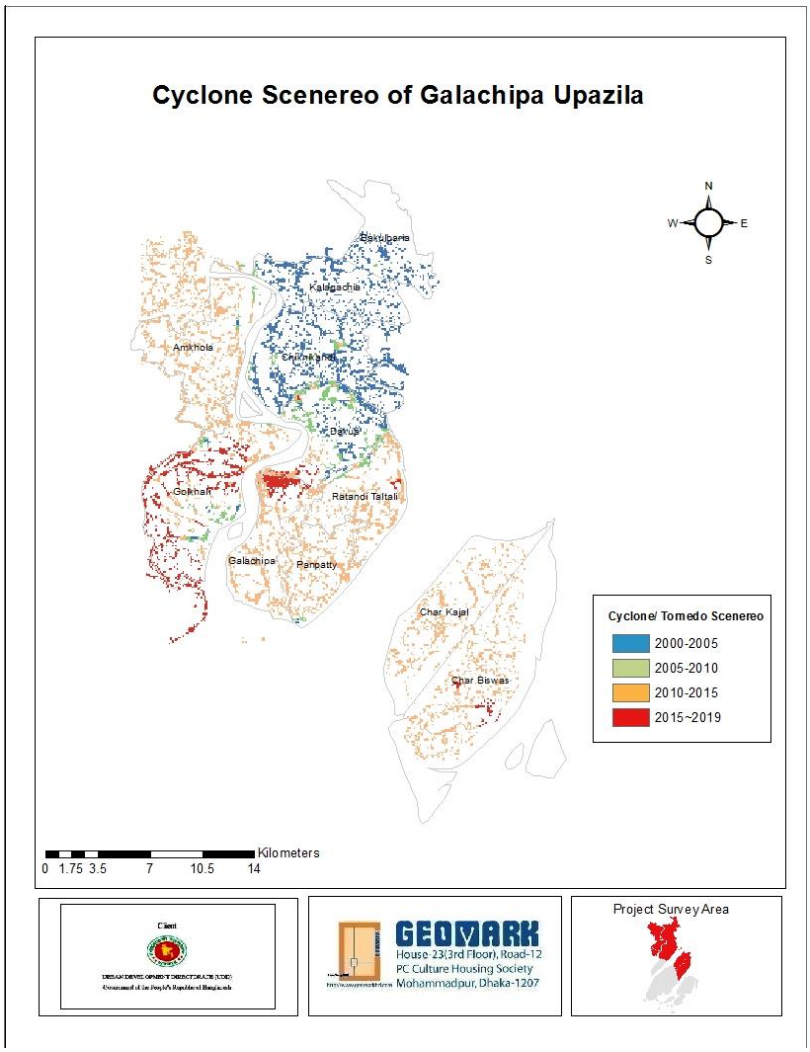


Figure 6-40 Amount of damage by Cyclone/Tornedo

From the Thematic map about the cyclone occurred and consequences in the area, it shows that the Cyclone occurred in Golkhali and some part of the Galachipa from the year of 2015 to 2019.
From 2005 to 2010 most of the Cyclone occurred in Panpatty, Char Kajal and Amkhola union. Map is given bellow.



Map 6-11 cyclone scenereo in Galachipa

6.2.6.5 Fire Hazard in Galachipa

Like the Cyclone, fire cost in the same time period of 2005 to 2009 and 88% of the damage done in that time period which costs TK 10,500,000 from the study year of 2000 to 2019.

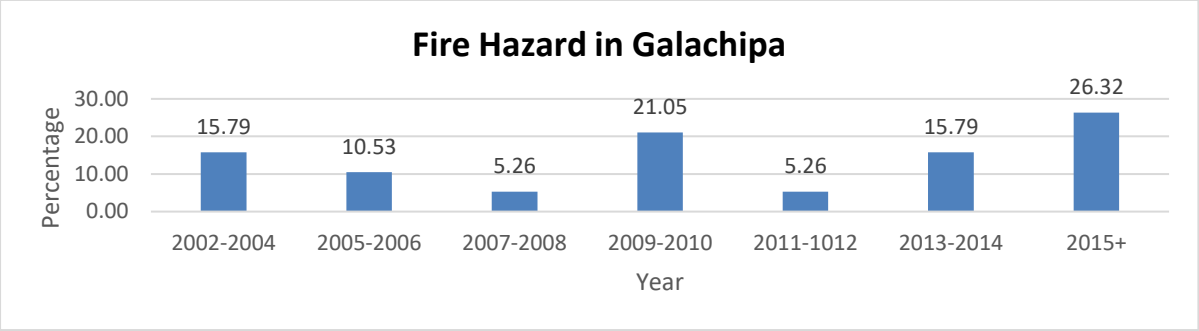


Figure 6-41 Fire Hazard in Galachipa

6.2.6.6 Amount of Damaged by Fire

Like the Cyclone, fire cost in the same time period of 2005 to 2009 and 88% of the damage done in that time period which costs TK 10,500,000 from the study year of 2000 to 2019.

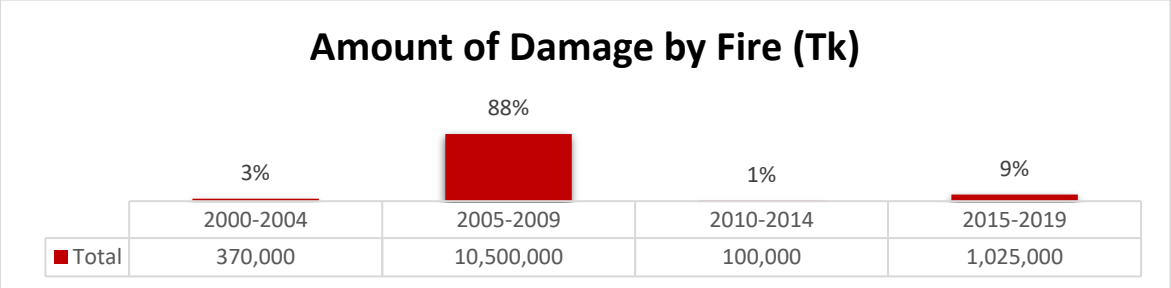


Figure 6-42 Amount of damage in Fire Hazard

6.2.6.7 Flow Tide in Galachipa Upazila

Cyclone and tidal search are natural hazards in our country. We are habited the Cyclone and tidal surge. Mainly they come summer season and let autumn in our country. It makes a ghastly situation. 20/30 feet tidal surge attract in our costal area. It damages our lives and wealth. Following table presents the Cyclone and tidal search in the Galachipa Upazila.

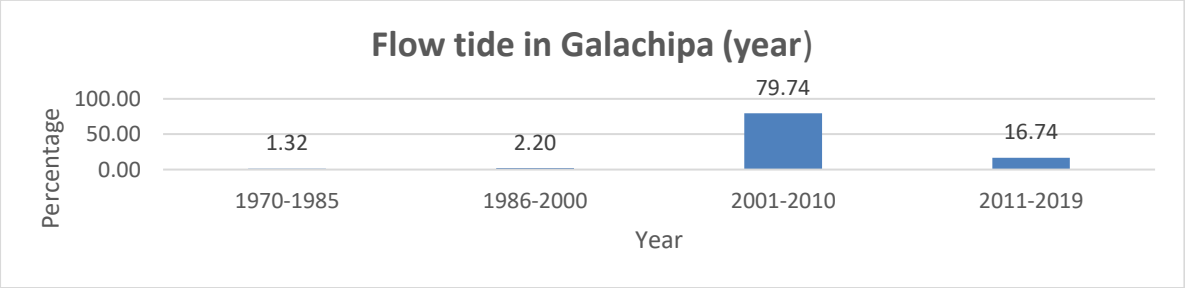


Table 6-11 Flow tide in Galachipa

6.2.6.8 Amount of Damaged by Tidal Surge

Flow tide occurred in maximum time in the year category of 2000-2009 and damage most among the total. 62% damage done in that time and total damage cost was TK. 1,247,00 in the area. In the recent decade flow tide damage cost only TK. 380,000.

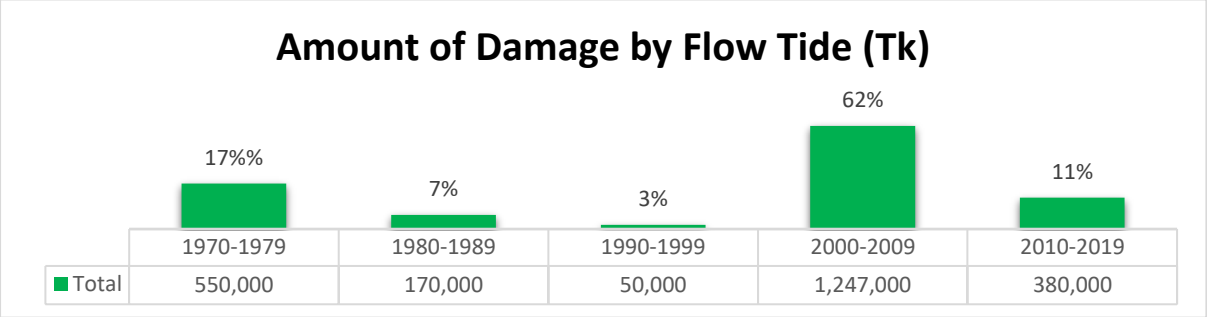


Figure 6-43 Ammount of damaged by Surge

6.2.6.9 Cyclone in Year

The Cyclone is a terrible situation in our country. If he did not suffer from the physicality of a whirlwind, no one could believe it. Sometimes attract the southern part of the whirlwind of our country. Following the table, the trend of Cyclone has been presented in Golchipa and Galachipa Upazilas.

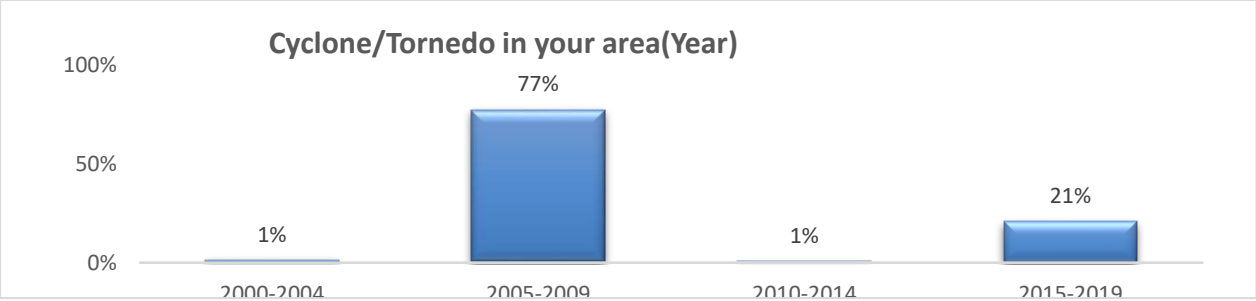


Figure 6-44 Cyclone in your area

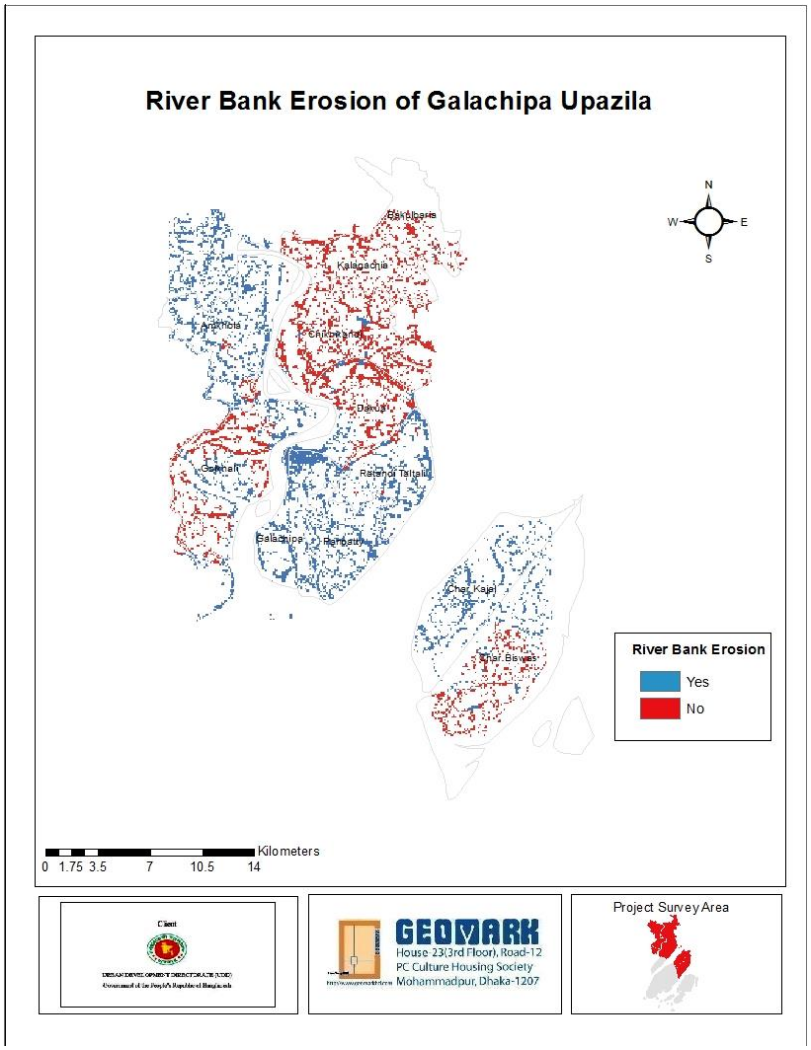
6.2.6.10 River Bank Erosion

Riverbank Erosion is an endemic and recurrent natural hazard in Bangladesh. When rivers enter the mature stage (as in the case with the three mighty rivers, ganges, brahmaputra and meghna) they become sluggish and meander or braid. These oscillations cause massive riverbank erosion. Since the Galachipa Upazila are located along the river the river bank erosion is the common occurrence. In the table below and Figure shows that most of the respondents say that the highest river bank erosion in this area is 64% and the lowest is 36%.

Table 6-12 River Bank Erosion

Categories	Frequency	Percentage
Yes	522	64%
No	296	36%
Grand Total	818	100%

In the Thematic Map about the River Bank Erosion in the Galachipa Upazila given below, showing the Char Kajal, Galachipa, Panpatty, Ratandi Taltali and Amkhola unions are most vulnerable to the river bank erosion, on the other hand Bakulbaria, Chiknikandi, Dakua, most of the part of Golkhaland char Biswas union are little good position of less risk from the river bank erosion. Map is given bellow.



Map 6-12 River Bank Erosion in Galachipa

6.2.6.11 Operational Switch Gate

Since Galachipa Upazila is on the bank of rivers, Switch gate is very much needed. In below table and Figure show that, most of the respondent say that the operation of switch gate in this area the highest of this is Yes 91% and lowest is No that is 9 %.

Table 6-13 Operational Switch Gate

Categories	Frequency	Percentage
Yes	748	91%
No	70	9%
Grand Total	818	100%

6.2.6.12 Symptom of climate change

There are many causes of symptom of climate change in Galachipa Upazila are those Humans are increasingly influencing the climate and the earth's temperature by burning fossil fuels, cutting down rainforests and farming livestock. This adds enormous amounts of greenhouse gases to those naturally occurring in the atmosphere, increasing the greenhouse effect and global warming. In below table and Figure show that most of the respondent say that the Highest Symptom in this area the percentage of this is 84 % and lowest percentage 16 %.

Table 6-14 Symptom of climate change

Categories	Frequency	Percentage
Yes	687	84%
No	131	16%
Grand Total	818	100%

6.2.7 Infrastructure and drainage

6.2.7.1 Drainage Type

Almost 92 people opined they got no drainage facility. Only according to 9 % of the respondents, they got pucca drain in proximity to their houses. Other categories with percentage are shown is the following chart.

Table 6-15 Drainage type

Drain Type	Frequency	Percentage
Katcha	2	0.18
No Drain	998	91.14
Pucca	95	8.68

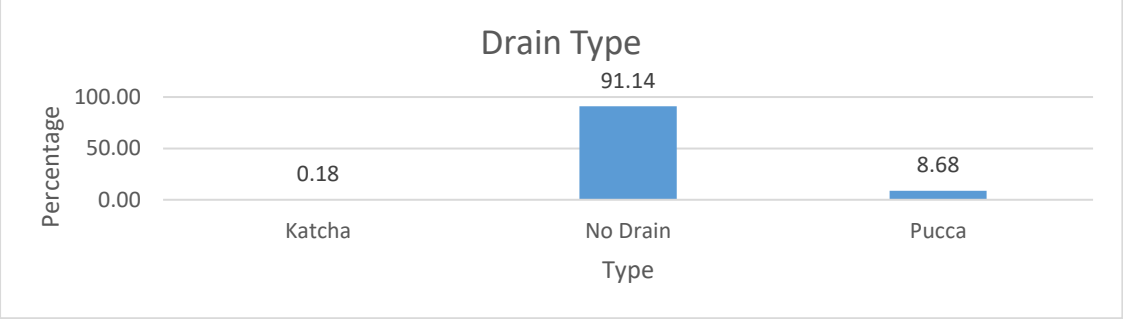


Figure 6-45 Drainage type

6.2.7.2 Height of the Embankment

In the coastal area it needed to protection from the flood or inundate. Embankment of height between 5 to 10 ft. having the most percentages (57%) in the study area. 33% of the embankment having height with 15-20+ ft. in the Galachipa upazila.

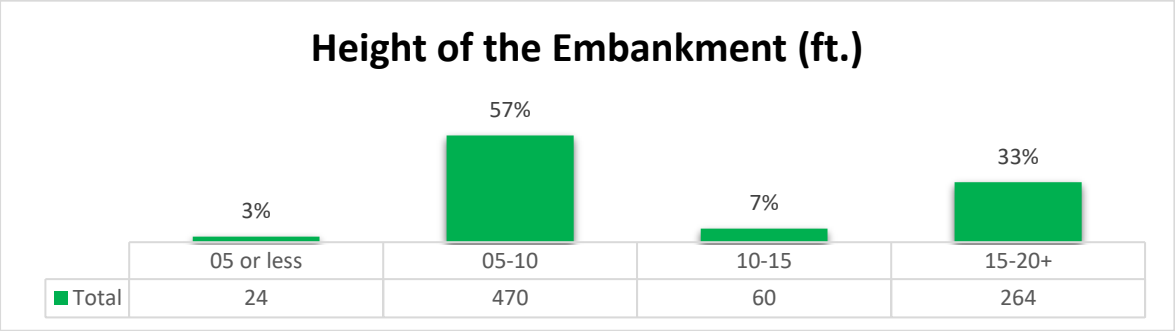


Figure 6-46 Height of the Embankment

6.2.7.3 Increasing the Height of Embankment

Almost 50 % of the respondents thinks that height of the embankment is not enough and needs to be get higher. Other catagories with percentage is shown is the following table.

Table 6-16 Increase the Height of Embankment

Categories	Frequency	Percent
No	408	49.9%
Yes	410	50.1%
Grand Total	**818**	**100.0%**

6.2.8 Disease and Healthcare

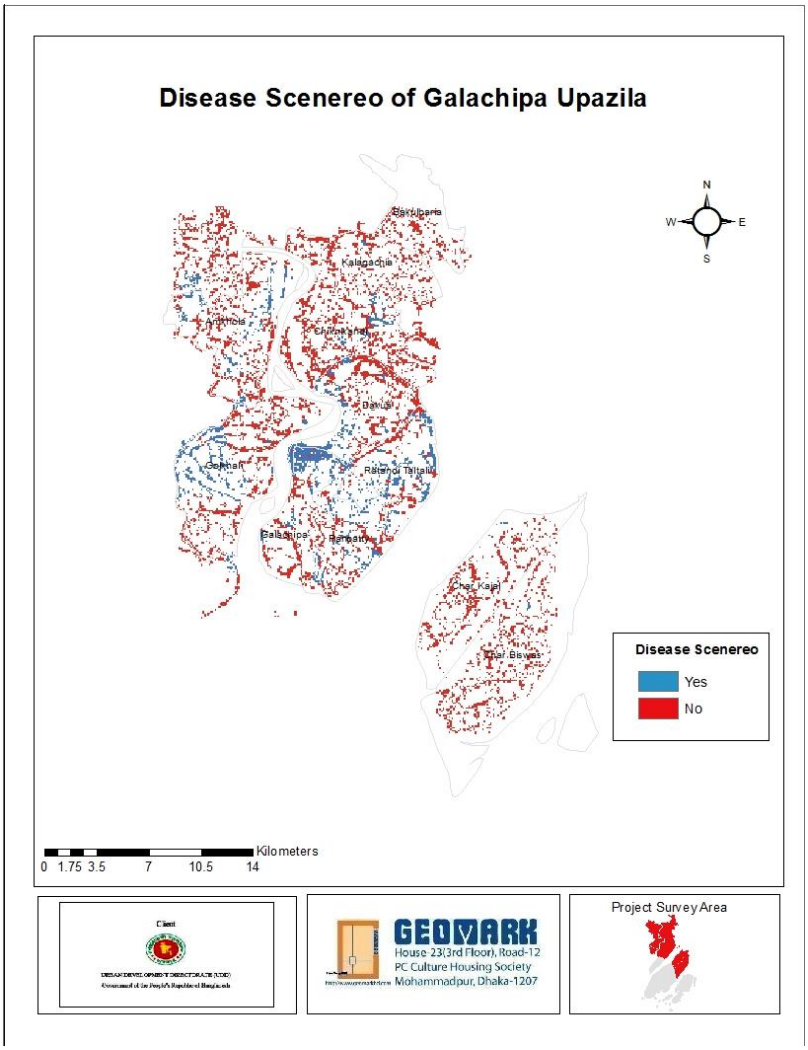
6.2.8.1 Suffered from Diseases

Getting infected by diseases is considered a common phenomenon is Bangladesh. It is a good thing that from our survey, we found only 38% of the people were affected by diseases last year. Other categories with percentage are shown is the following table.

Table 6-17 Suffered from Diseases

Categories	Frequency	Percent
Yes	309	38%
No	509	62%
Grand Total	**818**	**100%**

Recent disease recorded in the Galachipa upazila expressed in the next thematic map, it shows the majority of household in the Char Kajal,Kalagachia, Bakulbaria and Dakua have no recent disease, but some part of the Ratandi Taltali, Galachipa and Golkhali union having the recent disease record.



Map 6-13 Disease scenereo in Galachipa

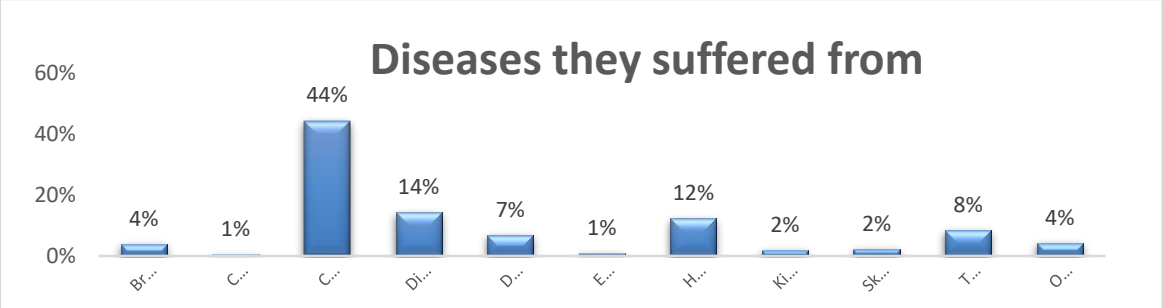


Figure 6-47 Diseases they suffered from

6.2.8.2 Medical Facility

GOV Medical facilities are the highest taken facility according to 80% of the respondents in the Galachipa Upazila. But still a significant percentage of people (second highest) goes to village doctor for treatment. Other categories with percentage are shown is the following chart.

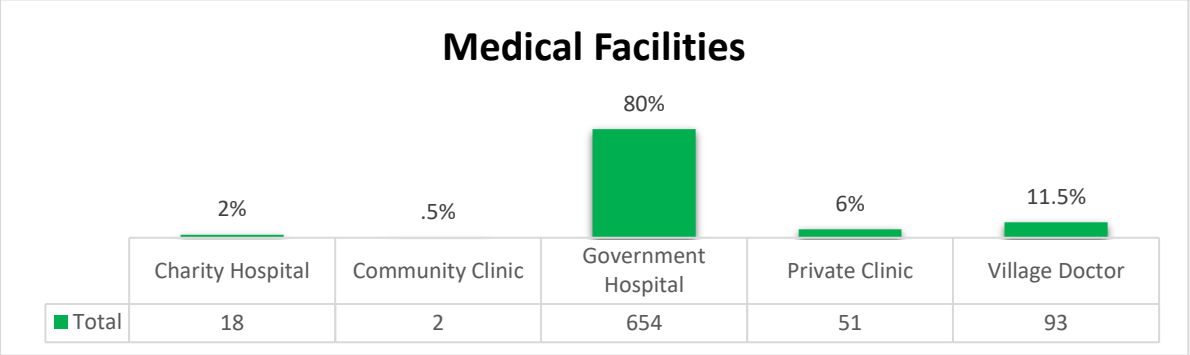


Figure 6-48 Medical Facility

6.2.8.3 List of Disease

Another table below, showing the list of disease attacked by the residents in this area. Common disease observed in the area is Cough Causes/Asthma this kind of disease belongs to 43% of the total disease attacked in the last year, diabetes and tuberculosis (TB) also two common observed disease having percentage of 13.9% and 8.2% respectively.

Table 6-18 Diseases List

Disease	Frequency	Percent
Amashoy/Diarrhea	2	0.6%
Brain Diseases	12	3.8%
Cancer	2	0.6%
Cough Causes/Asthma	137	43.2%
Diabetes	44	13.9%
Dysentery/Diarrhea	21	6.6%
Eye Problem	3	0.9%
Heart Disease/BP	38	12.0%
Kidney Disease	6	1.9%
Paralyses	1	0.3%
Skin	1	0.3%
Skin Disease	7	2.2%
Tuberculosis (TB)	26	8.2%
Others	16	5.0%
Grand Total	**317**	**100%**

6.2.9 Utility and waste management

6.2.9.1 Source of Fuel

Still, wood is considered as the primary source of fuel in Galachipa Upazila, opined by 87 % of the respondents. Cylinder gas is also getting popularity is some places. Other catagories with percentage is shown is the following chart.

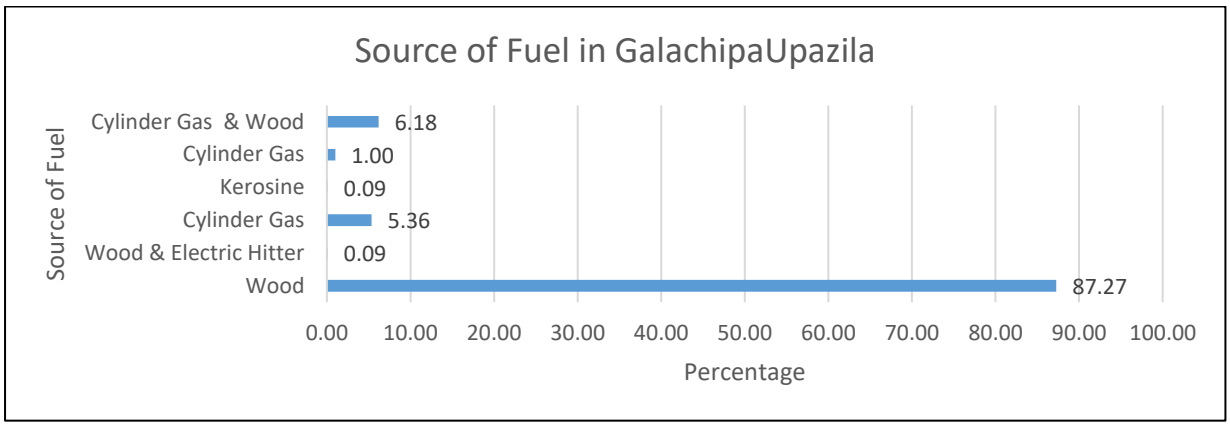
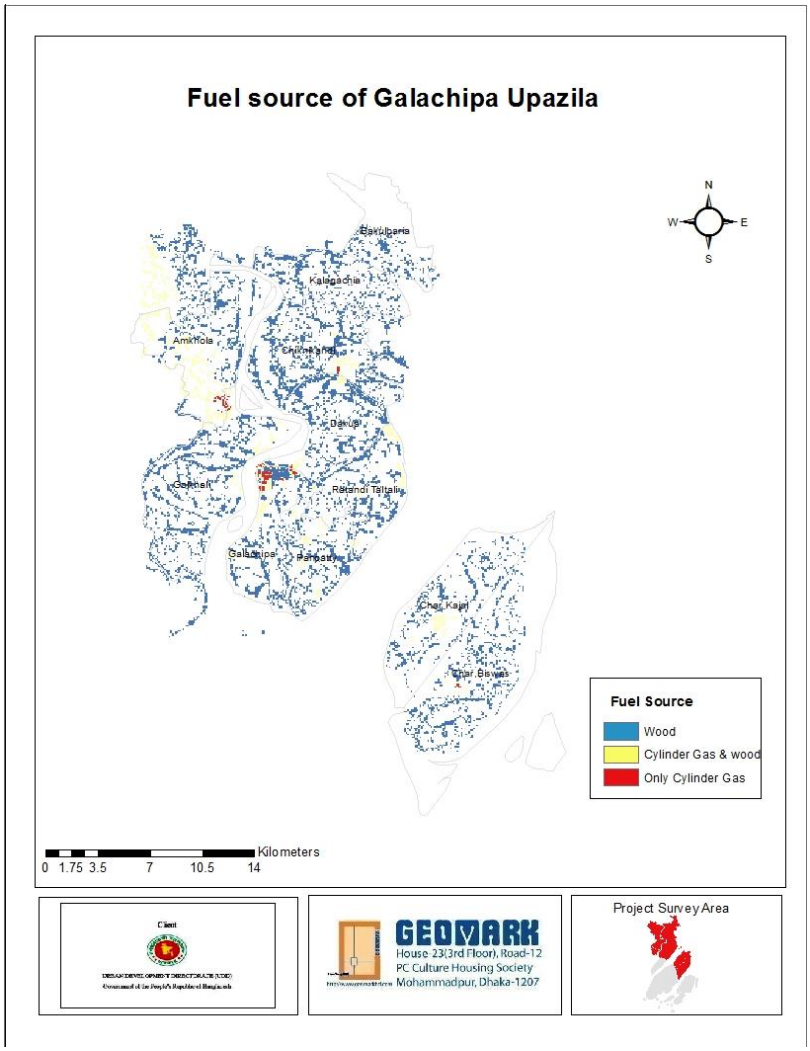


Figure 6-49 Source of Fuel

According to the Thematic map about the fuel source in the Galachipa Upazila, maximum of the house hold across the area uses woods, small portion of the Galachipa and Dakua union found that the along with wood they are using Cylinder Gas.



Map 6-14 Fuel source in Galachipa Upazila

6.2.9.2 Source of Light

Interestingly, solar power is getting popular in Galachipa Upazila as well as the entire country as a reliable source of renewable and sustainable source of electricity. Light sources in the Galachipa upazila mainly depends on electricity and solar panel, the study shows that the source of light in the area both of the electricity and solar electricity contribute the same percentage (48%), other 4% of the light source belongs to the kupi/Bati/Harican.

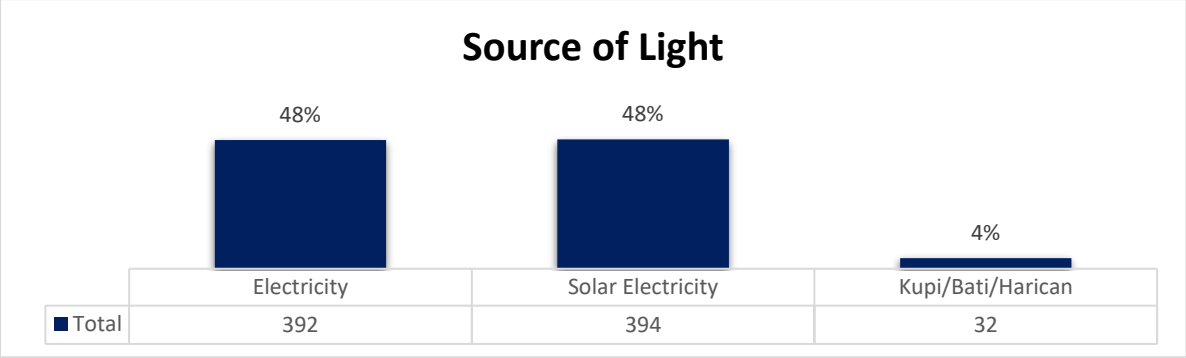
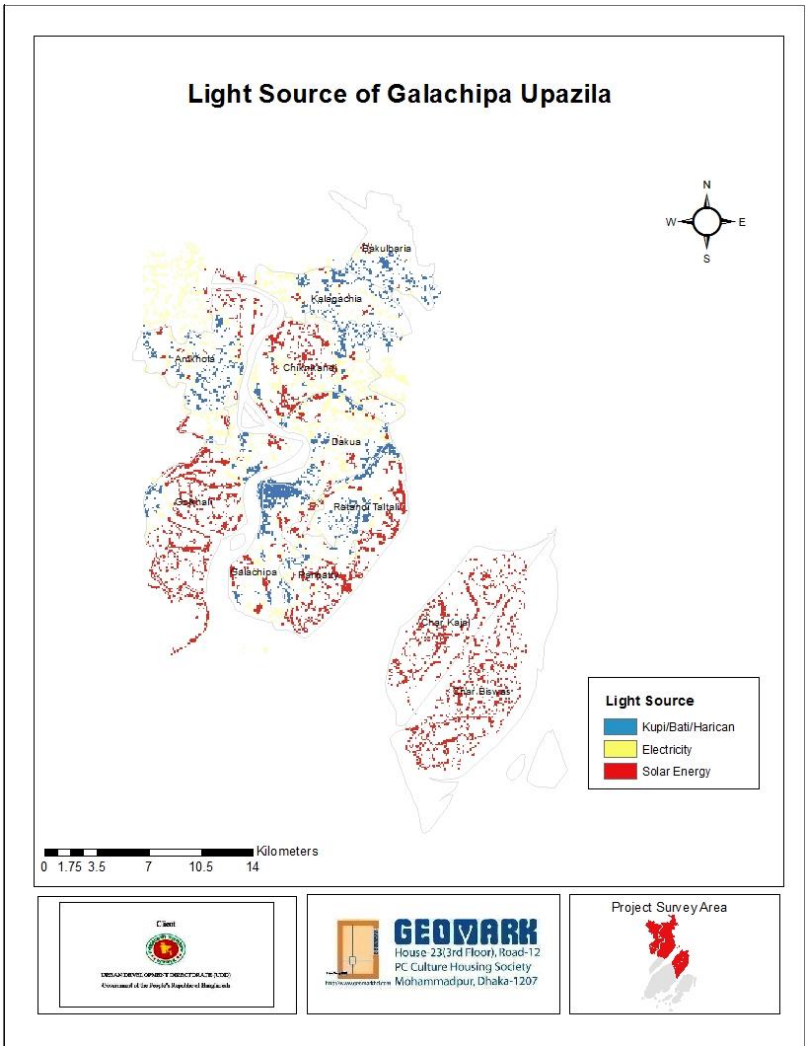


Figure 6-50 Source of Light

Thematic map given bellow showing that the light source in the Galachipa upazila, in the Char Kajal, Char Biswas and Gilkhali union uses solar electricity as a source of light.
On the other hand, most of the union powered by electricity like Galachipa,Dakua, Amkhola, Kalagaachia etc. in the region.



Map 6-15 Source of Light in Galachipa

6.2.9.3 Type of Sanitation

Maximum sanitation type in the area is Tin shed, tin shed sanitation type belongs to the 41% of the total sanitation in the area, 28% of the sanitation is Katcha and only 15% of the sanitation found as a Pucca in the Galachipa upazila study area.

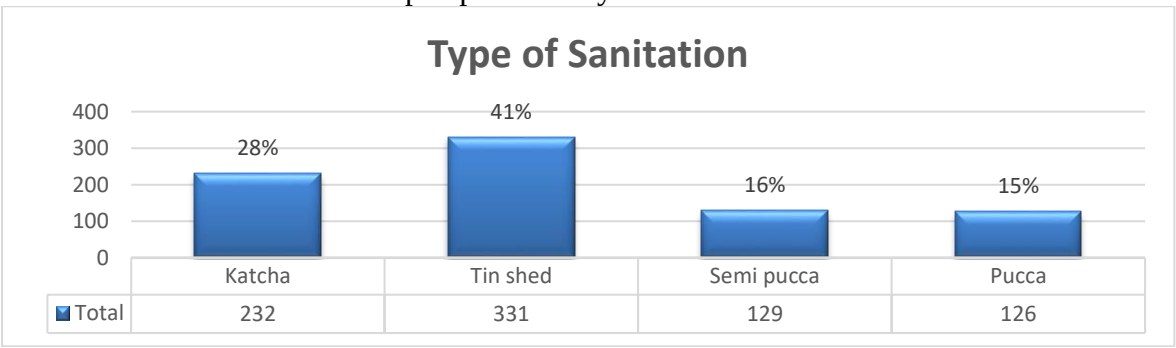


Figure 6-51 Type of Sanitation

6.2.9.4 Waste Disposal system

Waste management in Galachipa Upazila is not yet significantly good. In fact, it's not good at all. Almost 91 % of the respondents said they still dump the solid waste just outside their house.

Which may cause serious health issues. So, solid waste management condition in Galachipa Upazila need more improvement. And another thing to be concerned is they dump waste directly into the river or canal which is constantly polluting the water of that system. Which has immediate negative impact on the biodiversity and water ecosystem of the area. As the area is in a close proximity to the Bay of Bangal, the polluted river water must enter the sea and therefore endangered the life and ocean ecology.

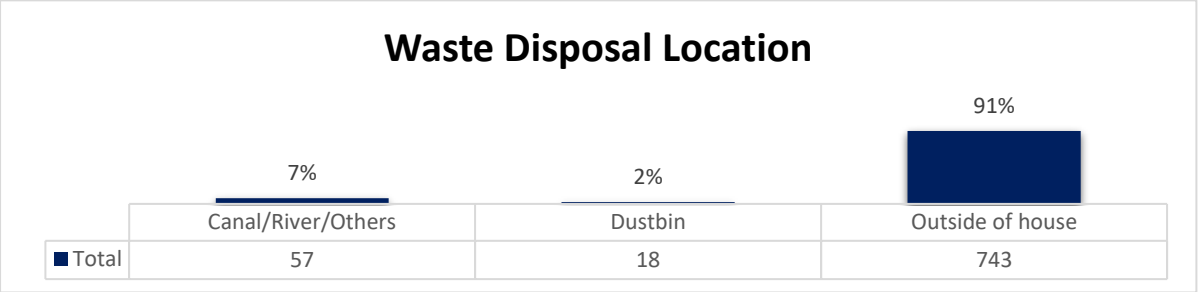


Figure 6-52 Waste Disposal Location

6.2.10 Water supply and Drainage

6.2.10.1 Water logging

Water logging is one of the major issues in Galachipa Upazila. Almost 83% respondents complained about water logging.

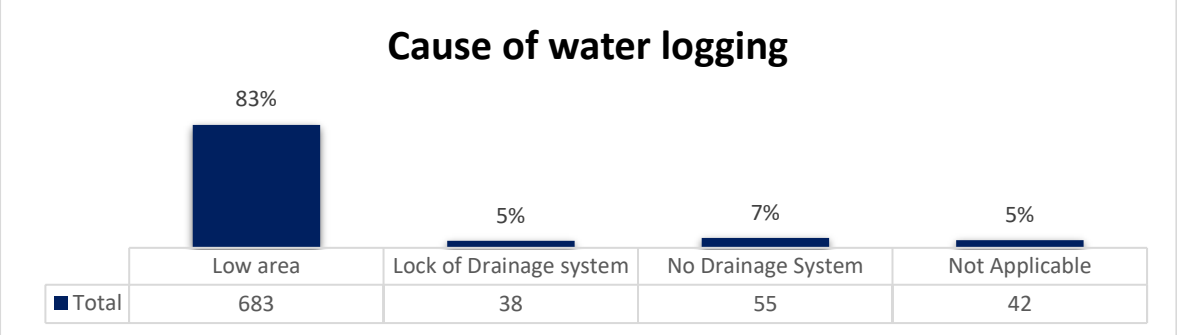


Figure 6-53 Causes of water logging

6.2.10.2 Cause of water logging

Water logging problem can be evaluated to identifying how much time its lasted in the specific area. Water logging lasted less than 1 hour only 17% of the total water logging duration, maximum 39% of the water logging occurred and lasted 3 to 5 hours, only 3% water logging lasted more than 5 hours in the study area.

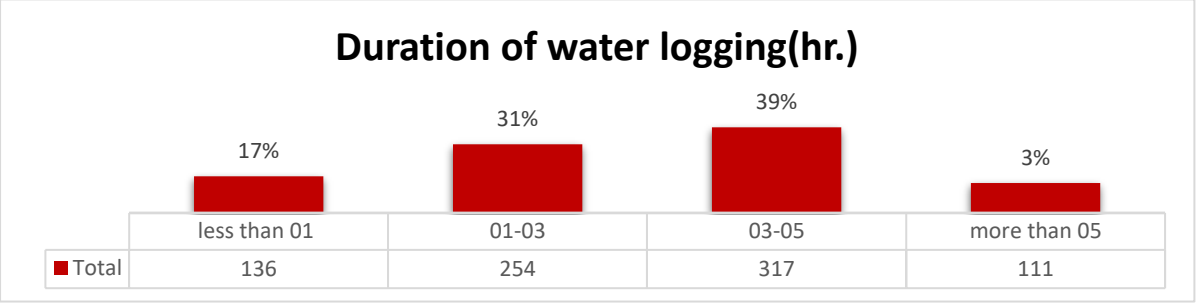


Figure 6-54 Duration of water logging

6.2.10.3 Operational switch gates

Switch gates maintain and control the flow of water. If the system fails, water logging and other related problems may occur. Luckily, 91 % respondent opined that the nearby switch gate was operational.

Table 6-19 Operational switch gates

Categories	Frequency	Percentage
Yes	748	91%
No	70	9%
Grand Total	818	100%

6.2.10.4 Water quality

It is a good thing that almost all the respondents (almost 99 %) believe that the water quality is good enough and it's perfectly drinkable. Percentage is shown in the following table.

Table 6-20 Water Quality

Water Quality	Frequency	Percentage
Drinkable	1084	98.28
Not Drinkable	19	1.72

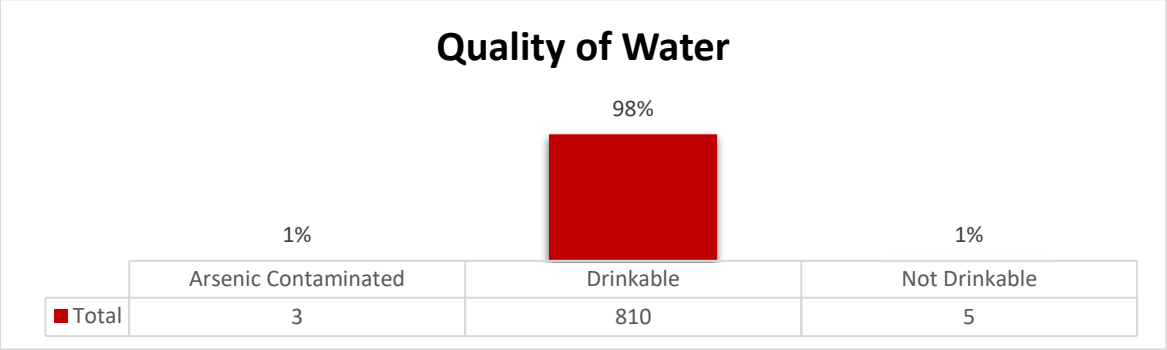


Figure 6-55 Water Quality

6.2.10.5 Source of Drinking Water

93% of the people are dependent on their personal Tube Well as a clean source of drinking water. Following chart is showing the sources with percentage.

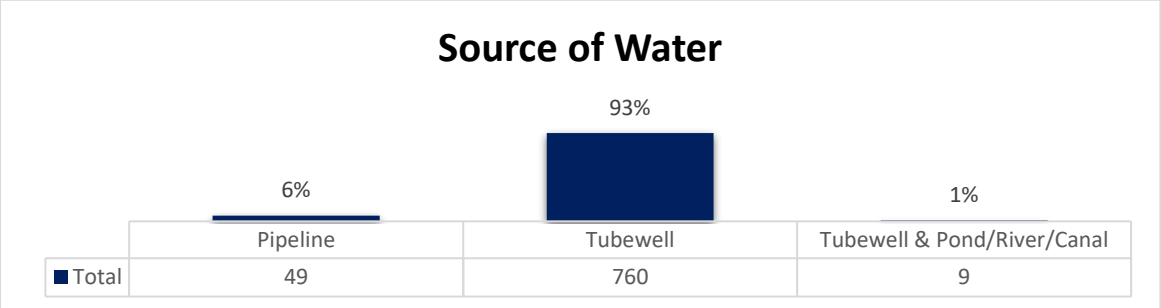
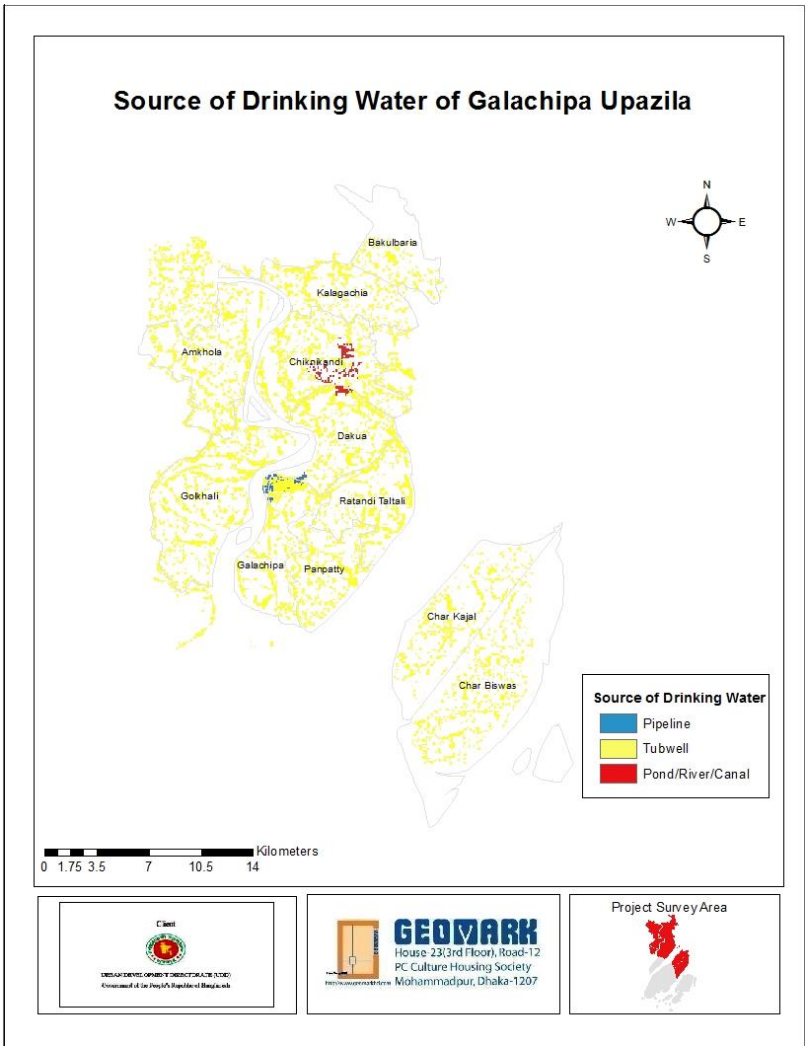


Figure 6-56 Source of Drinking Water

The following map showing that the tubewell water using the main source of drinking water in the Galachipa. Small portion of area in Chiknikandi uses the pond/River/Canal water as the source of drinking water in the study.



Map 6-16 Source of Drinking Water in Galachipa

6.2.10.6 Arrangement for Drinking Water During Flood

Bangladesh is situated on the largest delta of the world and most of its coastal area is low laying area therefore prone to flood. It is important to ensure the sufficient supply of pure drinking water during the flood. we collected information about the supply of water which is listed in percentage in following table. 55% people opined that they have arrangement for drinking water during flood.

Table 6-21 Arrangement for Drinking Water During Flood

Categories	Frequency	Percentage
Yes	447	55%
No	371	45%
Grand Total	**818**	**100%**

6.2.10.7 Water Supply Sufficiency

Sufficient supply of water is an essential requirement for human being to live. From our survey, we collected information about the supply of water which is listed in percentage in following table. Almost 78% people things that water supply is sufficient for them.

Table 6-22 Water Supply Sufficiency

Categories	Frequency	Percent

No	180	22%
Yes	638	78%
Grand Total	**818**	**100%**

6.2.10.8 Problem to Collect Water

Galachipa is located in the southern part of Bangladesh which is the coastal region of the country. It is obvious that is difficult to find drinkable pure water there. People living there often face difficulties collecting the water. From our survey, we listed down the scenario. Following table is showing that in percentage. According to the study, 23% of the household not facing such problem of collecting drinking water. Water source is so far from the house this type of problem facing 35% of the family in the study and 42% of the family express that the collection time water is taken too long for them.

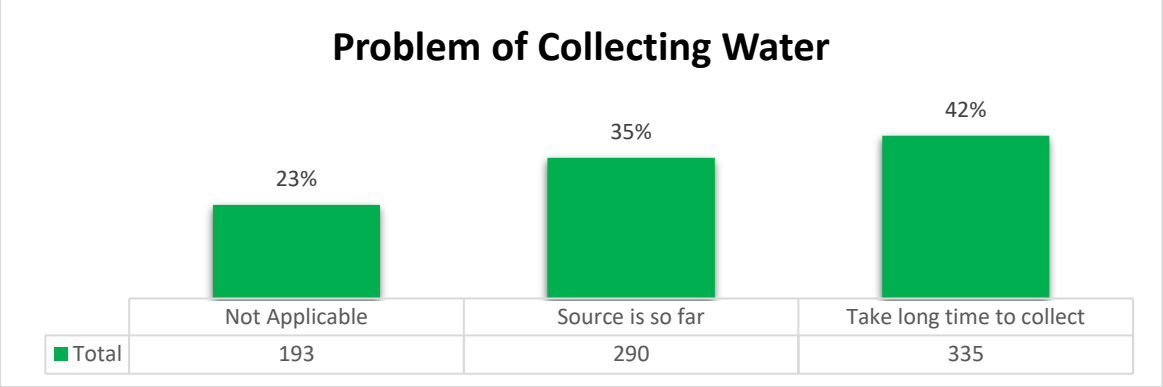


Figure 6-57 Problem to Collect Water

6.2.10.9 Arrangement for Collecting Rain Water

In char area, most of the water is saline water therefore not usable for drinking and other purposes. Treatment of saline water is also costly. So, rain water harvesting can the most reliable source of water. Following table is showing the rain water harvesting scenario of Galachipa Upazila. 78% of the respondents said they have arrangement for collecting rain water.

Table 6-23 Arrangement for Collecting Rain Water

Categories	Frequency	Percent
Yes	639	78%
No	179	22%
Grand Total	**818**	**100%**

6.2.11 Other Infrastructure and Facility

6.2.11.1 Problem of Main Road

Problem of the main road distributed into the four main problems; Damaged Road, Katcha Road, Narrow Road, Traffic Jam.

Among the problems 65% of the respondents think that the main road of the area is narrow. 32% road of the area is damaged.

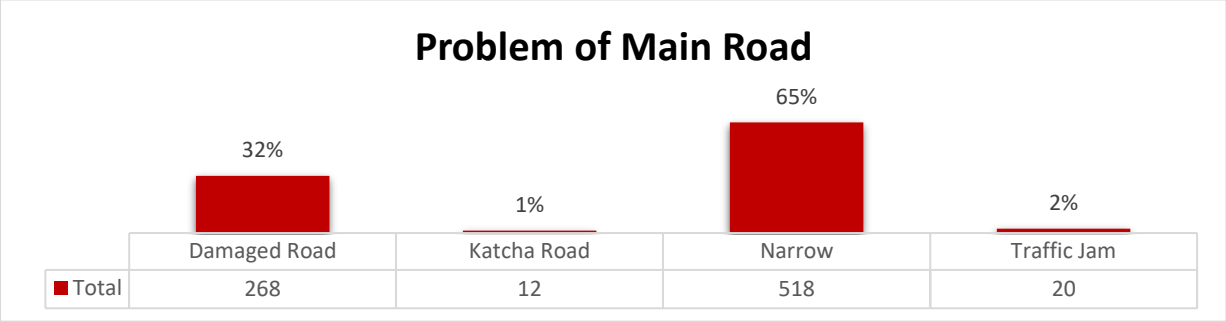


Figure 6-58 Problem of Main Road

6.2.11.2 Bazar, Post office & Shopping Mall Distance from House

Distance from the house distributed in five categories in the study 11% of the Bazar (4000-5000) meter away from the home, and approximately same distance for other distance categories in the study, where maximum 27% house lies in the category (1000-2000) meter.
Minimum distance of less than 1000 meter to the post office only 12% in the study, 27% of the post office not more than 2000 meter away and 18% of the post offices lies in the 4000-5000+ meter category.
In the figure, exhibits that the 57% of the shopping malls are more than 4000 meters away from the respondent's home, beside only 14% of the shopping malls distance less than 1000 meter away from the home of the respondents.

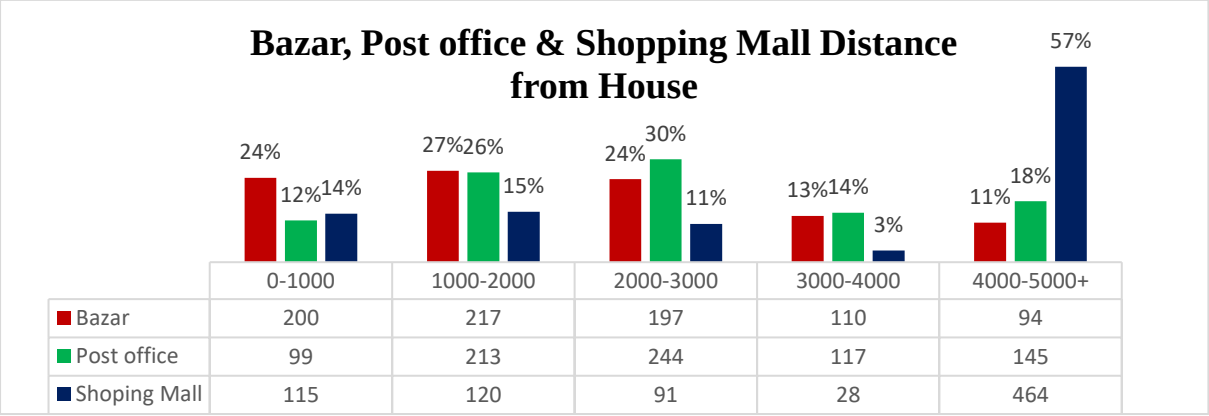
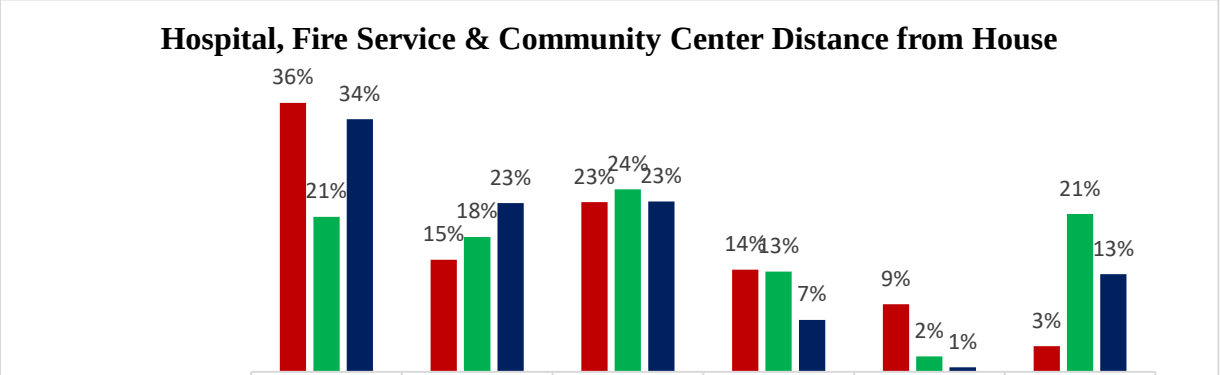


Figure 6-59 Bazar, post office and Shopping Mall Distance from House

6.2.11.3 Hospital, Fire Service & Community Center Distance from House

The following figure, shows that 36% of house less than 5000 meter away from hospital in the Galachipa upazila, and only 3% house are more than 25000 meters away from respective house.
For the fire service distance from home distributed in the something like equal distribution for the distance from respondents' home, minimum (5000 or less) and maximum (25000-30000+) both categories share the same 21% percentages in the Galachipa upazila.
34% community center are in the distance of less than 5000 meter from the home of the respondents, and maximum 25000-30000+ meter away community center only 13% in the study area.



	5000 or less	5000-10000	10000-15000	15000-20000	20000-25000	25000-30000+
Hospital	295	123	186	112	74	28
Fire Service	170	148	200	110	17	173
Community Center	277	185	187	57	5	107

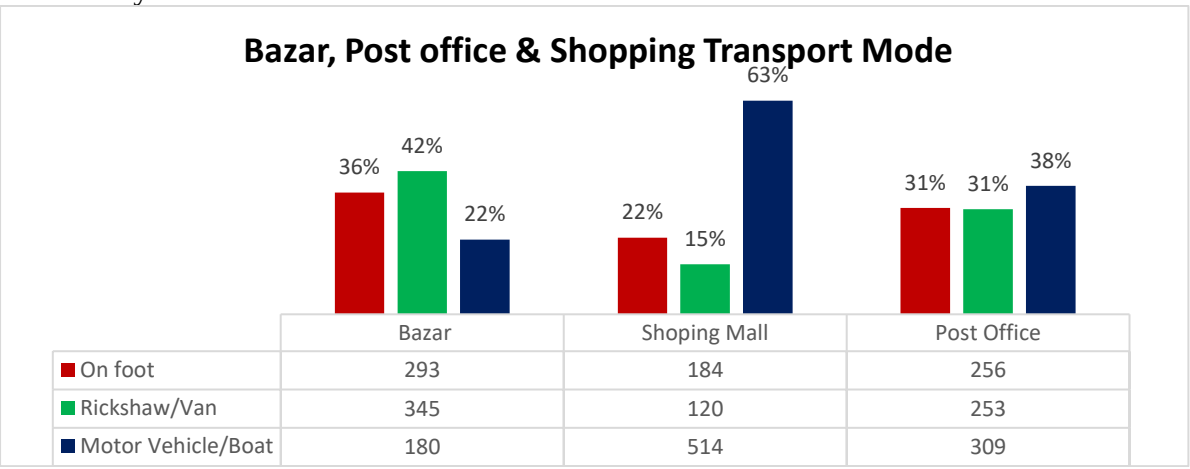
Figure 6-60 Hospital, Fire Service & Community Center Distance from House

6.2.11.4 Bazar, Post office & Shopping Transport Mode

Transport mode from home to bazar, post office and shopping mall distributed in three categories (On foot, Rickshaw/Van & Motor Vehicle/Boat),

In the figure 3.10.3, 36% of the respondents goes bazar on foot, 42% of them take Rickshaw/Van and 22% of the respondents uses Motor Vehicle/Boat. In the Galachipa upazila, 63% of the of the respondents uses Motor Vehicle/Van for reaching shopping mall, and 22% of the respondent goes to the shopping mall on foot.

For post office transport mode all the three categories are approximately same (maximum 38%) in the study



	Bazar	Shoping Mall	Post Office
On foot	293	184	256
Rickshaw/Van	345	120	253
Motor Vehicle/Boat	180	514	309

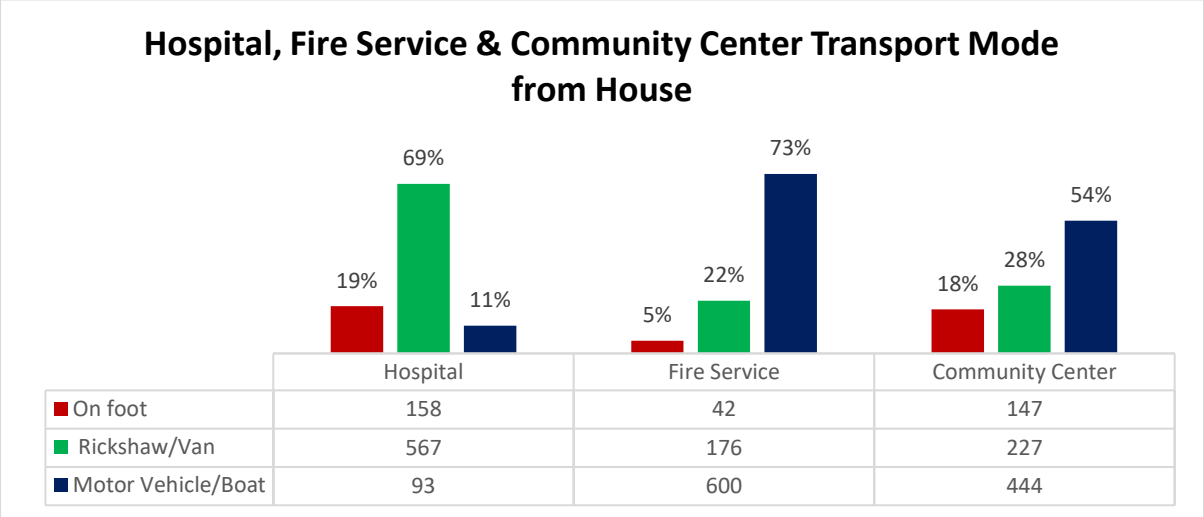
Figure 6-61 Bazar, post office and Shopping Mall Transport Mode

6.2.11.5 Hospital, Fire Service & Community Center Transport Mode from House

In the case of transport mode from house to the Hospital, Fire service & Community Center, all the transport options are categories into three option,

For the Hospital transport, 69% of the respondents prefer to take Rickshaw/Van, 19% goes on foot and 11% of the respondents uses Motor Vehicle/Boat.

In the figure 3.10.4, 73% of the respondents uses Motor Vehicle/Boat for the transportation to get fire service, and only 5% uses foot to reaches Fire service in the Galachipa upazila.

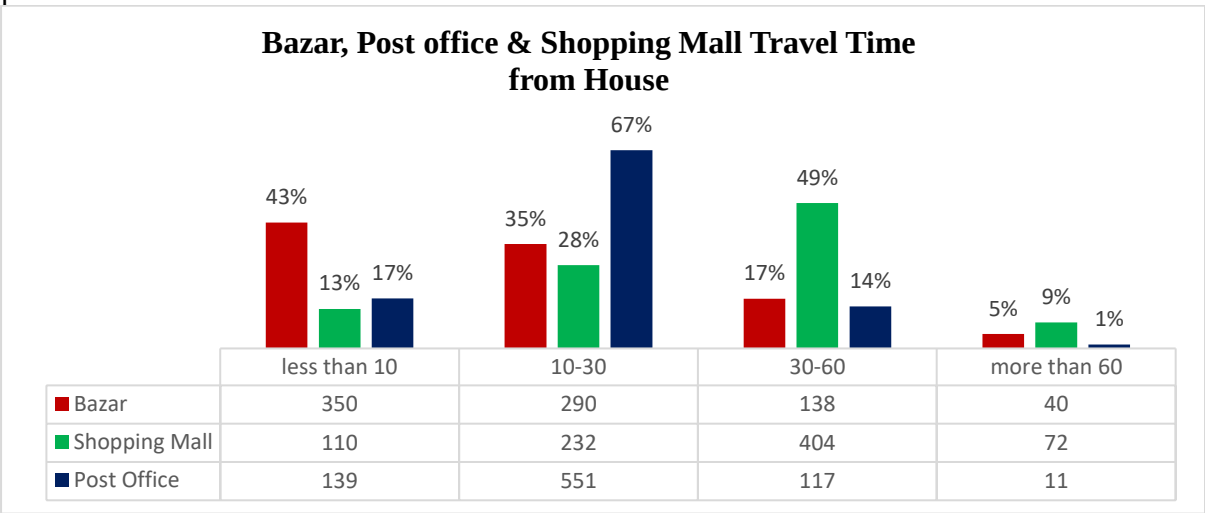


	Hospital	Fire Service	Community Center
On foot	158	42	147
Rickshaw/Van	567	176	227
Motor Vehicle/Boat	93	600	444

Figure 6-62 Hospital, Fire Service & Community Center Transport Mode

6.2.11.6 Bazar, Post office & Shopping Mall Travel Time from House

Travel time for Bazar, shopping Mall & Post office distributed within maximum 60 minutes, 43% respondents exhibits that to get a nearest bazar it takes less or 10 minutes, in the same time limit 13% of the respondents get into the shopping mall and 17% for the post office. Maximum 67% of response belongs to the 10-30 minutes time limit for the travel time to the post office. All the three destination seems same for the time limit more than 60 minutes.



	less than 10	10-30	30-60	more than 60
Bazar	350	290	138	40
Shopping Mall	110	232	404	72
Post Office	139	551	117	11

Figure 6-63 Bazar, Post office & Shopping Mall Travel Time

6.2.11.7 Hospital, Fire Service & Community Center Travel Time from House

Time limit of the travel time categorized into three categories, for the travel time to the hospital 63% of the respondents express that it takes maximum 60 minutes to reach the hospital from their home and only 2% takes 120-180-time limit category.

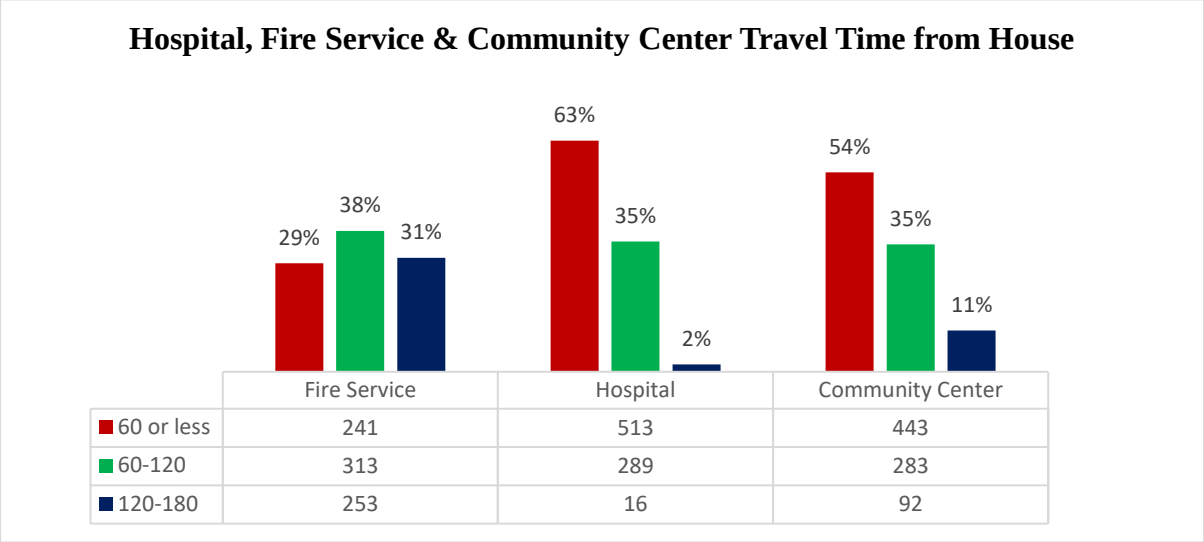


Figure 6-64 Hospital, Fire Service & Community Center Mall Travel Time

6.2.11.8 Bazar, Post office & Shopping Mall Service Quality

Service quality of bazar 64% of the individuals satisfied as an average level, 35% express bazar service is good and only 1% said that service quality of bazar is bad. For the service quality of shopping mall, shows that 66% of the residents said that service quality of shopping is average type, 30% of them express that it is good and only 4% marked as bad service quality.

Post office service quality distributed mainly in good and average categories, 43% of the feedback of the service quality is good, 55% belongs to the average service quality, and only 2% opinion belongs to the bad service quality.

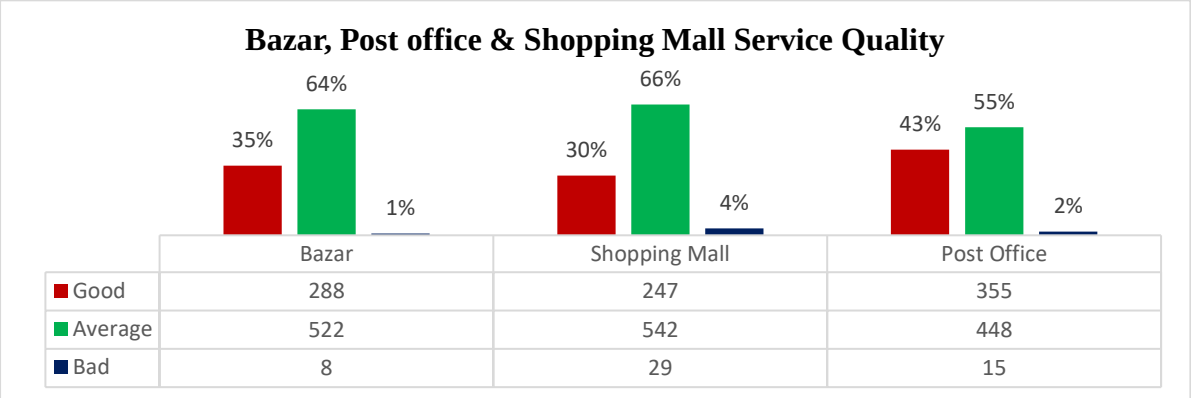


Figure 6-65 Bazar, post office and Shopping Mall Service Quality

6.2.11.9 Hospital, Fire Service & Community Center Service Quality

According to the respondents in study 58% express that service quality of hospital is average in quality, 25% belongs to the good service quality and 17% express that the service quality of hospital is bad in the study area.

Service quality of fire service is distributed same among the three option Good, Average and Bad where's 39% goes to the good service quality, 35% and 26% for the average and bad respectively.

In the figure, shows that 68% opinion belongs to the average service quality for community center, only 20% express that the service is good and rest 11% belongs to the bad service quality.

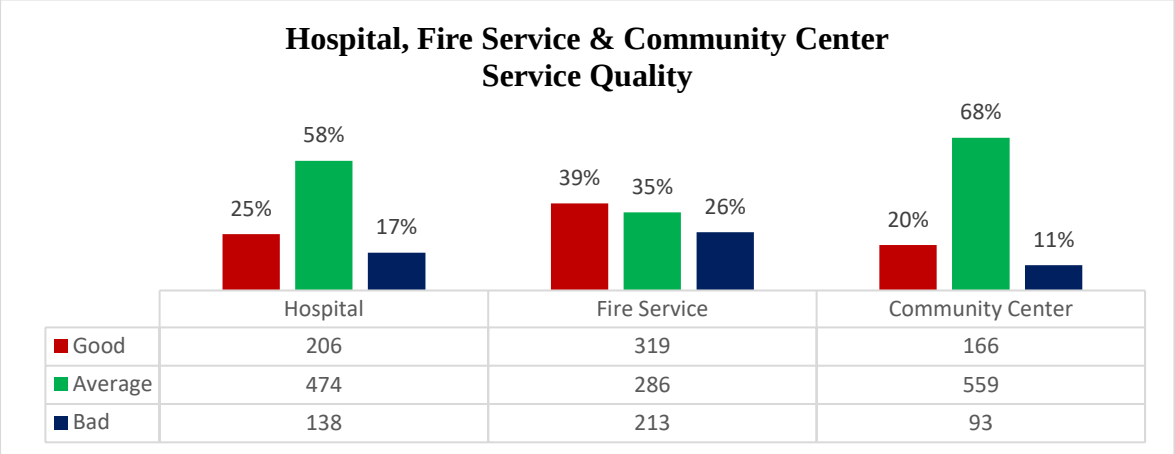


Figure 6-66 Hospital, Fire Service & Community Center Service Quality Hospital Distance (km)

6.2.11.10 Recreation Type

The type recreation is a very big factor in socio-economic condition. In below table and Figure show that most of the respondent in Galachipa and Galachipa Upazila say that the Highest Irregular type recreation in this area are 97% and lowest is 3%.

Table 6-24 Recreation Type

Categories	Frequency	Percent
Irregular	795	97%
Regular	23	3%
Grand Total	818	100%

6.2.11.11 Distance of Recreational place

Recreational places are important things for people. Without entertainment, people cannot live because anxiety draws their lives. So, every human being needs a place of entertainment. Following the table, the distances between recreational sites in Golchipa and Galachipa Upazilas are presented. Around 45% of the respondents believe that they can avail reactional facilities within 500 meters from their residence.

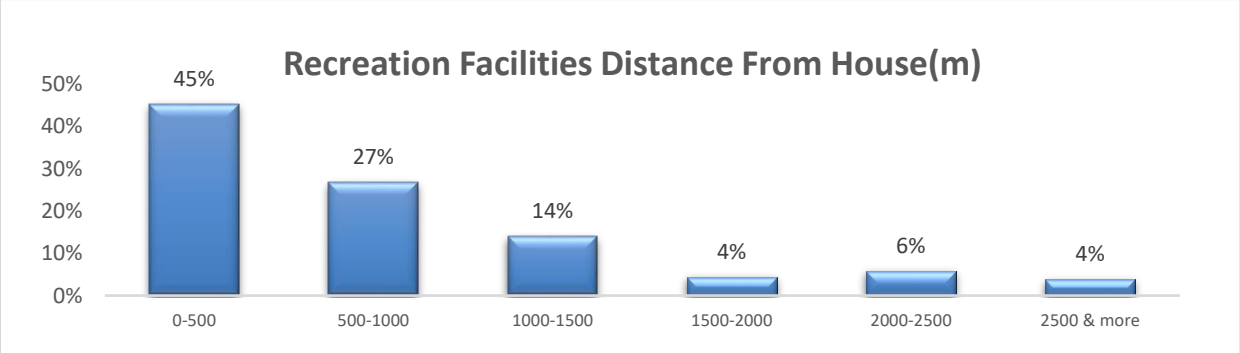


Figure 6-67 Recreation Facilities Distance from House

6.2.11.12 Location of Recreational Place

The recreation space is one of the most important elements of the socio-economic survey. The Galachipa Upazilas have many recreational places such as play fields, naturally beautiful places, shopping malls, parks, fairs, clubs and many more. The most striking is the natural beauty. As the table and diagram below show, the majority of respondents said that the naturally beautiful place in the area is 56% its highest and the lowest park 3%.

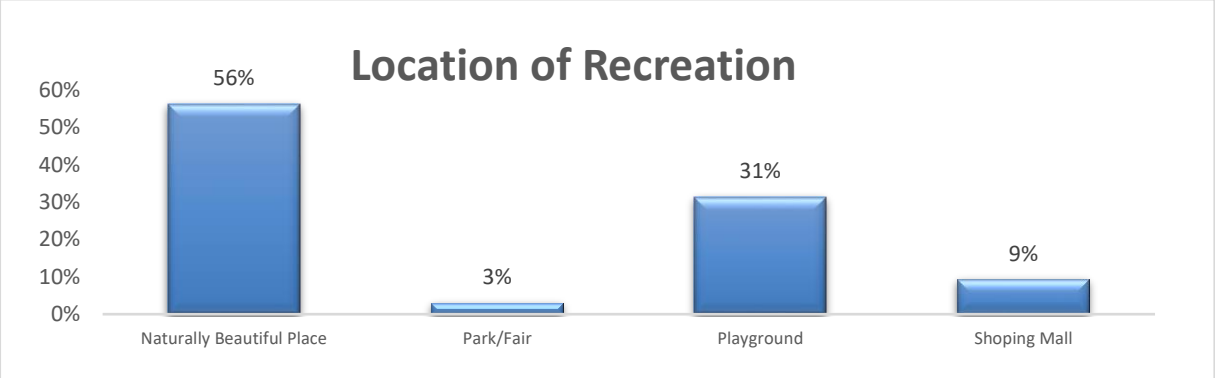


Figure 6-68 Location of Recreation

6.2.11.13 Passing Leisure Time

Leisure time is when you are not working and you can do things that relax and enjoy. In Gallachipa and Galachipa Upazilas, most people spend their leisure time in multiple jobs, which is the highest. 59% and the lowest reading book is 4%.

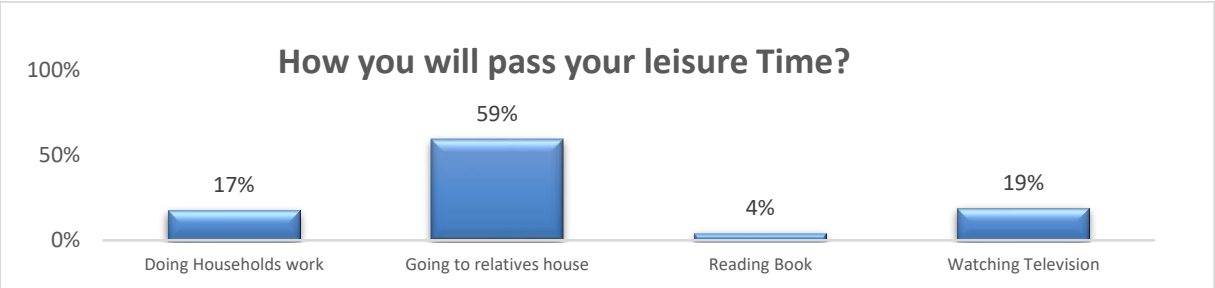


Figure 6-69 Passing Leisure Time

6.2.11.14 First Problem in This Area

Several of problem identified by the residents of the area ,among all the problem 49% of the respondents think that road and transportation problem is the main problem in this area, 22% of the residents think that water logging is the first problem and 18% residents given their opinion in the favor of load shedding is their first problem in the Galachipa upazila.

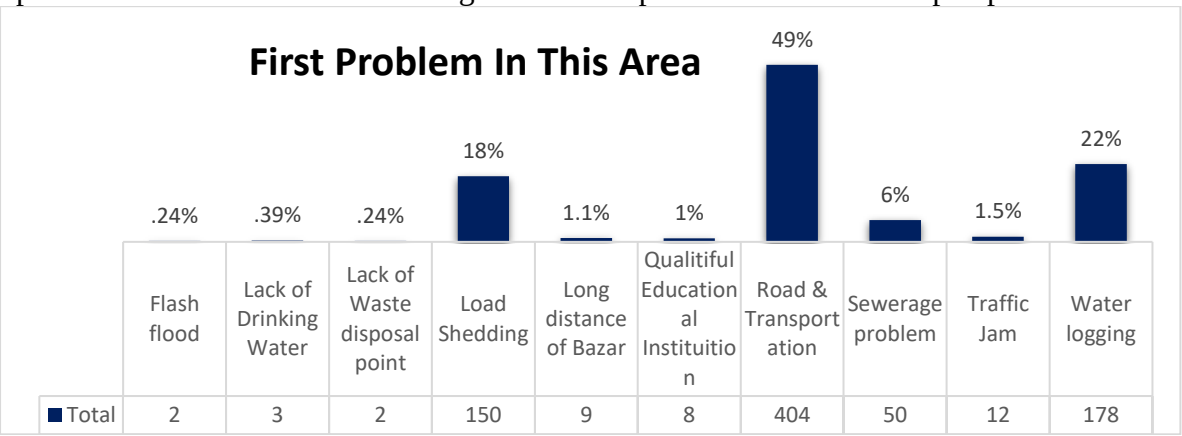
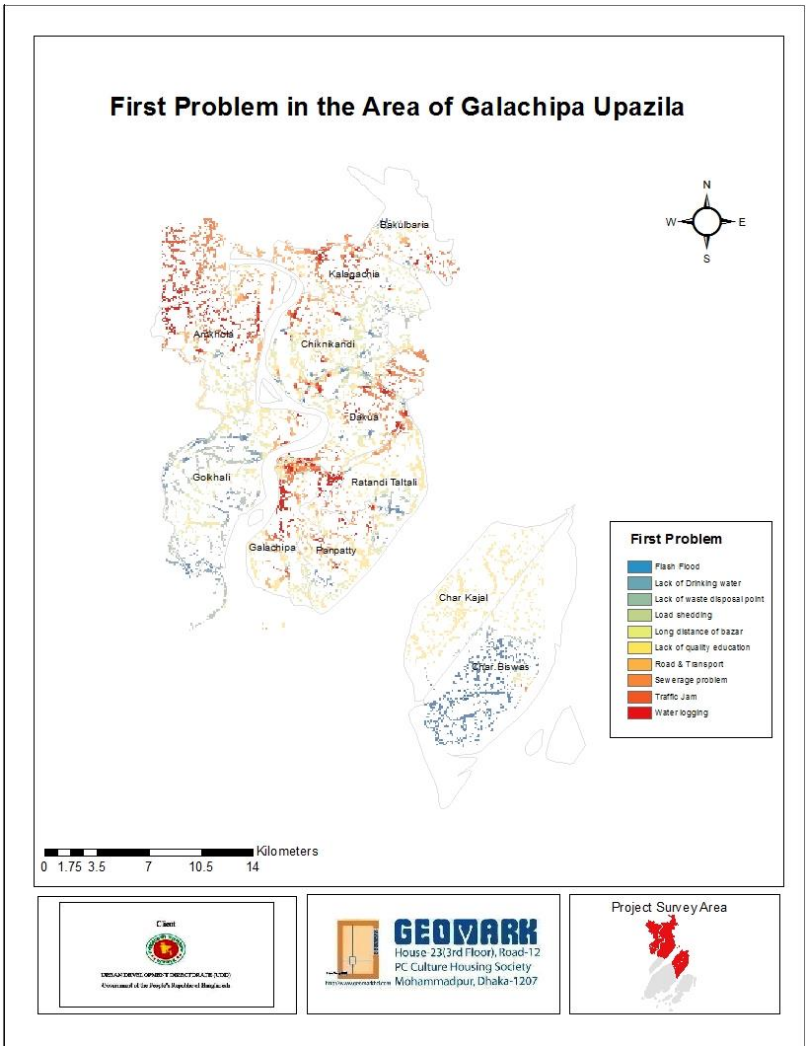


Figure 6-70 First Problem in This Area

In the southern part of the upazila, the respondents of Char Biswas express that their first problem is the flash flood. On the other hand, in the northern part of the upazila, where Amkhola union experiencing the problem of water logging as well as traffic jam, the traffic jam along with road & transport and sewerage problem also experiencing in Galachipa, Dakua,

Kalagachia and Bakulbaria. With the other first problem Panpatty, Ratandi Taltali and Char Kajal unions are facing of lack of quality education in the region.



Map 6-17 First Problem in Galachipa

6.2.12 Sanitation and Hygiene

6.2.12.1 Sanitation Condition

Sanitation condition is 70.95% good in the Galachipa Upazila. Other 29.05% sanitation condition is not enough. These two Upazila need to develop the sanitation condition. Hygienic sanitation is necessary for every people. We hope the government will take spatial care for this sector.

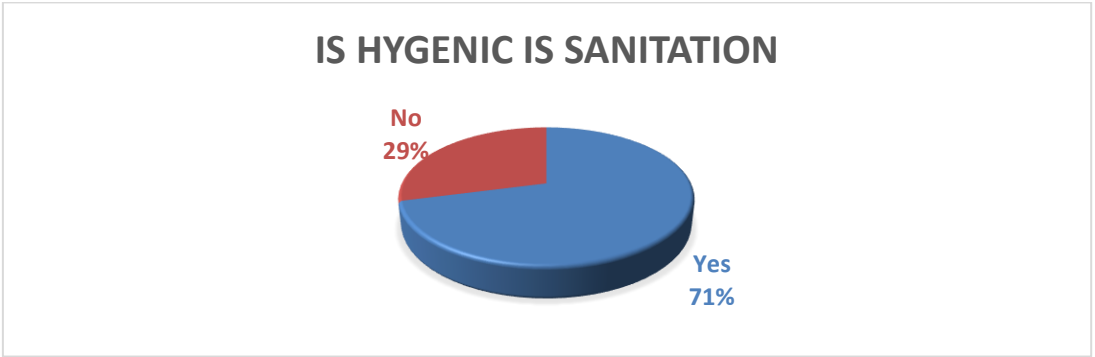


Figure 6-71 Sanitation Condition

6.2.12.2 Type of Sanitation

Galachipa Upazila contain the following types of sanitation. Toilet type is not fact but question is toilet hygienic or not hygienic. Only awareness can solve the problem. We hope that government and non-government organizations will take necessary action for this sector. 40% of the residents built their Sanitation facility as Tin shed structure and 28% are pucca structure.

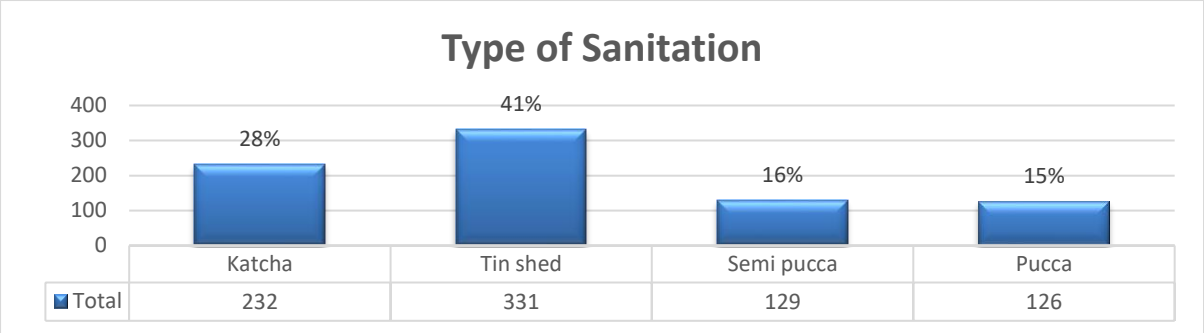


Figure 6-72 Type of Sanitation

6.2.12.3 hygienic sanitation

79% of the residents said their sanitation facility is hygienic.

Figure 6-73 Hygienic sanitation

Categories	Frequency	Percent
Yes	646	79%
No	172	21%
Grand Total	**818**	**100%**

6.2.13 Landuse Change and other problems

6.2.13.1 Landuse Change

In any type of development plan, one of the most important things to consider is land use change. Galachipa is the southern coastal Upazila of Bangladesh. Agriculture was considered the main occupation in the region, but the sector is suffering the most due to climate change. People are trying to find alternative ways of living. In recent times, the main profession has been considered as fishing and marketing. Most people are directly and indirectly involved in fishing, drying and selling. 37% of the residents think flood/ storm is responsible for land use change in their area and 27% think it is due to socioeconomic condition land use change occurs in their area.

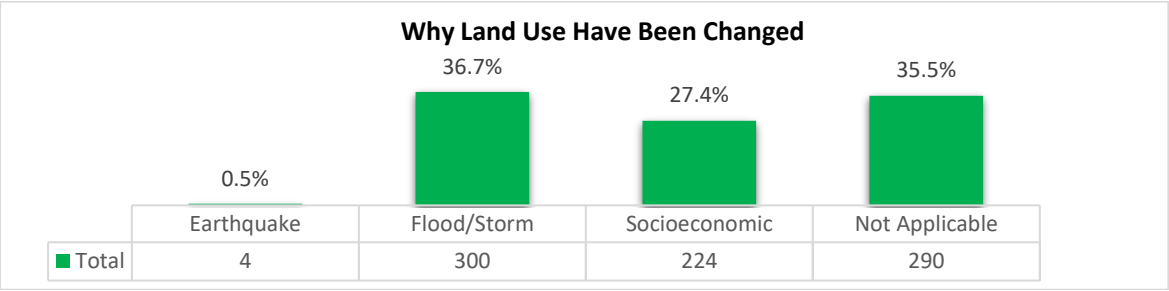


Figure 6-74 Causes of Land use change

6.2.13.2 The Area of Land willing to Give (sq. ft.)

This is an important issue for the development sector. Therefore, we have collected such data. A large part of the land in the Galachipa Upazila is a Khas (state-owned) property that is part of the newly formed delta. Most of the people migrate from other Upazilas. Since the property is government-owned, they have no choice but to agree to give the land. The following chart shows 65% of them want to give maximum 50 sq.ft from their property, 24% of them are willing to give maximum 100 sq.ft land for the purpose of the widening the road.

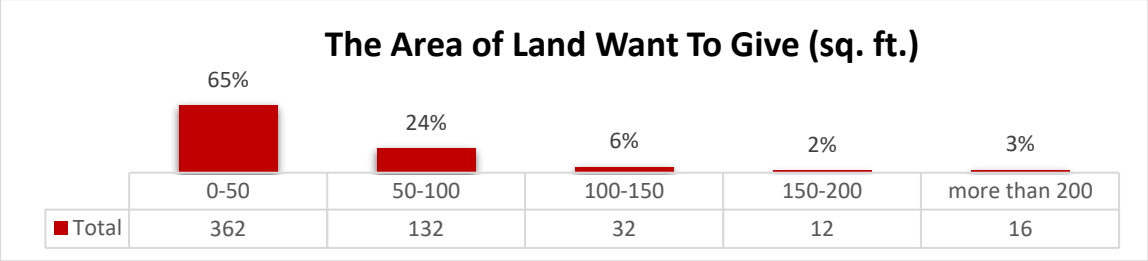


Figure 6-75 The Area of Land willing To Give (sq. ft.)

6.2.13.3 Willingness to Give land for widening of road

86% of the road to Galachipa are Upazila widening. Only 14% of the roads are narrow. We found that the road is widening but needs to make pucca all the road. Cycloneand tidal search come to this area every year and the road frequently needs repair every year.

Table 6-25 Willingness to Give land for widening of road

Widening of Road	Frequency	Percentage
Yes	703	86
No	115	14

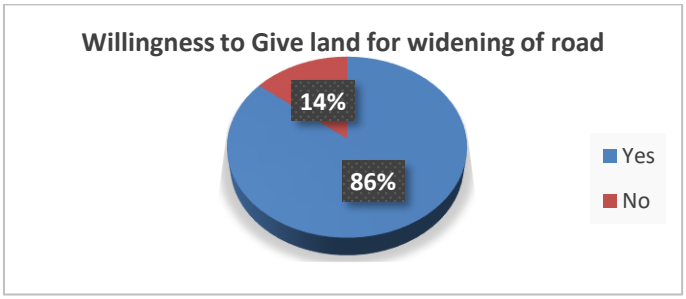


Figure 6-76 Willingness to Give land for widening of road

6.2.14 Educational Condition

6.2.14.1 School Going Children

81% of children go to school in Galachipa Upazila other 19% are not going to school. Our government has already given a different incentive package for our school going children. If our local government is aware of this issue then they can solve the problem.

Table 6-26 School Going Children

Categories	Frequency	Percent
Yes	665	81%
No	153	19%
Grand Total	**818**	**100%**

6.2.14.2 Cause of School Dropping

There is different reason behind the status of not going to the school, 92% children not going to the school because the parents think that children are under aged for going to school, 4% children do that because of the poverty and only 1% children do so because their parents are not willingness to send them to school.

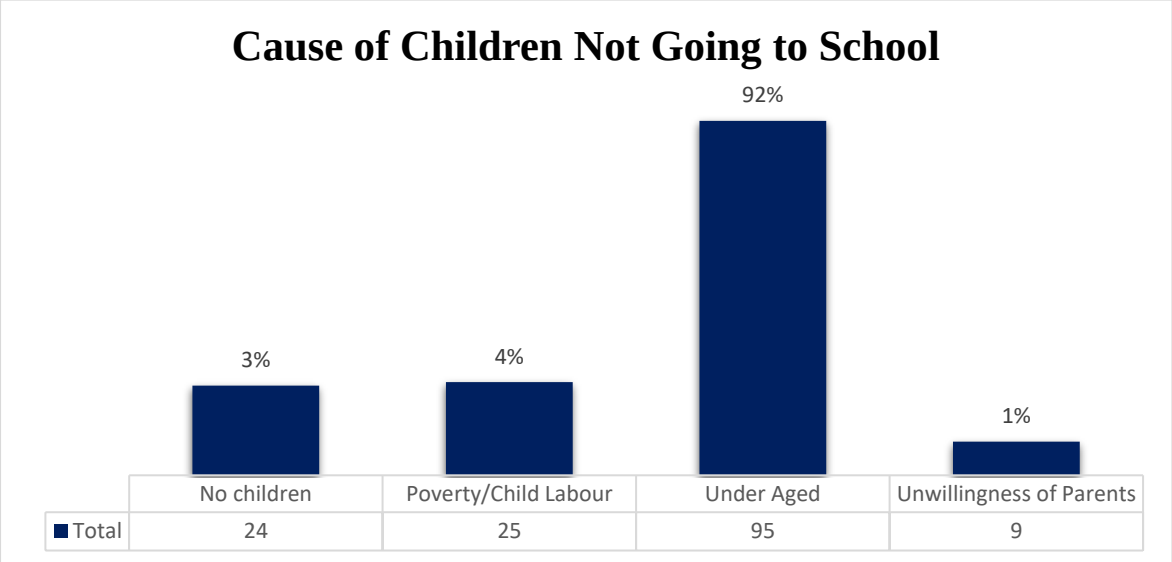


Figure 6-77 Cause of children not going to school

6.3 SWAT Analysis of Galachipa Upazila based on socio-economic survey findings

Strengths	**Weakness**
✓ From the topographic profile of Galachipa Upazila it is understood that the Upazila is Surrounded with rivers and cannels and a good number of Ponds which provides a natural water collection setup in this Upazila. ✓ Availability of natural water flow strengthens the agricultural production of the Upazila. ✓ Availability of electricity in the urban area. ✓ The agricultural economic base of this area opens the face of agro-based economic development of this Upazila ✓ Peoples Indigenous experience on fighting natural disaster. ✓ In rural area majority of the households have pond and small firm within their homestead. ✓ Population density in rural area is not that high in comparison to urban area. ✓ Galachipa Paurashava is a relatively new urban area and most of the development were initiated within 1990 to 2010.	✓ Majority of the houses were built without any approved plan. ✓ Lack of the formal drainage system and safe septic tank in Paurashava area. ✓ In rural area, no formal drainage system exists. These areas are fully dependent on natural drainage system like cannels and rivers. ✓ Embankment height is not sufficient as per requirement ✓ Pure drinking Water collection problem for the people of some union. Distance from water source was identified as the main reason. ✓ The inadequacy of the transport network, especially in rural area and trade route. ✓ Poor infrastructural facilities for waste disposal ✓ Water logging during the rainy season ✓ Lack of drinking water, transport mode, good educational institution ✓ Highly prone to natural disaster like Cyclone, Storm Surge, Flood etc.
Opportunities	**Threats**
✓ Availability of rain water collection facility. ✓ Significant number of Solar electric panel installed. ✓ Sufficient greenery to support environmental sustainability. ✓ Sufficient space available for future development. ✓ Lands are very much fertile. ✓ People are willing to give unbind land for road widening purpose ✓ Improving road network connectivity within and outside the Upazila.	✓ The frequent occurrence of a climatic disaster like Cyclonewhich can change the socio-economic and natural setting of this area. ✓ Frequent Flood and water logging can disrupt the agricultural production. ✓ Salinity can reduce lands fertility. ✓ Climate change effect especially temperature rising can degrade the living environmental quality of Galachipa Upazila.

✓ Prioritizing sewerage and sanitation system which would improve the living environmental quality of this Upazila. ✓ Agro-based economic development can improve the life of rural people.	✓ Encroachment of canals or other water bodies for purpose of development can disrupt the natural drainage system in the urban and rural area.

6.4 Planning Recommendation for Galachipa Upazila based on socio-economic survey findings

- ✓ Recover of encroached cannel and rivers is necessary to ensure proper flow of natural drainage and also to ensure the availability of sufficient natural water collection for agriculture.
- ✓ Rain water harvesting is already popular in the area, so, improving the facility can enhance efficiency.
- ✓ A significant number of Solar electric panel is already installed in the region. Future development can reduce dependency on national electric grid and the Upazila will be self-sufficient on electricity.
- ✓ Improving road network connectivity within and outside the Upazila can enhance trade efficiency.
- ✓ Prioritizing sewerage and sanitation system would improve the living environmental quality of this Upazila.
- ✓ Facilitating Agro-based economic development can improve the life of rural people.
- ✓ Promoting Sustainable development.
- ✓ Imposing planning regulations and design approval for new constructions as well as monitoring existing unplanned developments.

PART – B
RANGABALI UPAZILA

Chapter 7 Rangabali Upazila

Rangabali Upazila (patuakhali district) area 470.1 sq km, located in between 21°46' and 22°05' north latitudes and in between 91°15' and 90°37' east longitudes. It is bounded by amtali and Galachipa Upazilas on the north, Bay of Bengal on the south, Galachipa and char fasson Upazilas on the east, Amtali Upazila on the west. (Wikipedia, 2018)

7.1 Total Population

86819; male 45235, female 41584; Muslim 66517, Hindu 19058, Christian 375, Buddhist 780 and others 89. Indigenous community such as rakhain belongs to this Upazila. Water bodies Main Rivers Agunmukha and Kajal; Rabanabad and Char Kalmi channels are notable. Administration Rangabali Upazila is formed on 14 march 2011 comprising part of Galachipa Upazila. Religious institutions Mosque 312, temple 20, pagoda 5. (BBS, 2011)

7.2 Literacy rate and educational institutions

Average literacy 38.23; male 53.3%, female 42.01%. Educational institutions high school 5, primary school 15, madrasa 7. Noted educational institutions Rangabali High School, Rangabali Saleha Junior High School. (Banglapedia, 2018)

7.3 Cultural organisations

Club 2, jatra party 2,' playground 32, women's organisation 1.

Tourist spots Sunrise and sunset can be viewed from Rabanabad Island. (Wikipedia, 2018)

7.4 Main sources of income

Agriculture 48.18%, non-agricultural labourer 3.52%, commerce 17.15%, transport and communication 7.41%, service 9.33%, construction 1.91%, religious service 0.14%, rent and remittance 0.57% and others 11.79%. (BBS, 2011)

7.5 Ownership of agricultural land

Landowner 53.25%, landless 46.75%. Main crops Paddy, wheat, potato, onion, pulse, vegetables. Extinct or nearly extinct crops Sesame, linseed, kaun. Main fruits Mango, jackfruit, papaya. Fisheries, dairies and poultries. This Upazila has a number of fisheries, dairies and poultries. Extinct or nearly extinct traditional transport Palanquin, bullock cart, horse carriage. Noted manufactories Rice mill, cold storage, welding factory. Cottage industries weaving, blacksmith, potteries, wood work, embroidery. (BBS, 2011)

Hats, bazars and fairs Hats and bazars are 22, fairs 2, most noted of which are Chalitabunia Bazar, Koralia Bazar, Felabunia Bazar, Gohin Khali Bazar, Montaj Sluij Bazar, Baher Char Bazar, Katakhali Bazar, Takta Bunia Bazar, Neta Bazar, Tulatali L. Ghat Bazar, Pulghat Hat, Mollar Hat, Mowdubi Hat, Bestin Bazar and Char Naluar Hat. (Banglapedia, 2018)

Main exports Paddy, fish.

7.6 Access to electricity

All the unions of the Upazila are under rural electrification net-work. However, 32.26% of the dwelling households have access to electricity. Sources of drinking water Tube-well 92.27%, tap 2.30%, pond 0.10% and others 5.33%. Sanitation 30.68% of dwelling households of the Upazila use sanitary latrines and 33.95% of dwelling households use non-sanitary latrines; 35.37% of households do not have latrine facilities. Health centres Family welfare centre 1, community clinic 2, and clinic 3. Important NGOs are ASA, BRAC, PROSHIKA, and CARTAS. (Banglapedia, 2018)

Table 7-1 Rangabali Upazila Information

Upazila								
Municipality	Union	Mouza	Village	Population		Density (per sq km)	Literacy rate (%)	
				Urban	Rural		Urban	Rural
-	5	49	93	-	86819	257	-	38.23

Union					
Sl No	Name of union and GEO code	Area (acre)	Population		Literacy rate (%)
			Male	Female	
1	Char Montaz 34	46898	8049	6897	31.88
2	Chalitabunia 32	6758	3317	3027	34.78
3	Chhota Baisdia 44	13492	8945	8497	36.08
4	Bara Baisdia 27	23838	12163	10959	50.28
5	Rangabali 83	26843	12761	12204	38.14

Source Bangladesh Population Census 2011, Bangladesh Bureau of Statistics.

Map 7-1 Rangabali Upazila Location

Source LGED

Table 7-2 Upazila wise population distribution

Upazila Name	Population	Male	Female
Rangabali	104128	55027	49101

Source Ranglabali Upazilla portal

Chapter 8 Data collection and Analysis

8.1 Data collection

We have successfully completed the 287-questionnaire survey in Rangabali Upazila. We conducted survey in other unions as well. Upazilla and union-wise data collection in represented in following tables,

8.1.1 Union/ Paurashava –wise Data collection

Table 8-1 Union/ Paurashava –wise Data collection

Questionnaire Distribution Table		
Upazila	**Union Name**	**Number of questionnaires surveyed**
	Bara Baisdia	50
	Chalitabunia	35
	Char Montaz	53
	Chhota Baisdia	68
	Rangabali	81
Grand Total		**287**

8.2 Data Analysis

We analyzed the data from 1105 questionnaire under the GALACHIPA Upazila. Weanalysis the various variable and found different type of problem. We analysis the Socio-Economic data of two costal Upazila. These results are following,

8.2.1 Basic Household Information

8.2.1.1 Family Type

Family type data is most important for social aspect. It presents the scenario of the individual family. So, it is important phenomena for our survey. Hence, we collect this type of database. 85% of the families in Rangabali Upazila are single Family type but few of the family are combined. We also found that maximum young generation migrate on the city area for working purpose.

Table 8-2 Family Type

Categories	Frequency	Percentage
Joined	42	15%
Single	245	85%
Grand Total	287	100%

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8.2.1.2 Region Type Data Analysis

Religious factor plays the important role in the development sector so we collect the religious database. In Rangabali Upazila, almost 97.9 % respondents are Muslim; and 1.7 % are Hindu besides some Buddhist are lives here they are 0.3%. We can say that Rangabali is the multi religious field. We cannot imagine the development without religious factors. So, need to priority the planning religious aspect.

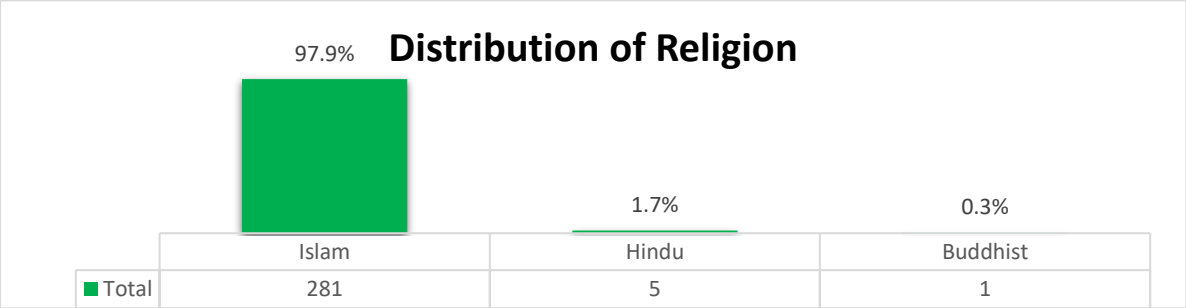


Figure 8-1 Distribution of Religion

8.2.1.3 Age of the respondent

The number of dependent in children age group is not consider in this study so the age category started from the age of 30 as the respondent. In the figure 3.2.4, shows that the maximum 33% of the household head belongs to the age category 40-50 responding for the survey, two outlier age group combined as 8% shows minimum representing as the respondents in the Rangabali upazila.

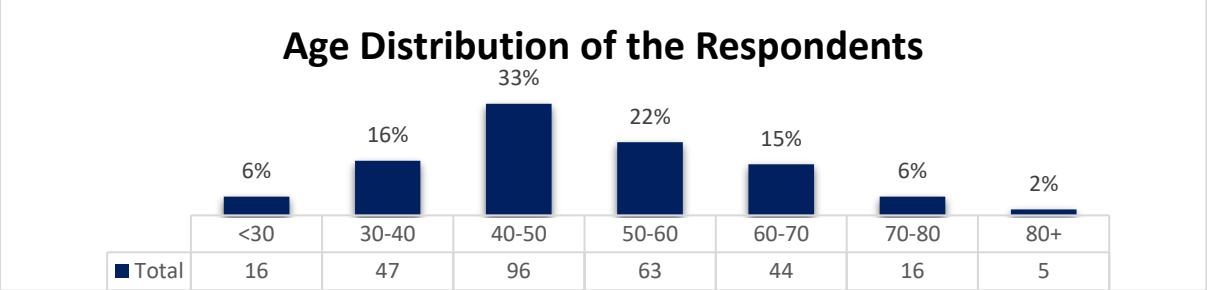


Figure 8-2 Distribution of Age of the Respondents

8.2.1.4 Sex

Sex is an important aspect of the development sector. It plays the important role. So, we collect this kind of data. The majority of the respondents were male. This information does not represent the actual situation because religious and cultural factors play an important role in this data. Our database says that 96% male lives in the Rangabali Upazila. But national data says that it's not authentic. Our respondent was 96% male and 4% female. Our interviewer was male person so female respondent are no interests come to the interview.

Table 8-3 Sex Type

Categories	Frequency	Percentage
Female	11	4%
Male	276	96%
Grand Total	287	100%

8.2.1.5 Education

Education is the mirror of our society. Without education we cannot be liberated in our development sector, social life and personal life. It plays an important role in the development sector. So, we have collected such a database. The majority of the respondents were not highly educated, only 37% of them passed primary level and 10% passed at secondary level.

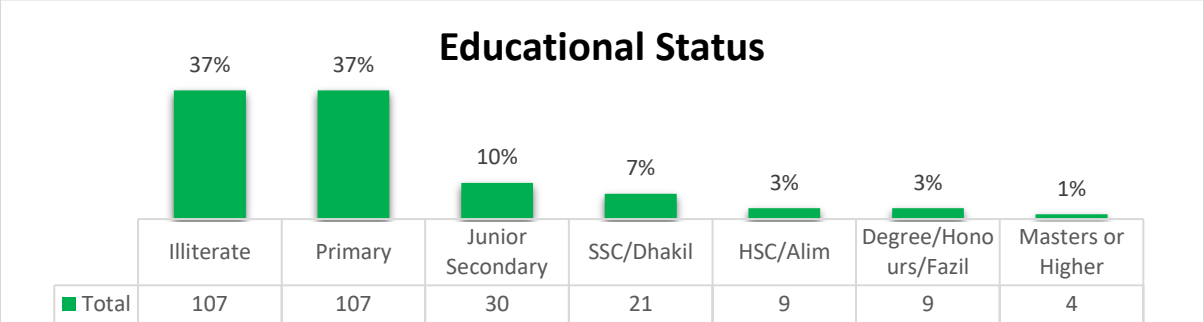
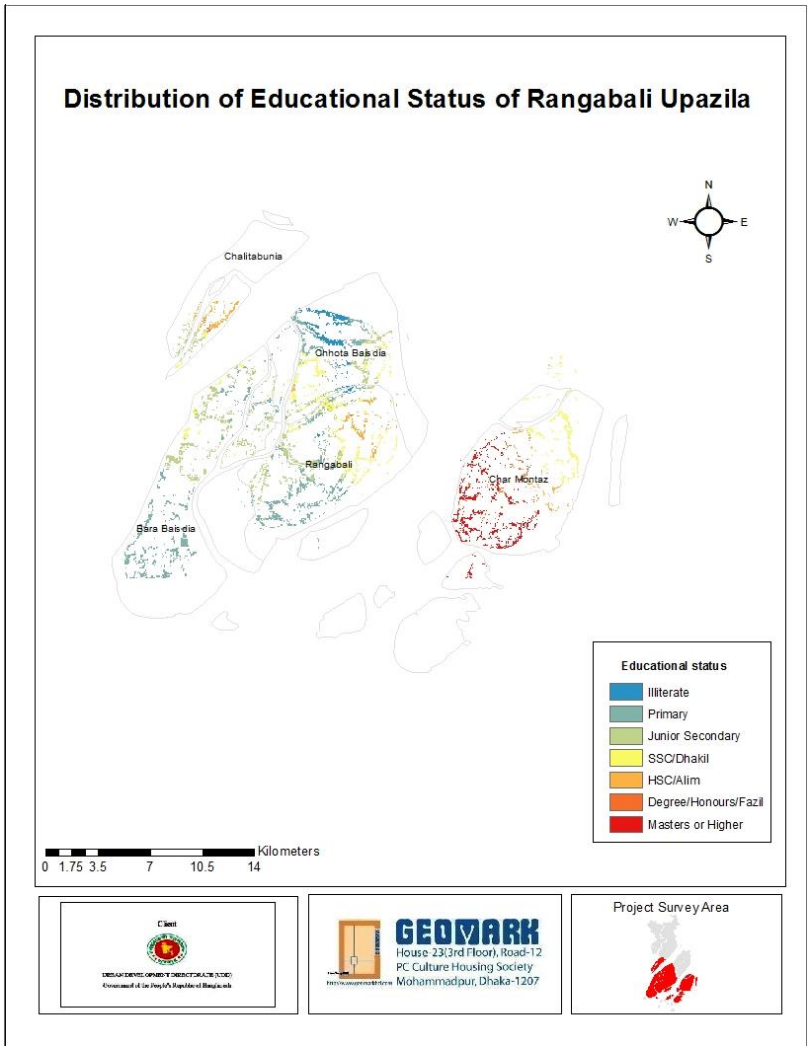


Figure 8-3 Distribution of Education

Most of the illiterate person mainly distributed across the Rangabali upazila, but Char Momtaz, and Baro Baisdia union having the most of the illiterate people in the study.



Map 8-1 Distribution of Educational Status

Thematic Map of Distribution of Educational Status shows that the higher educated (above the bachelor degree holder) respondents mainly belongs to the Rangabali upazila area Chalitbunia and with a small portion from Chotta Baisdia union.

8.2.1.6 Marital Status

Almost 96% of married respondents appears in the study 2.1% are unmarried and 2% respondents share the divorced and widow categories combined in the Rangabali Upazila.

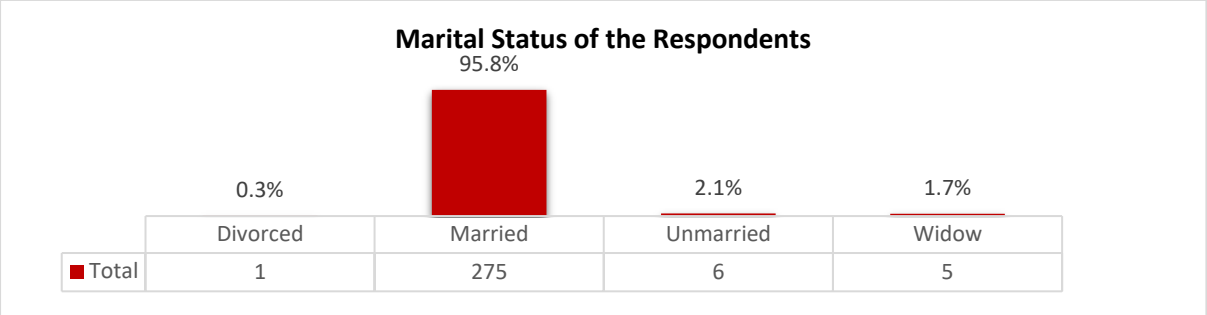


Figure 8-4 Distribution of Marital Status

8.2.1.7 Occupation

In the Figure 6-5, exhibits that the maximum 44% respondents in the Rangabali upazila involved in the agricultural sector, 28% doing small/Medium business.

Despite the above categories some other occupation like Laboure, Government employee, Student and Teacher etc. are also found in the area with a small percentage.

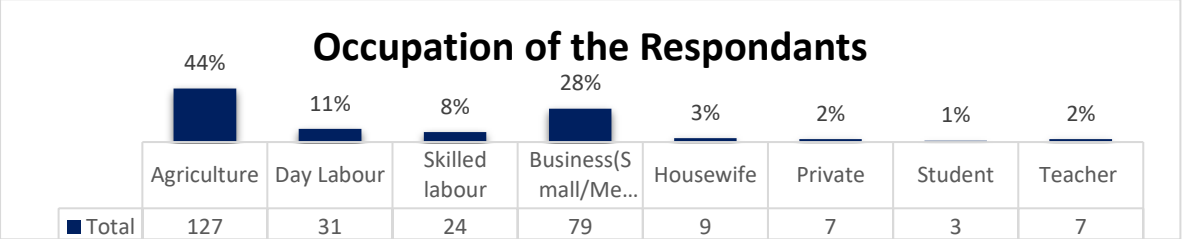
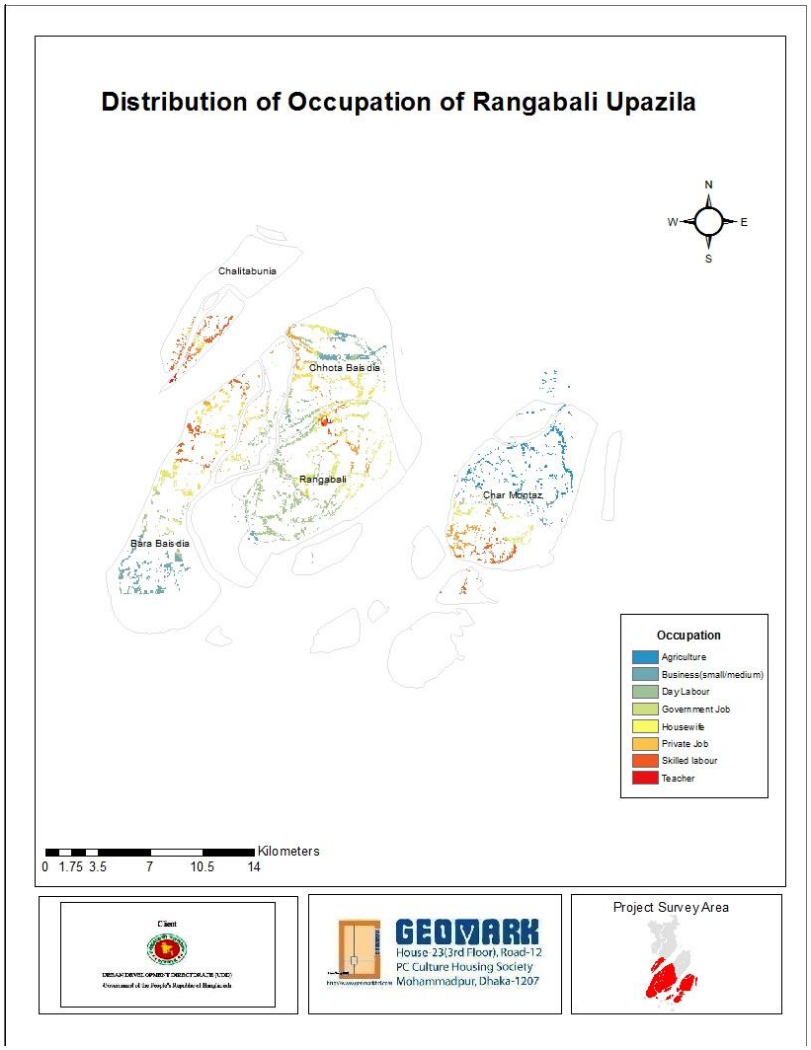


Figure 8-5 Distribution of Occupation

The Thematic map given below shows that the respondents belongs to the occupation to the agriculture in the Rangabali Upazila is mainly scattered all over the upazila but Char Momtaz and Bara Baisdia having the maximum number of the Agriculture based occupation.



Map 8-2 Distribution of Occupation

8.2.1.8 Relationship with Household Head

Our boys went from house to house collecting information. However, they do not always meet the respondent. Sometimes they miss them and collect data from the alternative person. So, need to know about the relationship between HH and others. In most cases, the head of the family has responded to himself / herself. The following chart present the relationship between others. Around 24% of the respondents were wife of household head.

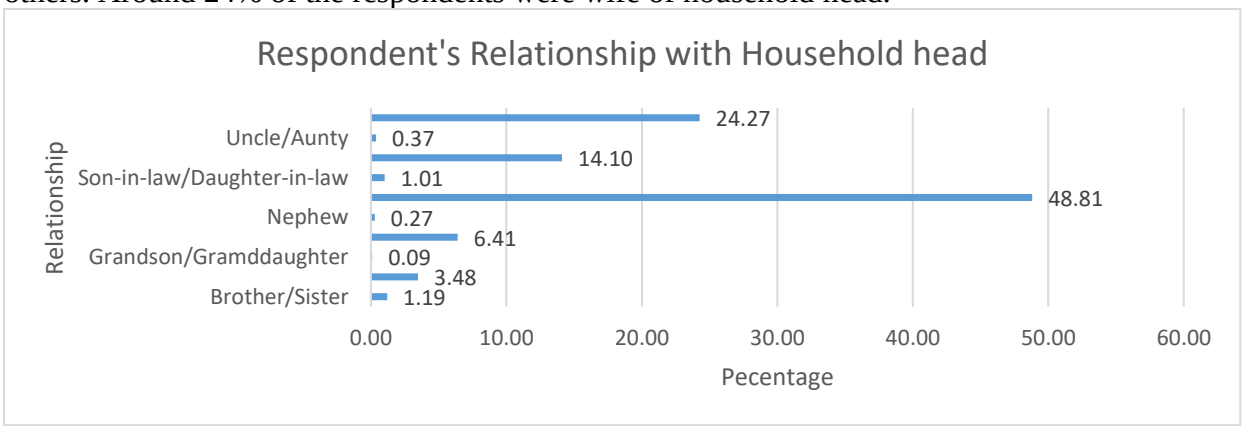


Figure 8-6 Respondent's Relationship with Household head

8.2.1.9 Family Member

Number of family member in the Rangabali Upazila mainly four categories, socioeconomic condition of the people of Bangladesh is changing rapidly and the traditional joined family broken down as well.

In Rangabali Upazila 56% of family having the member of 05 to 10 members, 40% of the family having not more than 5 people in the family.

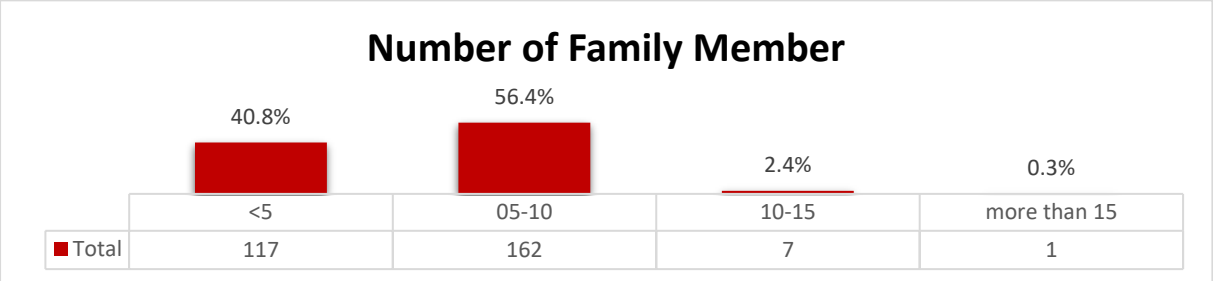
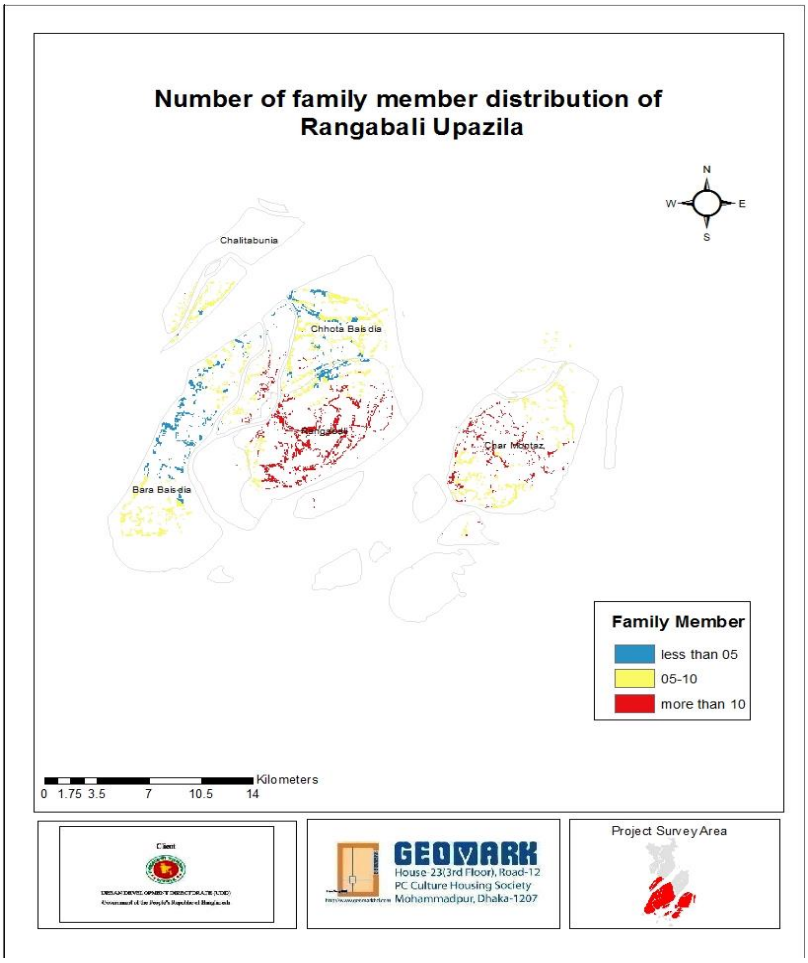


Figure 8-7 Number of family member distribution

According to the thematic map given below shows that the maximum union in the Rangabali Upazila and Chhota Baisdia have maximum ratio of family with 5 to 10 family members in the family. But in Bara Baisdia union have some portion of family with family member less than five family member. On the other hand, Rangabali region shows that the it having more ratio of family with more than 10 family members.



Map 8-3 Number of family member distribution

8.2.2 Building Information

8.2.2.1 House Type

Because of natural disaster mainly cyclone, flood and other disaster frequent hit in the coastal area of Rangabali the house structure type is quite different from the main land of the country. Tin Shed type housing type is very common,83% of the structure is Tin shed type, 6% of the semi pucca and only 3% house pucca in the study area.
On the other hand, 6% of the structure are katcha and only 2% having Jhupri type structure in the Rangabali upazila.

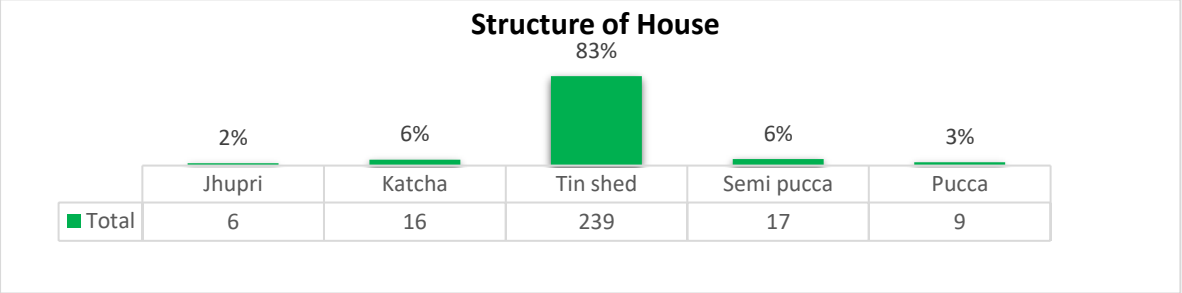
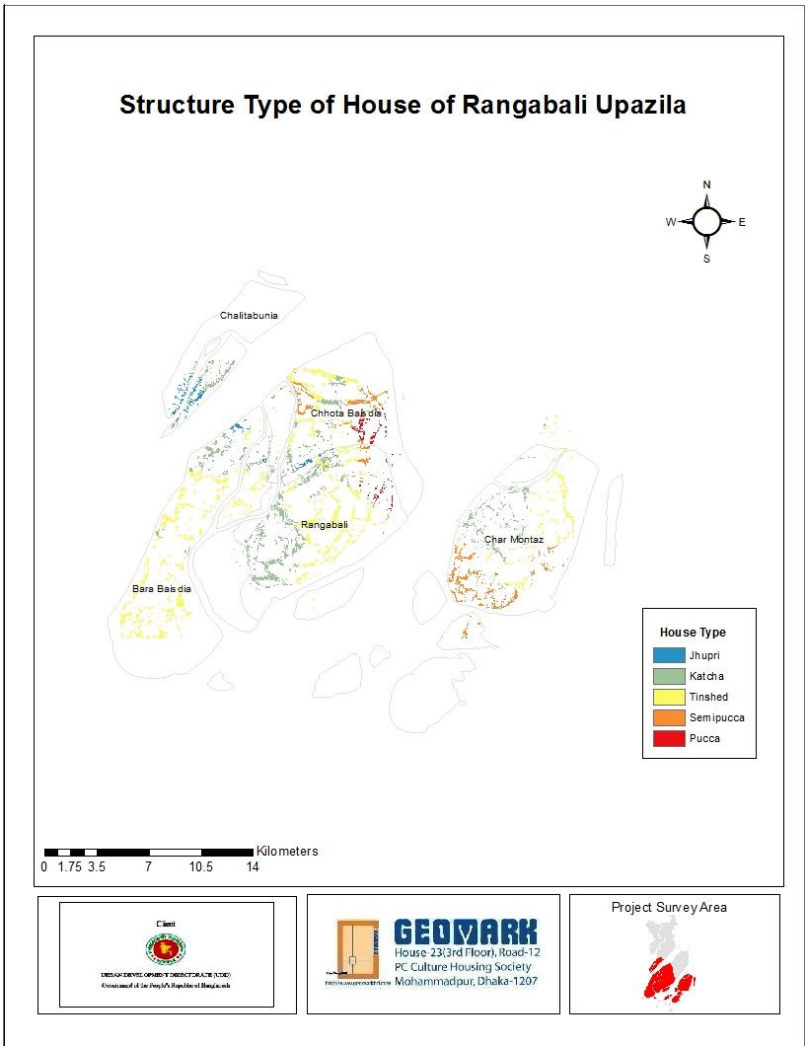


Figure 8-8 House Type

Two type of structure of house dominated in the Rangabali upazila, one is Katcha and other is Tinshed. Chalitabunia and small portion of Chhota Baisdia are the main union swhere katcha structure type is dominant most, Bara Baisdia, Char Momtaz and Rangabali region have more Tin shed structure than that of Katcha. See the thematic map given below.



Map 8-4 House Type

8.2.2.2 House Construction Year

House construction trend accelerated in last decade where 57% of the house constructed of the total construction of house, 40% of the house constructed in the 2000-2010 decade.
So, it is very clear to specified that maximum construction of house constructed after the year of 2000, and only 0.3% of the house constructed before the liberation in the Rangabali upazila.

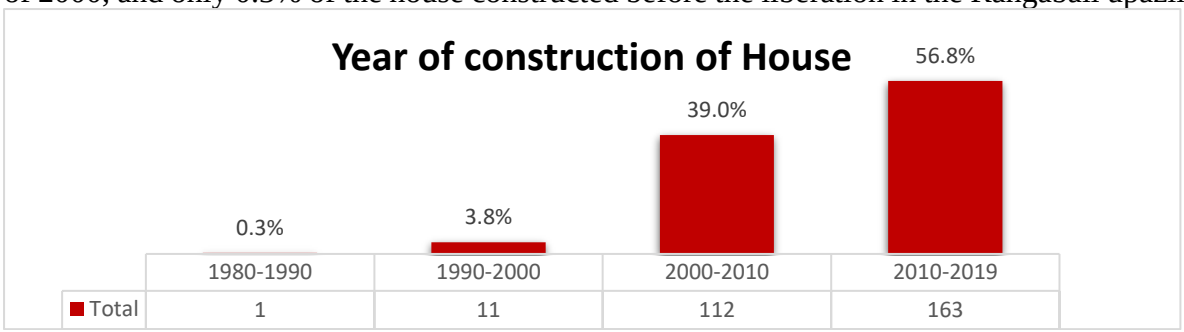


Figure 8-9 Year of Construction of House

8.2.2.3 Housing Rules and Regulation

The municipality and other local government authority may give plan or design to construction of house, but in the area only one building (0.3%) of the construction built under the supervision of the Pourashava, 9.1% of the house constructed without any plan/design.

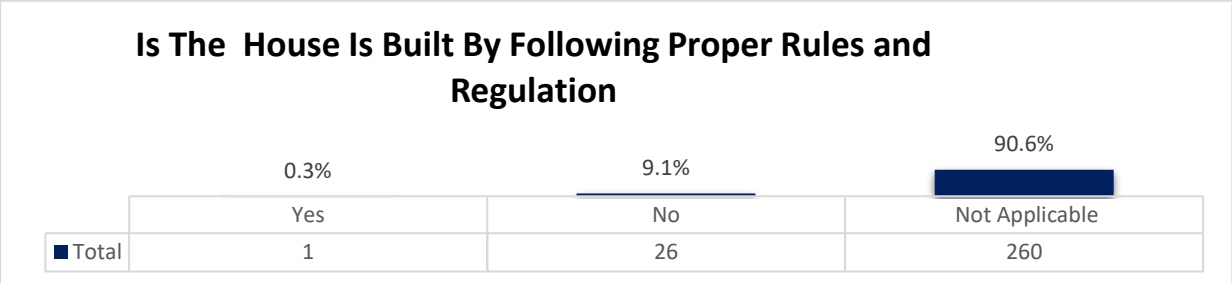


Figure 8-10 Plan Approval

8.2.2.4 Reason for not following the rules to build house

Maximum people blamed that they were not properly informed when it came to building their house. And for the most part, people think that because their housing parameters are too small, they don't have to follow the rules for so little space. Not flowing the rule is a common trend in our country. In the Figure 3.6.7, shows that the maximum 20% of the house owner think that it is not so binding about the necessity of getting an approval from the pourashava. 3% of the owner think that approval not needed for him because of the building constructed in the small area.

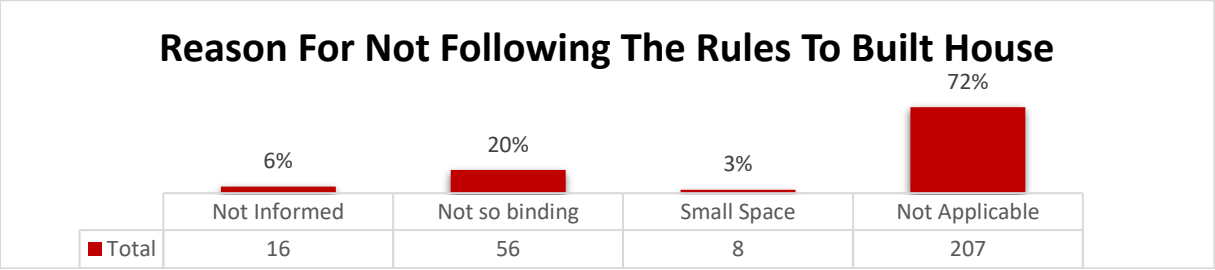


Figure 8-11 Reason for Not Following the Rules

8.2.2.5 Ownership of flat/ House/ land

Ownership is the important matter for the house hold head. Without ownership one cannot live permanently. Majority of the respondents opined that they are the owner of the flat/ House/ land on which they live. Around 91.93 % respondents were the owner of their house.

Table 8-4 Ownership of flat/ House/ land

Categories	Frequency	Percent
Yes	263	91.93%
No	24	8.07%
Grand Total	**287**	**100.00%**

8.2.2.6 Structure of the House

Because of natural disaster mainly cyclone, flood and other disaster frequent hit in the coastal area of Rangabali the house structure type is quite different from the main land of the country. Tin Shed type housing type is very common,83% of the structure is Tin shed type, 6% of the semi pucca and only 3% house pucca in the study area.
On the other hand, 6% of the structure are katcha and only 2% having Jhupri type structure in the Rangabali upazila.

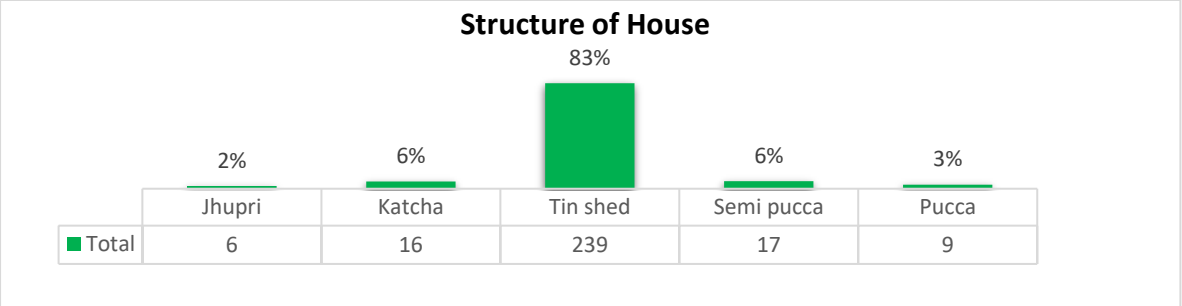


Figure 8-12 Structure of the House

8.2.2.7 Number of Floor

Among 7% of the pucca structure, 70% of the pucca structure having two storied and 30% of them are one storied.

Table 8-5 Number of Floor

Number of Floor	Frequency	Percent
1	34	30%
2	78	70%
Grand Total	**112**	**100%**

8.2.2.8 House Area

Total house area including yard area categorized minimum sq.ft. 500 or less to maximum sq.ft 5000 in the study area.
In the figure 3.6.3, shows that the maximum 15% of the house having the area category (500 0r less) sq.ft., and only 11% of the house having sq.ft. 4500-5000 area category in the Rangabali upazila.

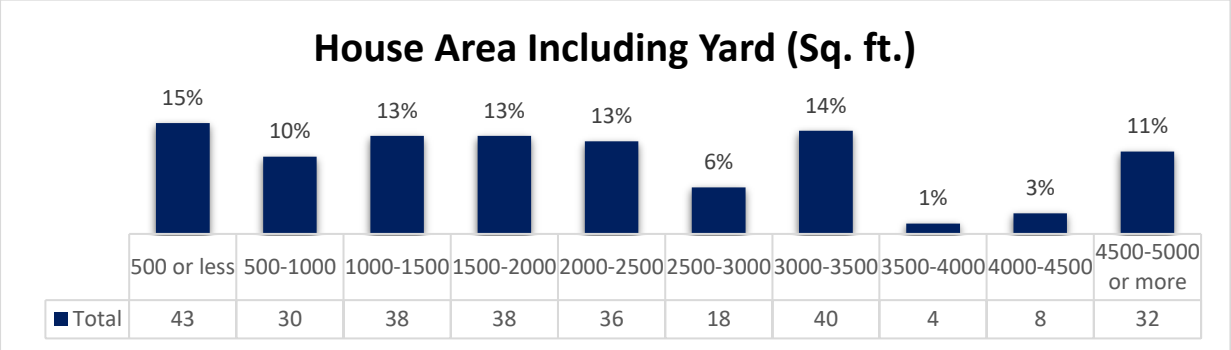


Figure 8-13 House Area Including Yard

8.2.2.9 Number of House in the Area

Our database says that most people live in their single home. Some types of people live in their other homes. Some people own two homes. The people of Rangabali Upazila are poor in other

Upazilas of Bangladesh. So, they live in a single home. The following chart shows the number of houses sown in Rangabali Upazila.

Table 8-6 Number of House in the Area

Categories	Frequency	Percent
1	223	78%
2 or more	64	22%
Grand Total	**287**	**100%**

8.2.2.10 Plinth Level

Maximum 54% of the houses in the area having (01-02) ft. plinth height, nearest 02-03 ft plinth height of the house having 29%, and only 0.3 % of the plinth having height of 07 ft or more in the study area.

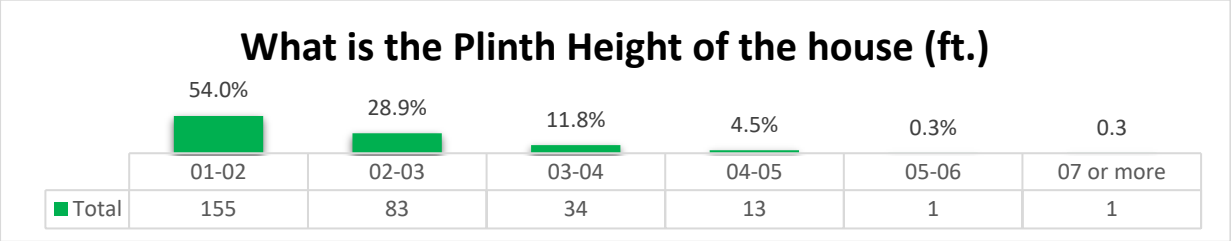
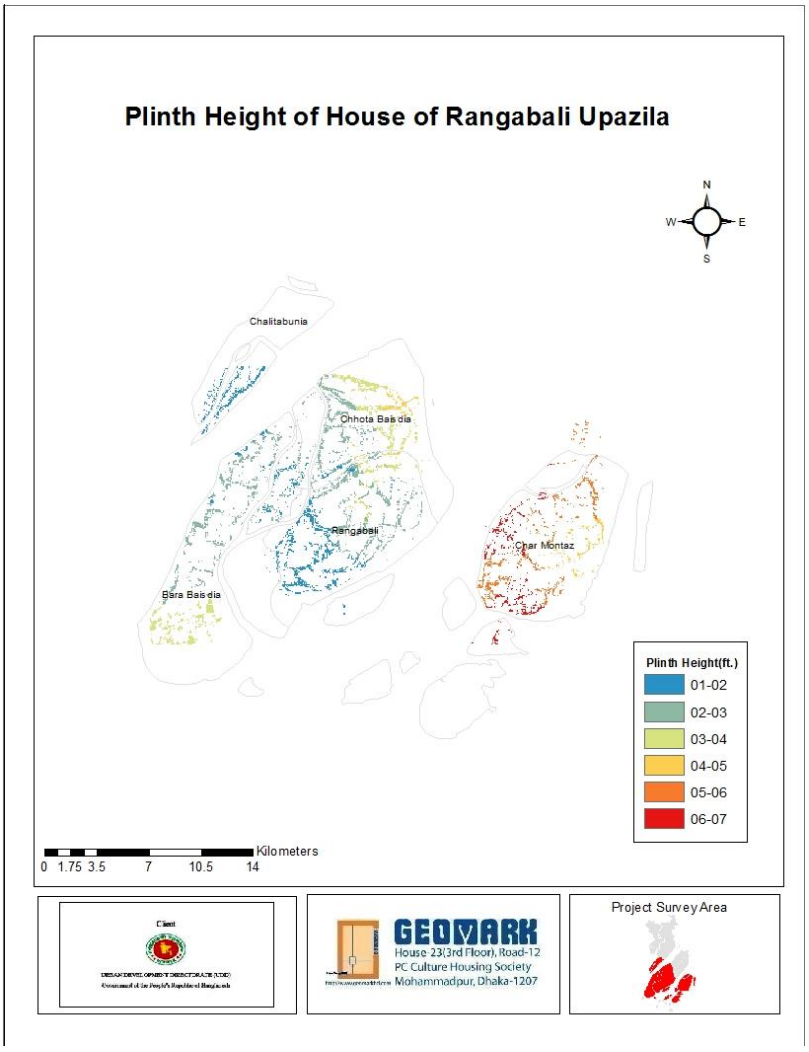


Figure 8-14 Plinth Height of the house

According to the Thematic map given below, plinth height distributed 1 foot to more than 7-foot categories. Among all the union in the Char Momtaz union having the most houses with plinth height more than minimum five feet high and more, but Rangabali, Bara Baisdia and Chhota Baisdia and Chalitabunia unions have the maximum house with more than five feet plinth height in the house.



Map 8-5 Plinth Height of the house

8.2.3 Migration status

Rangabali is a coastal Upazila, so the Cycloneis the final attraction of this Upazila. The land of this Upazila is emerging day by day and outsiders come and live here. About 85% of the respondents think that they are not local but migrated from other places.

8.2.3.1 HH Birthplace

76% of the respondents said that their birthplace is in Rangabali and 24% of people said that their birthplace is outside. Some people are born outside for different reasons. Some were born in hospitals; Some are born in their relatives' homes.

Table 8-7 Birth place of the household head

Categories	Frequency	Percentage
No	68	24%
Yes	219	76%
Grand Total	287	100%

8.2.3.2 District Where Migrated From

Bangladesh is the most populous country so land crisis is a common issue in our country. Those who are suffering from lack of land are going to Rangabali Upazila. Rangabali is a coastal

Upazila, so Cycloneis the ultimate attraction of this Upazila. The land of this Upazila is emerging day by day and the outsiders live here. Almost 79% of the migrants came from Patuakhali and 15% of the migration happened from the island district Bhola.

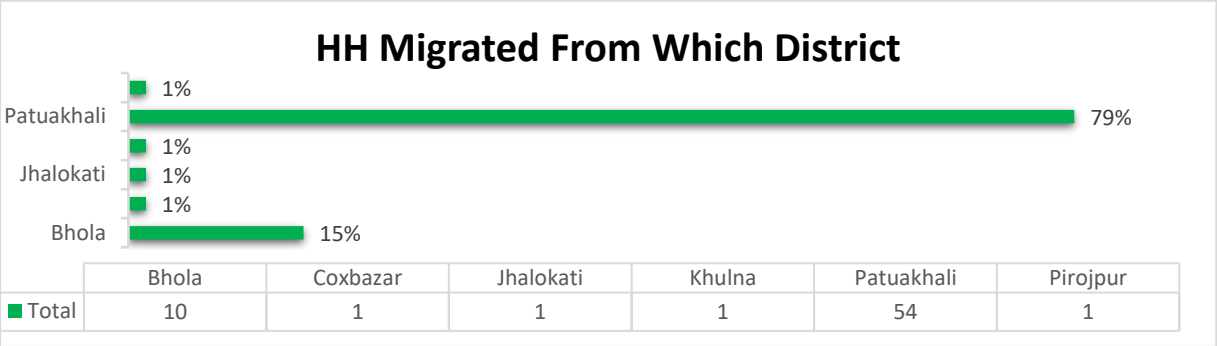


Figure 8-15 District Where Migrated From

8.2.3.3 Year of Migration

Following the chart, the existing migration situation has been presented in Rangabali Upazila. Rangabali Upazila, a sub-island of Bangladesh, was once less populated by Galchipa. Day by day they come here and live. Maximum migration (47%) occurred in the Rangabali upazila within 1990 to 2010, 5% migrants coming in the last decade, only 4% migration occurred between 1950 to 1970.

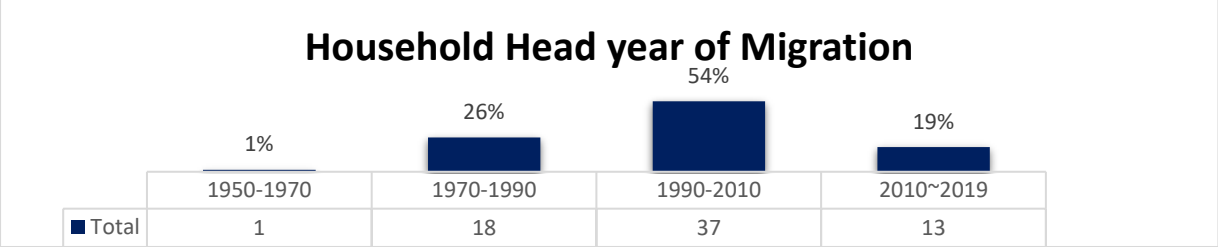


Figure 8-16 Year of Migration

8.2.3.4 Migration Pattern

Some people migrated externally from Rangabali Upazila. They are being relocated for various reasons. Some people migrated with the whole family (19%), some relocated themselves (76%), some emigrated with the wife (5%). The following chart exhibits that 61% of the household head migrated himself, 38% with the parents and rest of 1% with the wife in the Rangabali upazila.

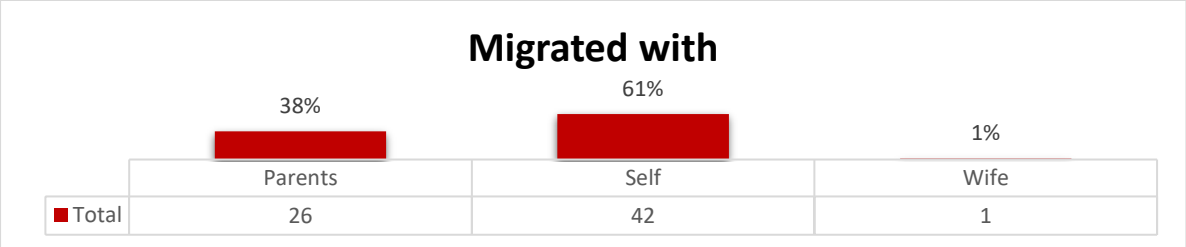


Figure 8-17 Migration Pattern

8.2.3.5 Member Staying Outside of the Locality

Besides migration another option to stay somewhere else from the Rangabali upazila also a common trend.

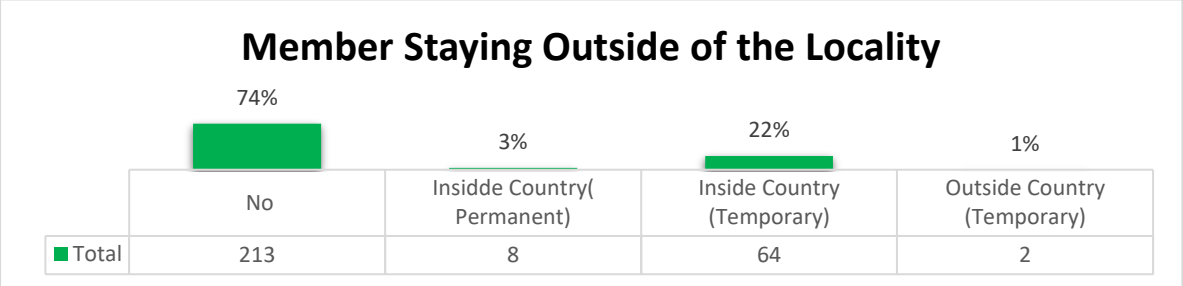


Figure 8-18 Member Staying Outside of the Locality

Migration occurred for better life mainly for stable financial and to fulfilling other human needs. In this study shows that the 66% of the migration occurred due to choose better workplace, 13% of the migration for river erosion which is quite common in the coastal area.

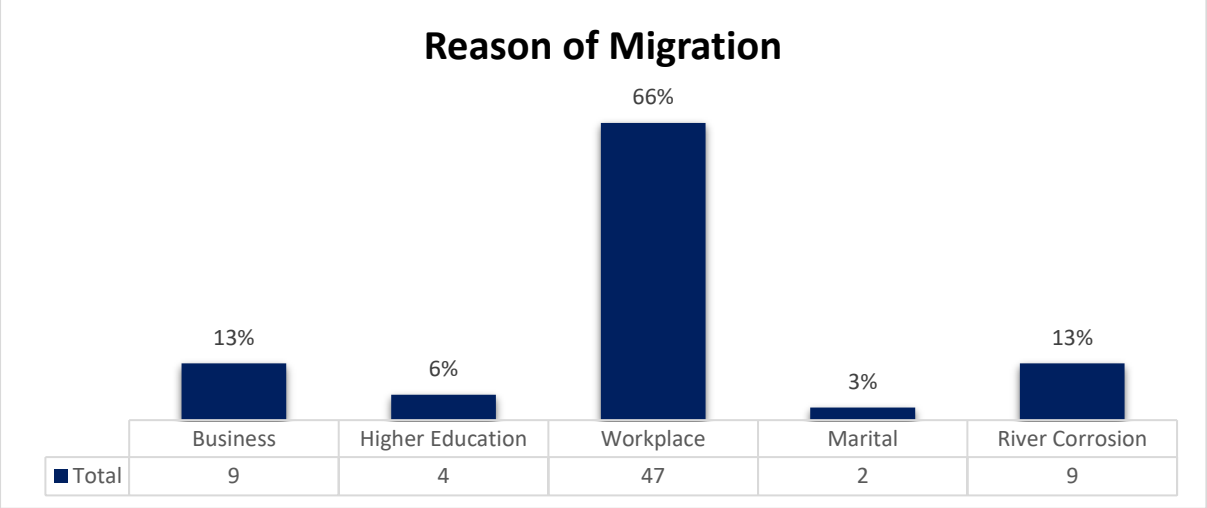


Figure 8-19 Reason of Migration

8.2.3.6 Reason of Stay Outside

Although a small portion of the family whose members are stating outside of the locality, so there are some reasons behind it.

58% of the family member staying outside from the locality because of their Job, 30% of the members for higher education and only 12% staying outside for their marriage.

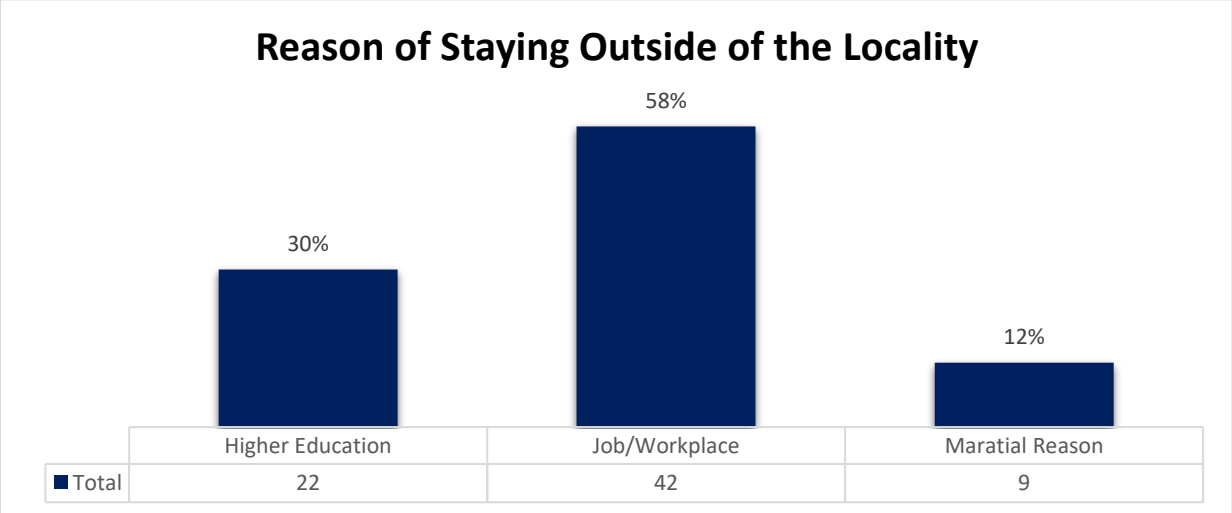


Figure 8-20 Reason for Stay Outside

8.2.4 Household income, expenditure and savings

8.2.4.1 Household Income

Total household income is the combination of income of HH and the other family member in the household. Figure shows that 21% of the monthly total income of house is not more than TK 10,000.

Maximum percentage of total income of 50% belongs to the income category of TK 10,000 to TK 20,000 and only 3% of the total household income in the category of more than TK 50,000 monthly income in the Rangabali upazila.

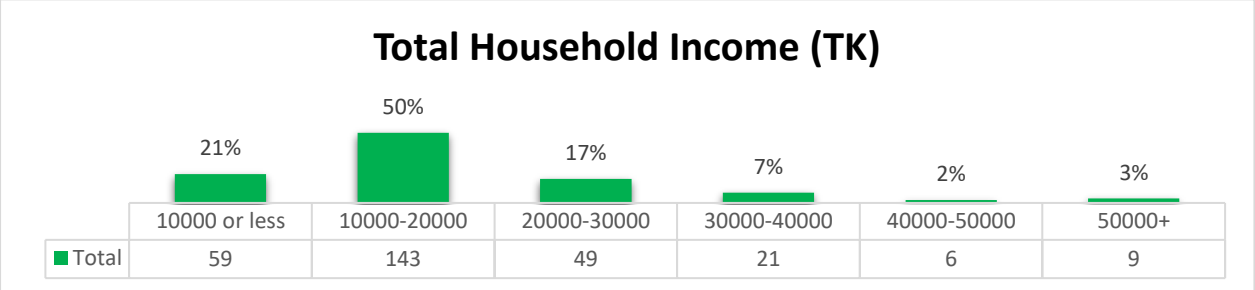


Figure 8-21 Household Income

8.2.4.2 Household Expenditure

Total household income reflecting the total household income in this study, Figure shows that maximum 55% of the household expenditure lies in the TK 10,000 to TK 20,000 category, 22% of the household expenses TK 10,000 or less for their total monthly expenditure and 1% of the household expenses TK 50,000 per month in the Rangabali upazila.

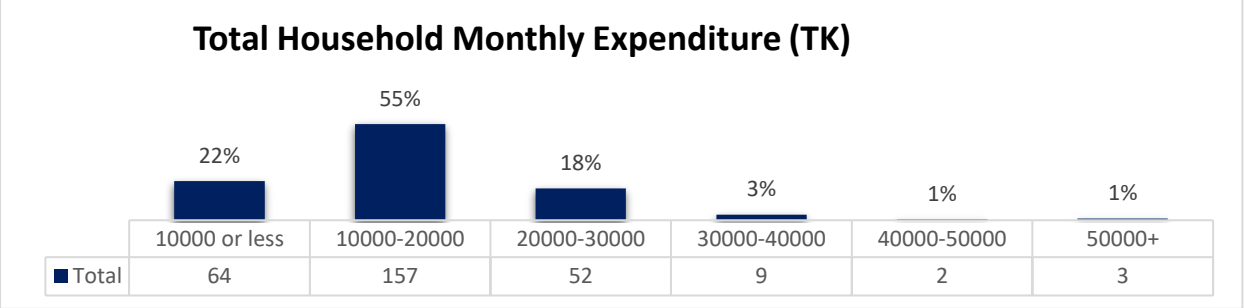


Figure 8-22 Household Monthly Expenditure

8.2.4.3 Expenditure on Children

Percentage of expenditure on children depends on the number of children in the family.

56% of the family not said that they spend on children and closely 27% family spend maximum TK 1500 per month for their children in the Rangabali upazila.

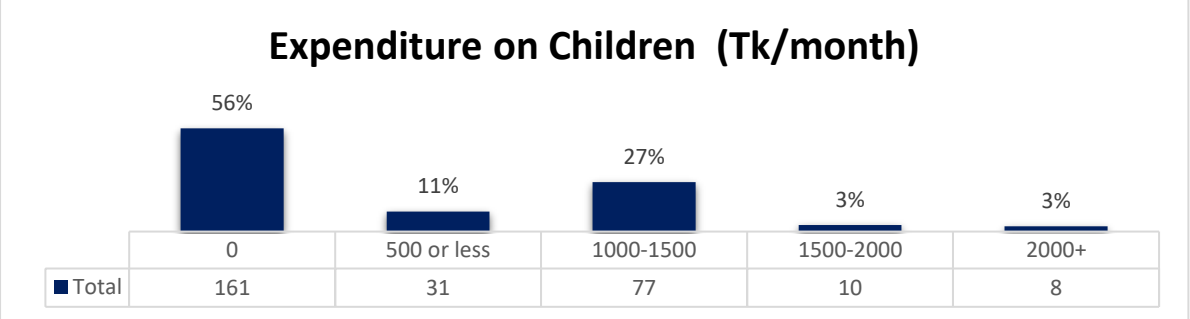


Figure 8-23 Expenditure on Children

8.2.4.4 Cloth Expenditure

The study shows that the maximum of TK 3,000 on expenditure on cloth shares only 11% of the total.

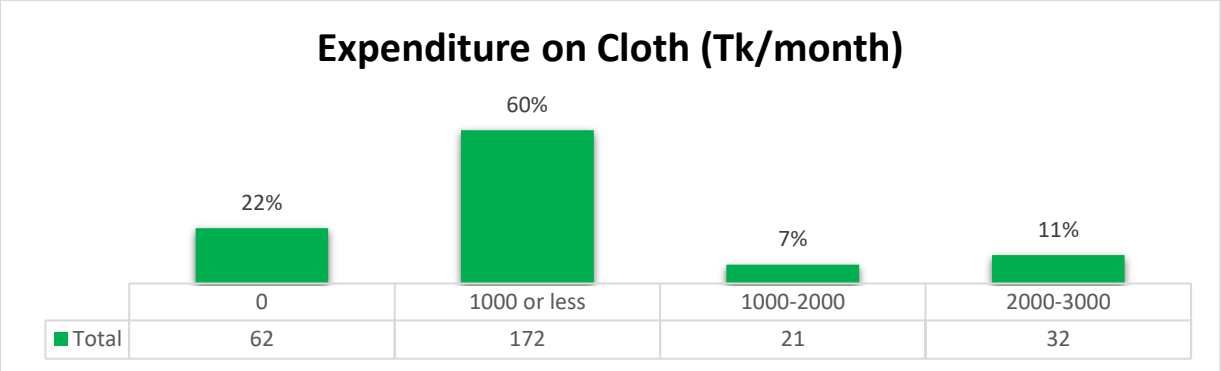


Figure 8-24 Expenditure on Cloth

8.2.4.5 Educational Expenditure

Expenditure on education depends on mainly how many school going children belongs to the family.24% of the family spends the amount between TK 1,000 to 2,000 with approximately same percentage (25%) of the family expenditure on education of the category of nothing at all.

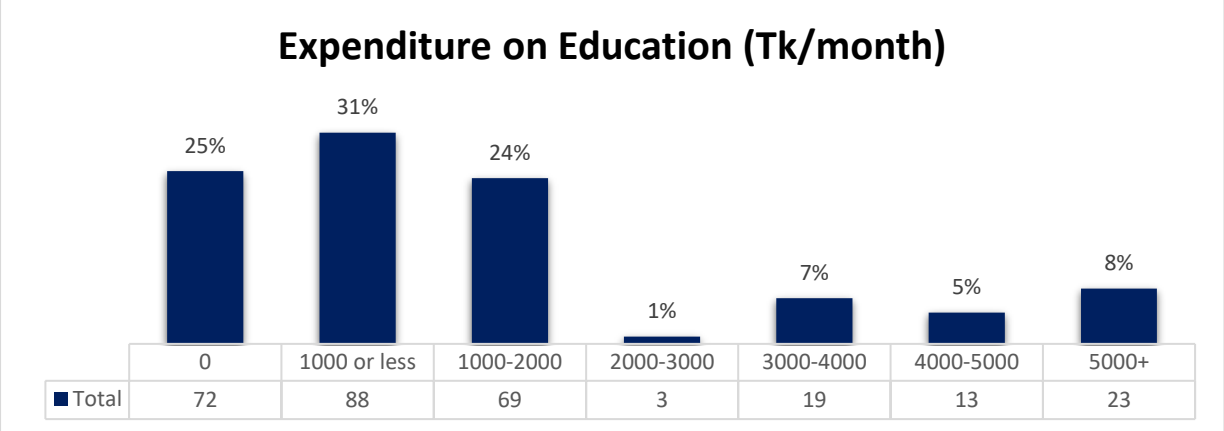


Figure 8-25 Expenditure on Education

8.2.4.6 Expenditure on Food

Maximum household expenditure mostly used for food, and food expenditure relates with the household monthly income.
Figure shows the scenario of how the household expense for food in the study area.

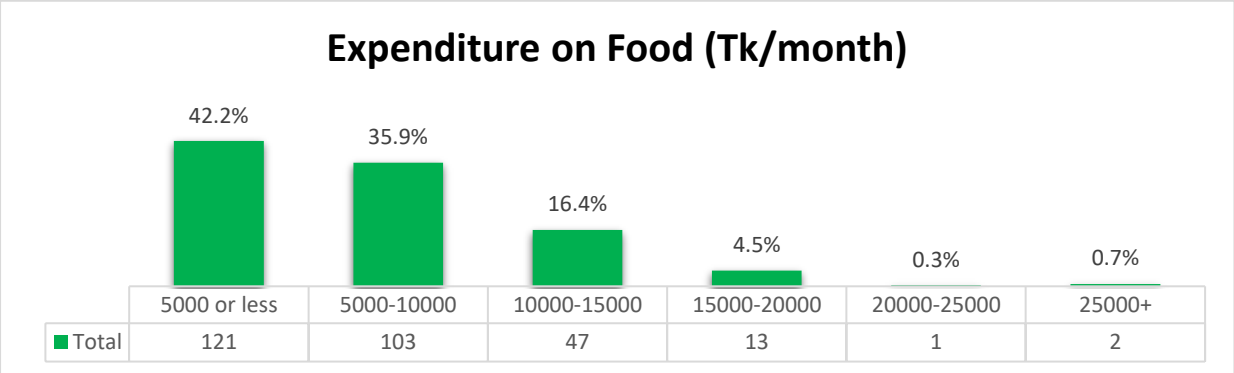


Figure 8-26 Expenditure on Food

8.2.4.7 Expenditure on health

Figure exhibits that 14% of the respondents do not expense any money for treatment or other health issues, 53% of people of the total survey expenses TK 1,000 or less money for health and maximum expenditure of TK 4,000 belongs to the 3%.

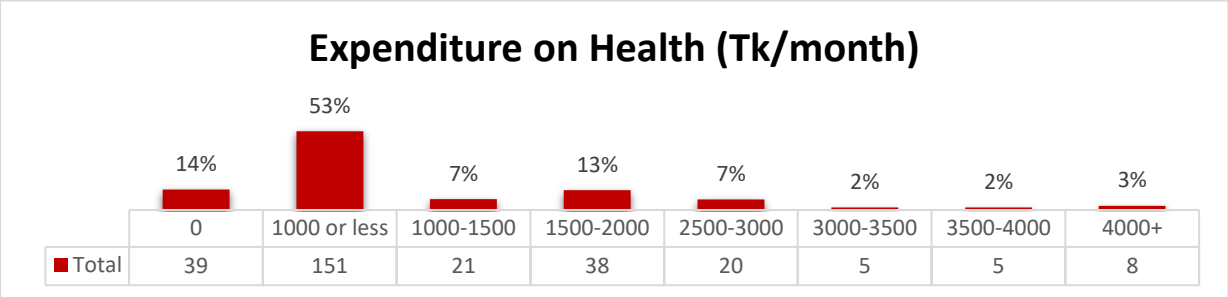
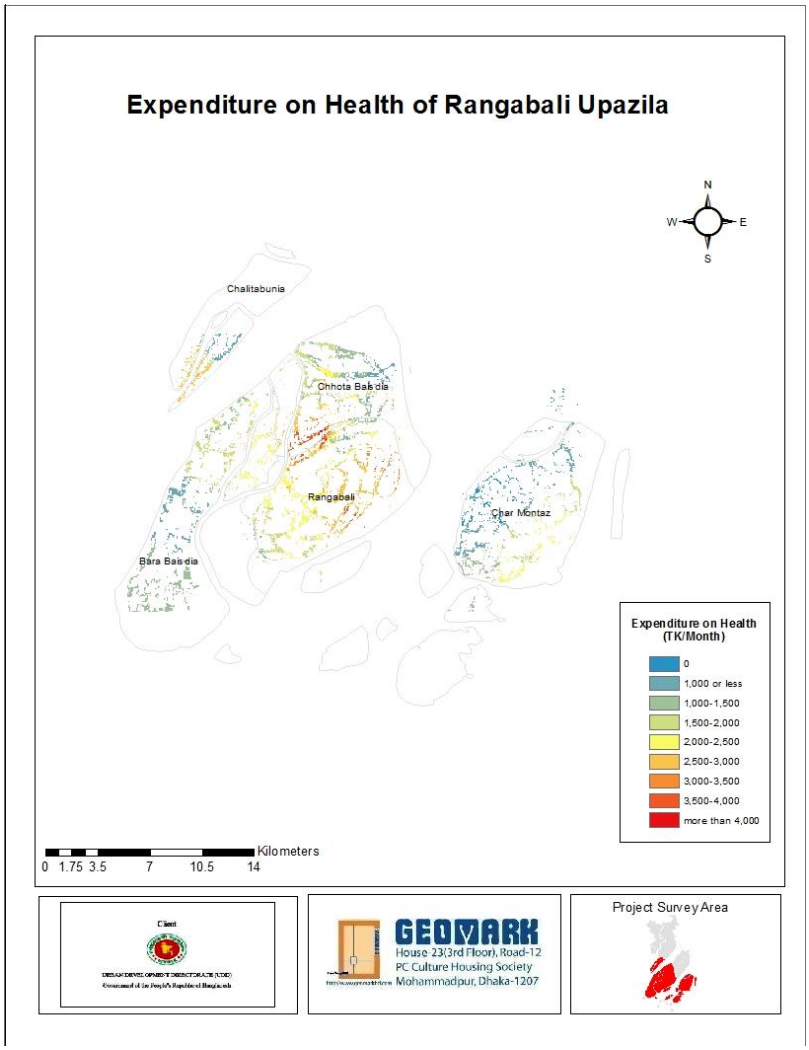


Figure 8-27 Expenditure on Health

According to the Thematic Map shown below, Chhota Baisdia union having the most expenses for health issues with more than TK 4,000 per month and some other union like Rangabali and Chalitabunia having expenses between more than TK 2,000 to TK 4,000 for the health per month. Char Momtaz and Bara Baisdia have the less expenses for the health which are not more than TK 1,000 per month in the Rangabali.



Map 8-6 Expenditure on Health

8.2.4.8 Transport cost

Transport system in the survey mainly in the waterway, maximum 65% respondents express that they expense maximum TK 1,000 per month for the transport expenditure. Transport expenditure not exceeds the TK. 3,000 in this study.

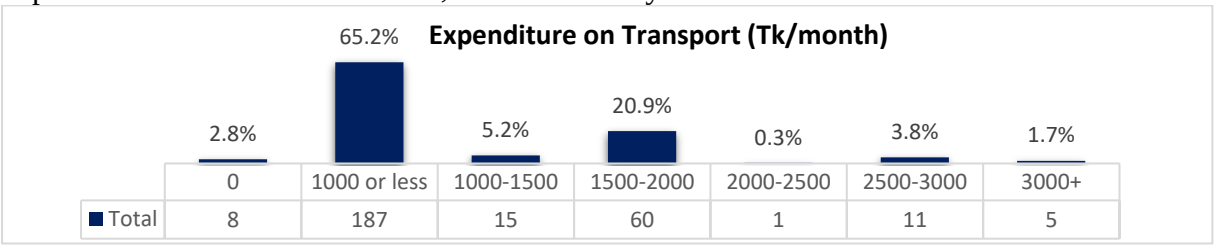


Figure 8-28 Expenditure on Transport

8.2.4.9 House Rent

The conducted in the mostly in the rural area so most of the household has their own house to live, 92% of the household has no need to expense for monthly house rent, only 6 % household who expense more than maximum TK 5,000 for monthly household rent in Rangabali upazila.

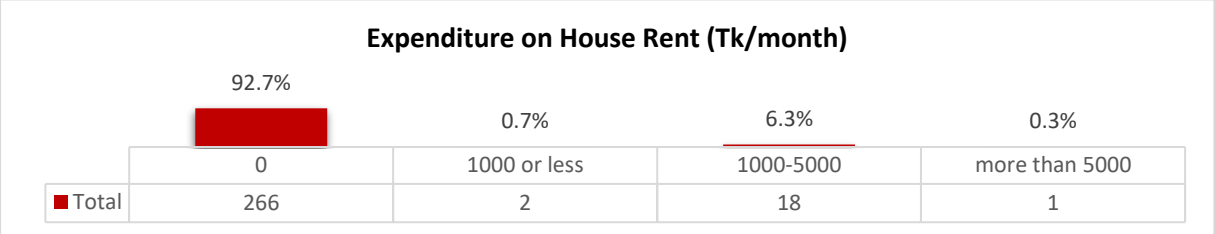


Figure 8-29 Expenditure on House Rent

8.2.4.10 Utility Expenditure

In microeconomics, the cost function is the minimum amount of money a person spends to achieve some level of utility due to the cost of a utility function and available materials. It is necessary for human life. So, we collect this kind of database. Following the chart, the existing utility costs of Rangabali Upazila are shown. In the study area of the Rangabali upazila, 14% of the family expenditure on the utility not more than TK 500, 24% of the family not expending on utility per month in regular basis.

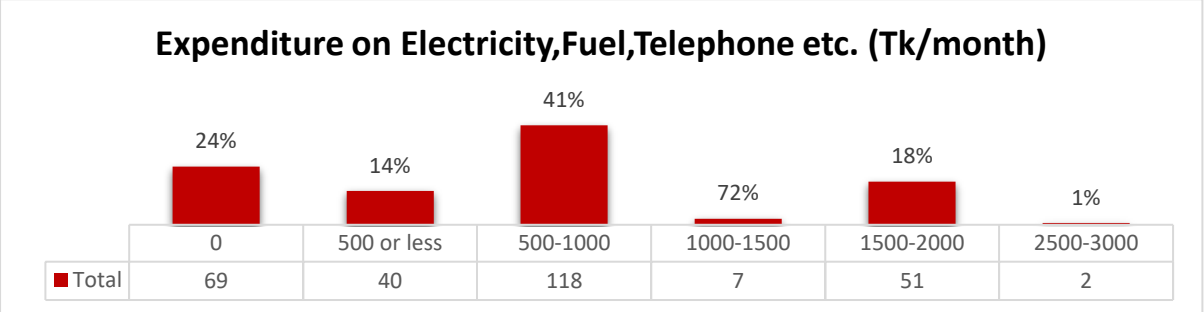


Figure 8-30 Expenditure on Electricity, Fuel, Telephone etc.

8.2.4.11 Monthly Saving

Monthly savings directly dependent on the monthly income of the individuals, 53% of the individuals in the study shows that they are not having any savings in the monthly basis according their monthly income in the Rangabali upazila. Monthly savings less than TK 5,000 represents 38% of the family in the study area and only 1% household have more than TK 20,000 savings in the project area.

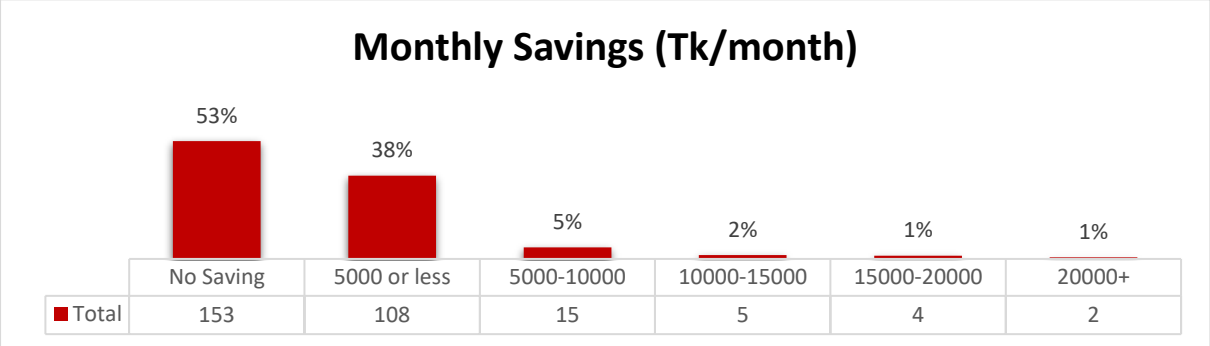


Figure 8-31 Monthly Savings

8.2.4.12 Place of Savings

Following Figure exhibits that the 52% of the household do not have savings place option because of they have no savings per month. only 14% of the individual save their money in regular basis into the bank, 13% of them save money in their own, and 21% in the Micro credit banking system.

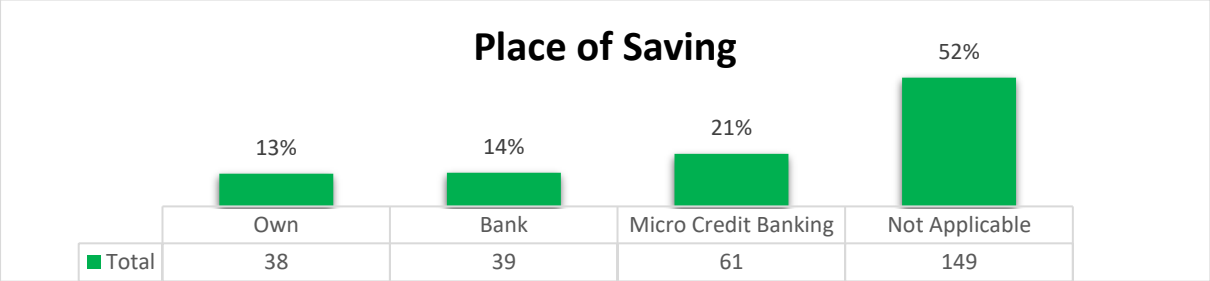


Figure 8-32 Place of Saving

8.2.4.13 Loan

Poor people are poor. They have no additional capital for a significant period of time. That is why many people get loans in times of crisis. It was an interesting fact that in the following chart, we found the ratio of borrowing and non-lending. Almost 51% of the respondents said they have loan.

Figure 8-33 Status of Loan

Categories	Frequency	Percentage
No	141	49%
Yes	146	51%
Grand Total	287	100%

8.2.4.14 Source of Loan

The people of Rangabali are poor among the people of other sub-districts of Bangladesh. They cannot borrow from their neighbors because they have no power. So, they take loans from different financial institutions. Some government and some NGOs. The following chart shows the source of loan credit in Rangabali Upazila. Almost 47% of the loans were taken from ASA and 17% were taken from Grameen Bank.

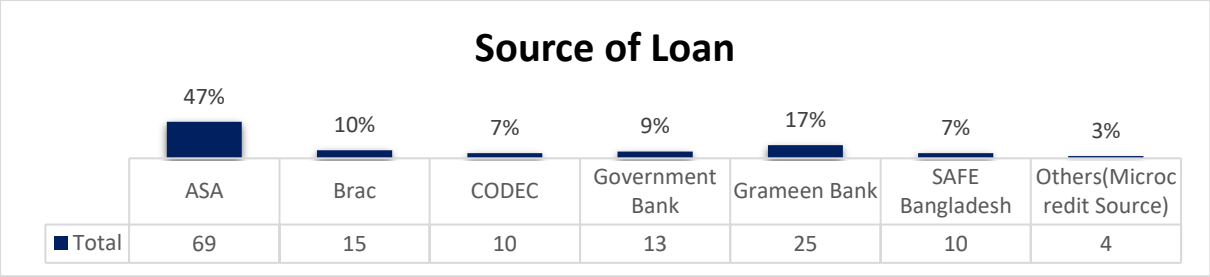


Figure 8-34 Source of Loan

8.2.4.15 Monthly Installment to Pay

The Rangabali people are poor in other Upazilas of Bangladesh. Their per capita income is not high. It plays an important role in the domestic economy of Rangabali Upazila. The following chart shows the monthly installments to provide. 52% of the respondents said their monthly installments was less than 5000 BDT per month.

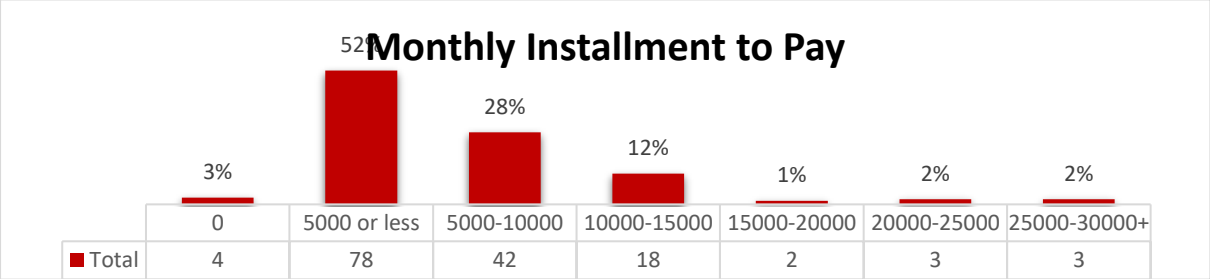


Figure 8-35 Monthly Installment to Pay

8.2.4.16 Economic Base

We analyzed the economic database of Rangabali Upazilas and found that according to 83% of the respondents the economy of the Upazila is agro-based. The production and marketing of industrial products is not strong here. The service sector needs to raise the base economy. The table below presents the internal economic base of Rangabali Upazilas.

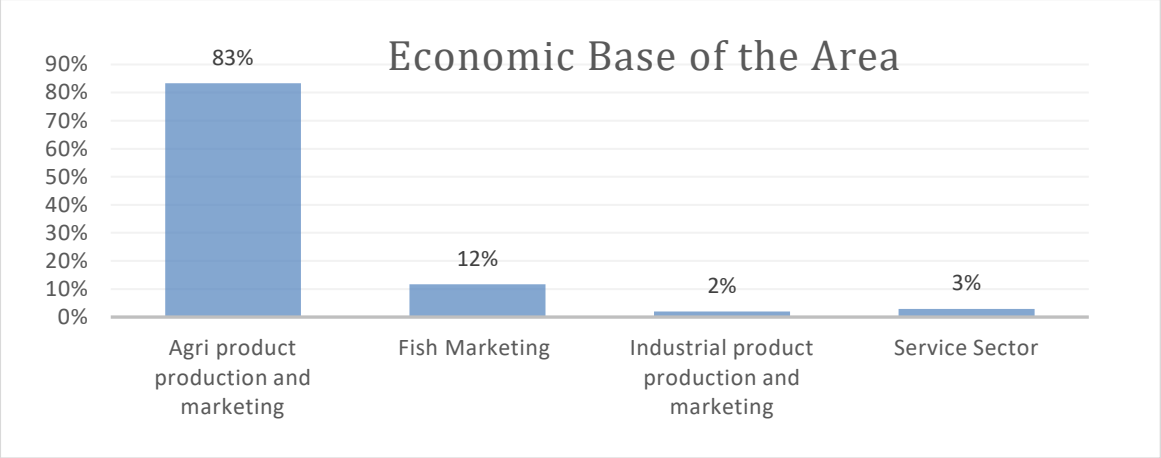
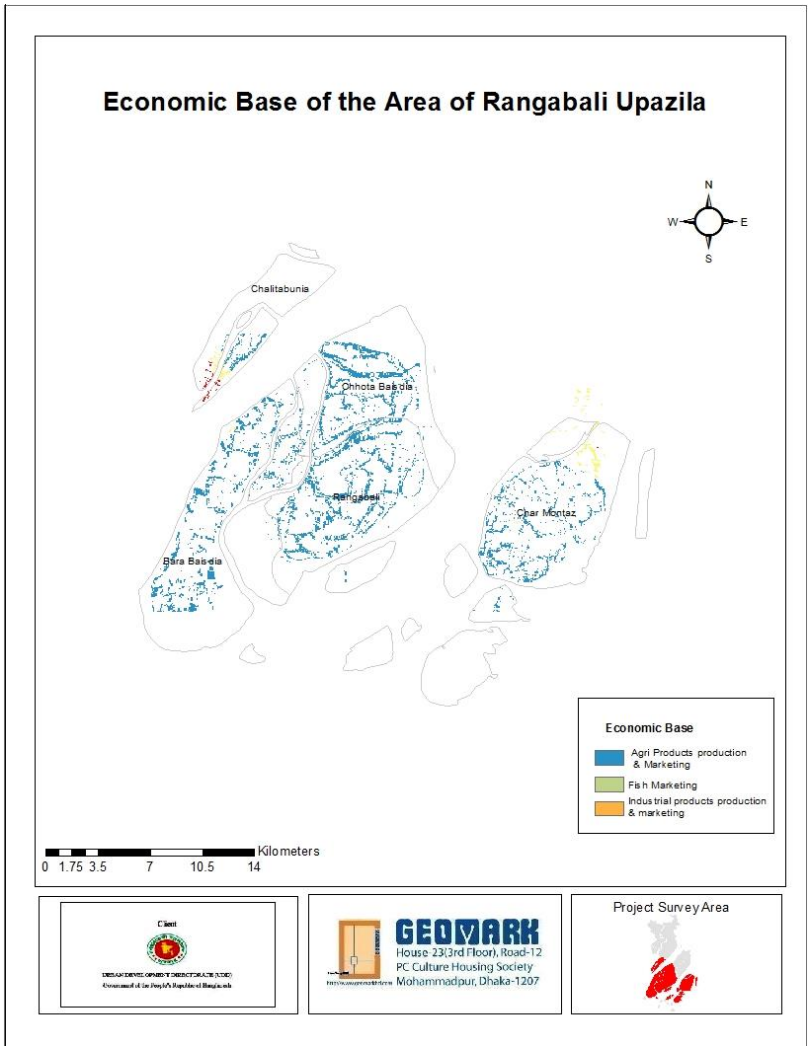


Figure 8-36 Economic Base of the Area

According to the Thematic map about the Economic Base of the Rangabali Upazila, all the union sharing the almost same economic base in the Rangabali Upazila, Agri products Production & Marketing is the main economic base for the maximum union like Char Momtaz,Rangabali, Bara Baisdia, Chhota Baisdia and Chalitabunia.
With the Agri products economic base some other economic activities like Fish Marketing mainly in Char Momtaz as the economic base in the Rangabali Upazila.



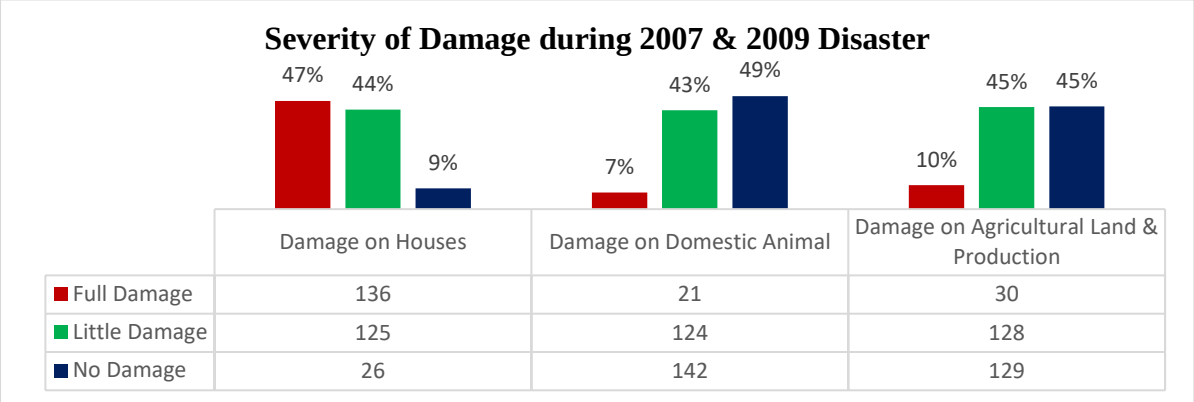
Map 8-7 Economic Base of the Area

8.2.5 Natural Disaster and Consequences

8.2.5.1 Severity of damage during 2007 and 2009 Disaster

In this study severity of damage during 2007 & 2009 disaster mainly focus on the how damage on house, domestic animal and agricultural land & production. For the damage of house during the disaster following figure shows that 47% of the house got full damage and little damage occurred for 44% house, only 9% of the house suffer no damage during the disaster.

In the counting of damage on domestic animal, the figure shows that 49% of the household had no experience of damage of domestic animal, 43% had little damage and only 7% experienced full damage on their domestic animal. 45% of the agricultural land and production was little damaged by the disaster during the 2007 & 2009, only 10% belongs to the full damage in that time.

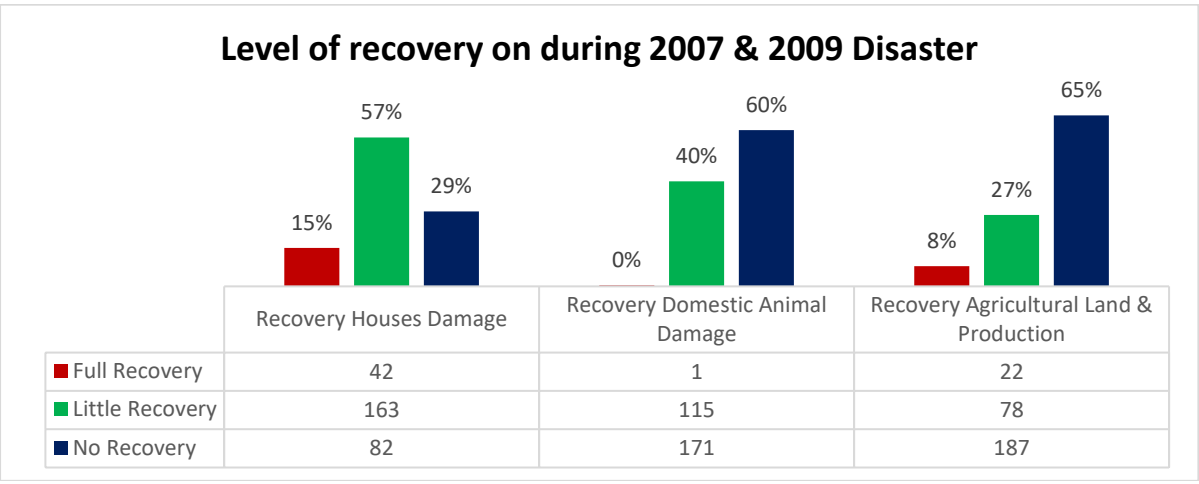


	Damage on Houses	Damage on Domestic Animal	Damage on Agricultural Land & Production
Full Damage	136	21	30
Little Damage	125	124	128
No Damage	26	142	129

Figure 8-37 Severity of Damage During 2007 & 2009 Disaster

8.2.5.2 Level of Recovery on During 2007 & 2009 Disaster

For the house damage during the disaster 2007 & 2009, in the account of recovery study shows that 15% of the house, no full recovery for the domestic animal and 8% of the agricultural land & production was fully recovered from damage. Domestic animal damage during 2007 & 2009 disaster 60% of them no recovered, 65% agricultural & production also not recovered, but only 29% of the house not recovered from the disaster.



	Recovery Houses Damage	Recovery Domestic Animal Damage	Recovery Agricultural Land & Production
Full Recovery	42	1	22
Little Recovery	163	115	78
No Recovery	82	171	187

Figure 8-38 Level of Recovery During 2007 & 2009 Disaster

8.2.5.3 Severity of damage during 2018

Severity of damage during 2018 shows the less damage compare with the 2007& 2009 disaster, the following figure, below shows that the 78% of the house, 91% of the domestic animal and 92% of the agricultural & production had no damage in the study area.

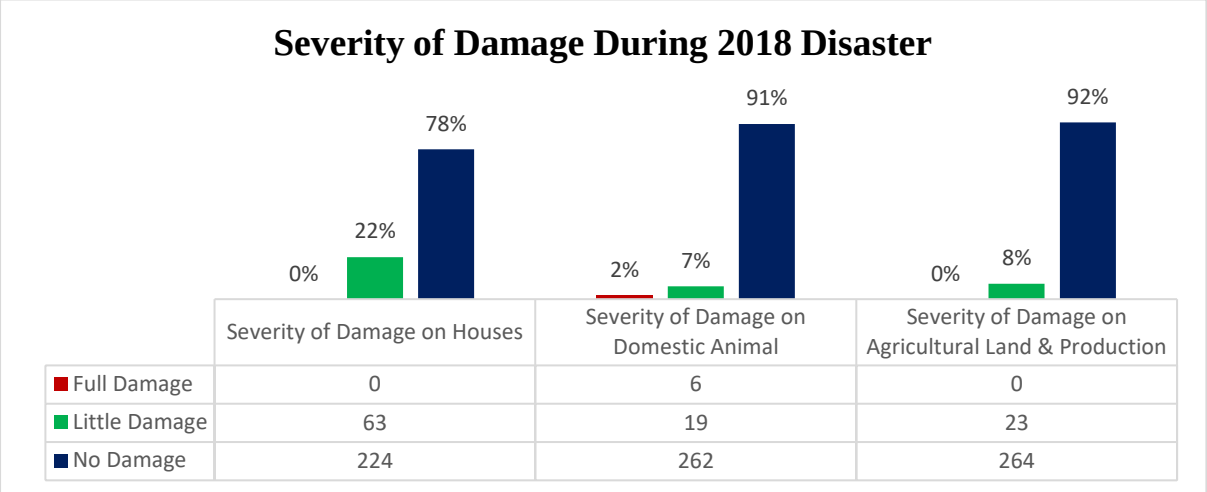


Figure 8-39 Severity of damage during 2018

8.2.5.4 Level of Recovery of damage during 2018

Survey data shows, according to 22% of the respondents, there was little damage on houses during 2018 disaster. Detailed list with percentage has been given in the following table.

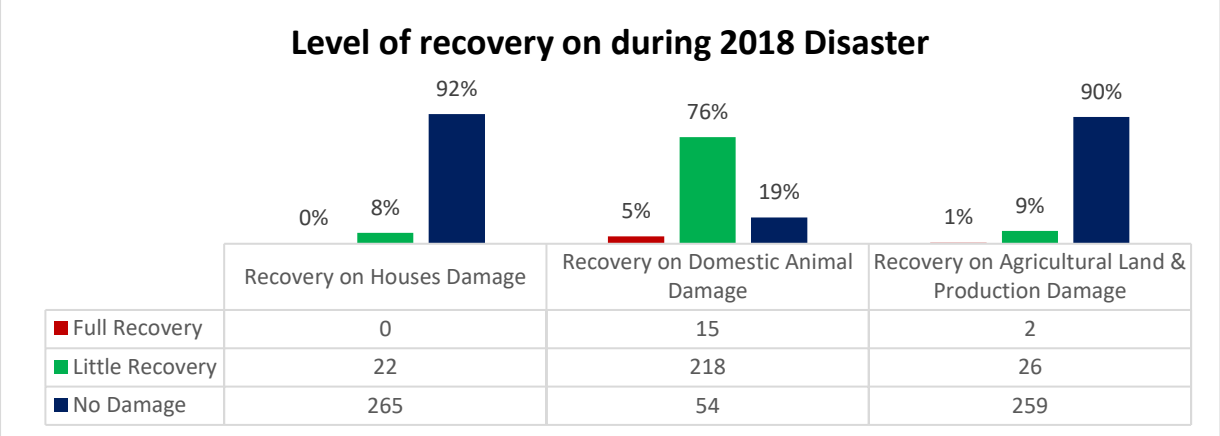


Figure 8-40 Level of Recovery During 2018 Disaster

8.2.5.5 Amount of damage by Cyclone (Tk)

Maximum time of Cyclone hit by the region in the time interval of 2005-2009 and most damage done in that time, 91% of the damage occurred in that time interval from year 2000 to 2019.

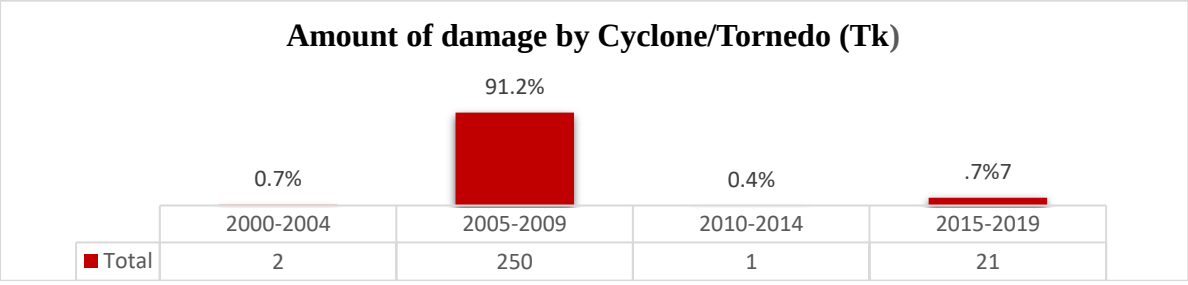
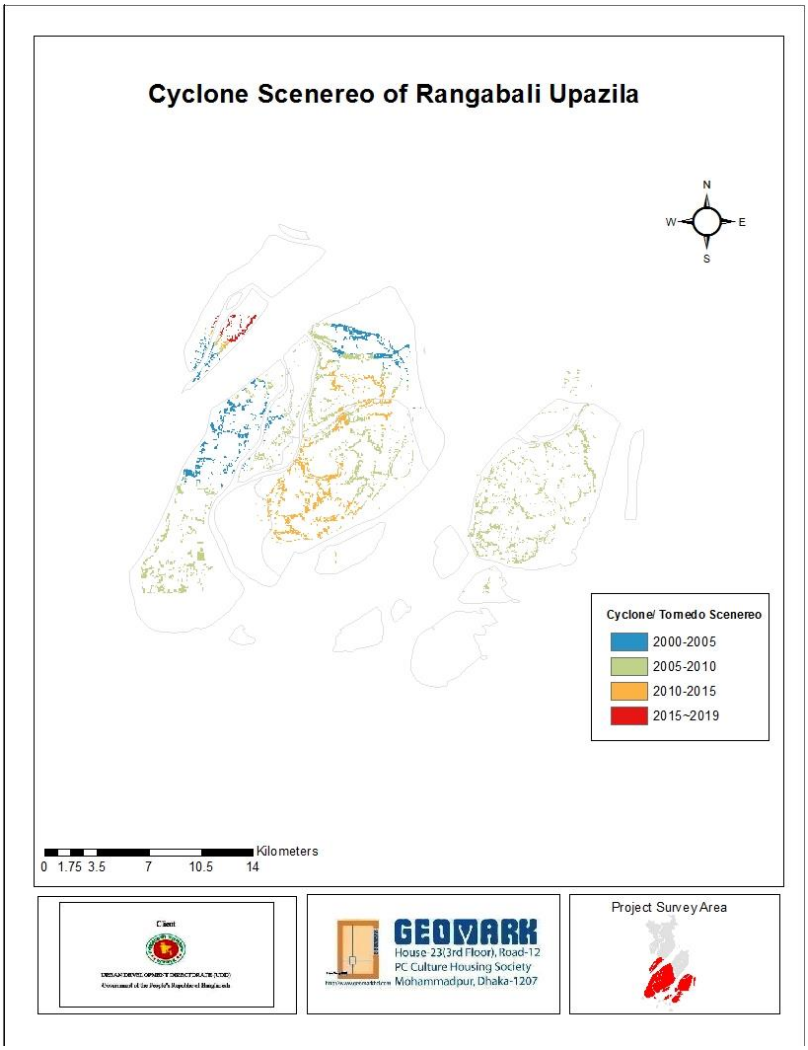


Figure 8-41 Amount of damage by Cyclone (Tk)

From the Thematic map about the cyclone/ Tornedo occurred and consequences in the area, it shows that the Cyclone occurred in most southern part of the region like Char Momtaz, Bara Baisdia and some part of the Rangabali from the year of 2005 to 2010.

From 2005 to 2010 most of the Cyclone occurred in some northern part of the Bara Baisdia, Chhota Baisdia union. On the other hand, in Chalitabunia union was suffered most for the Cyclone in the recent past.



Map 8-8 Cyclone occurrence

8.2.5.6 Amount damage by Fire (TK)

Like the Cyclone, fire cost in the same time period of 2005 to 2009 and 74% of the damage done in that time period which costs TK 6,80,000 from the study year of 2000 to 2019.

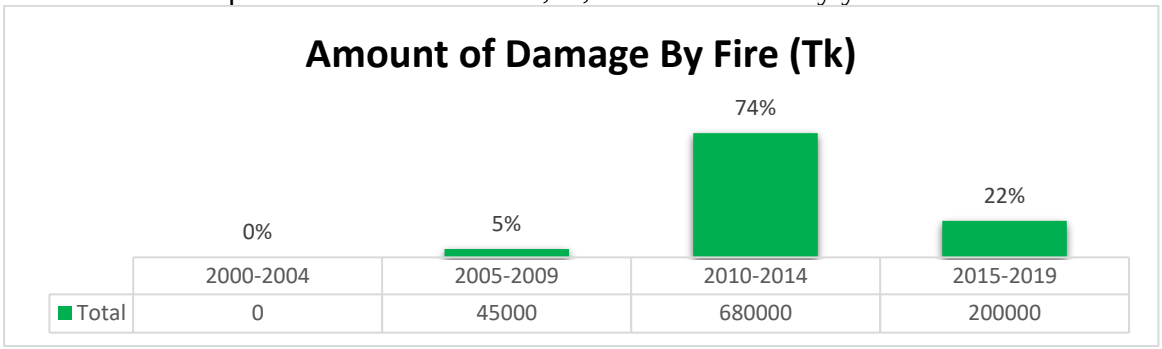


Figure 8-42 Amount of Damaged by Fire

8.2.5.7 Amount of Damaged by Tidal Surge

Flow tide occurred in maximum time in the year category of 2000-2009 and damage most among the total. 62% damage done in that time and total damage cost was TK. 3,254,000 in the area. In the recent decade flow tide damage cost only TK. 8,85,000.

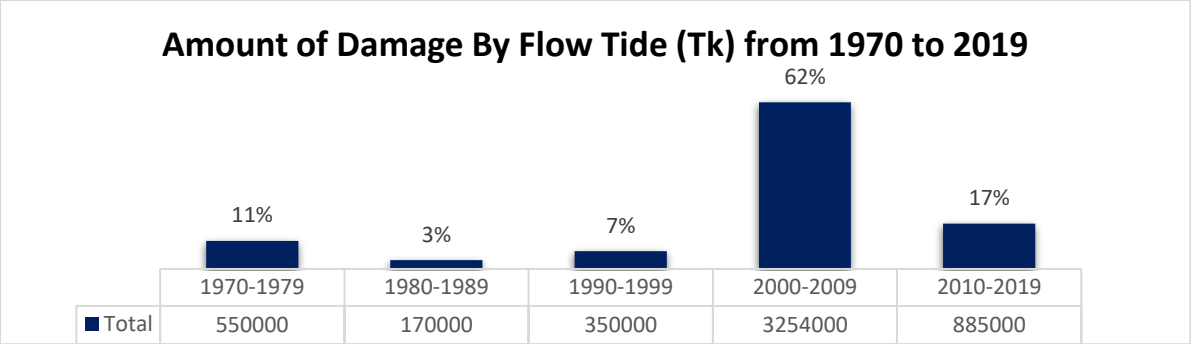


Figure 8-43 Amount of Damage by Flow Tide

8.2.5.8 River Bank Erosion

Riverbank Erosion is an endemic and recurrent natural hazard in Bangladesh. When rivers enter the mature stage (as in the case with the three mighty rivers, ganges, brahmaputra and meghna) they become sluggish and meander or braid. These oscillations cause massive riverbank erosion. Since the Rangabali Upazila are located along the river the river bank erosion is the common occurrence. In the table below and Figure shows that most of the respondents say that the highest river bank erosion in this area is 77% and the lowest is 23%.

Table 8-8 River Bank Erosion

Categories	Frequency	Percentage
Yes	220	77%
No	67	23%
Grand Total	287	100%

8.2.5.9 Operational Switch Gate

Since Rangabali Upazila is on the bank of rivers, Switch gate is very much needed. In below table and Figure show that, most of the respondent say that the operation of switch gate in this area the highest of this is Yes 98% and lowest is No that is 2 %.

Table 8-9 Operational Switch Gate

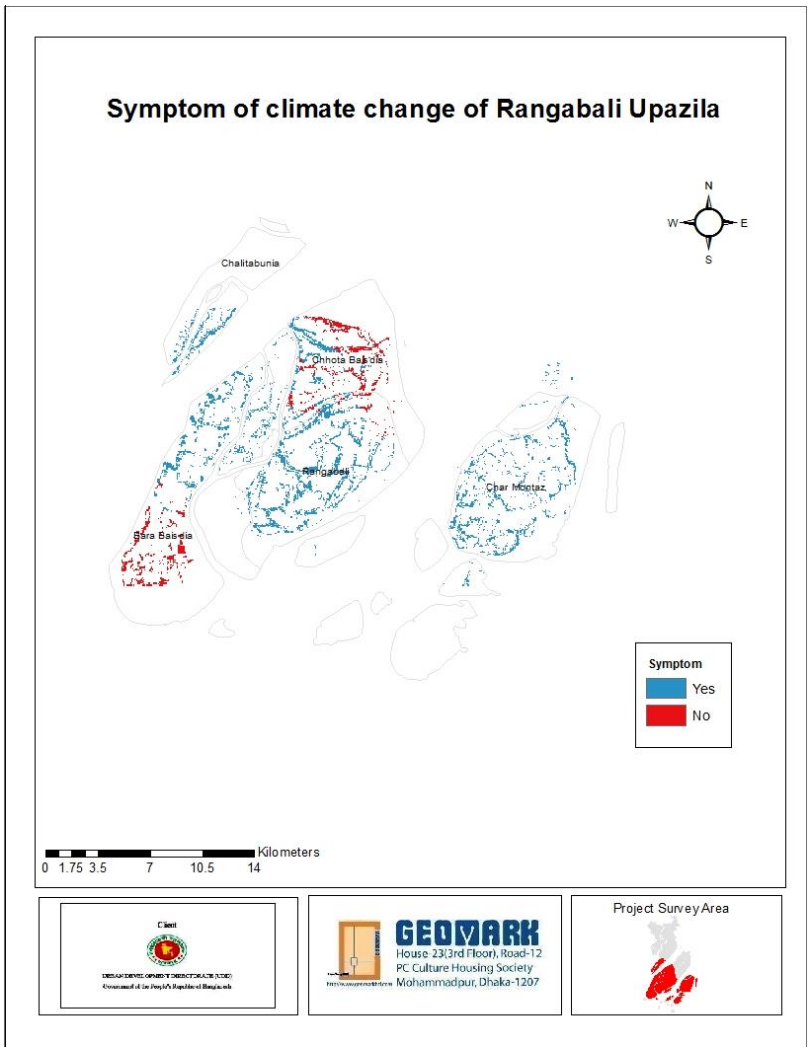
Categories	Frequency	Percentage
Yes	280	98%
No	7	2%
Grand Total	287	100%

8.2.5.10 Symptom of climate change

There are many causes of symptom of climate change in Rangabali Upazila are those Humans are increasingly influencing the climate and the earth's temperature by burning fossil fuels, cutting down rainforests and farming livestock. This adds enormous amounts of greenhouse gases to those naturally occurring in the atmosphere, increasing the greenhouse effect and global warming. In below table and Figure show that most of the respondent say that the Highest Symptom in this area the percentage of this is 93 % and lowest **percentage 7**%.

Table 8-10 Symptom of climate change

Categories	Frequency	Percentage
Yes	267	93%
No	20	7%
Grand Total	287	100%



Map 8-9 Symptom of climate change

8.2.5.11 Flow Tide in Rangabali Upazila

Cycloneand tidal search are natural hazards in our country. We are habited the Cycloneand tidal search. Mainly they come summer season and let autumn in our country. It makes a ghastly situation. 20/30 feet tidal surge attacked in our costal area. It damages our lives and wealth. Following table presents the Cycloneand tidal search in the Rangabali Upazila. 95% people said most of the flow occoured in betueen 2000-2009.

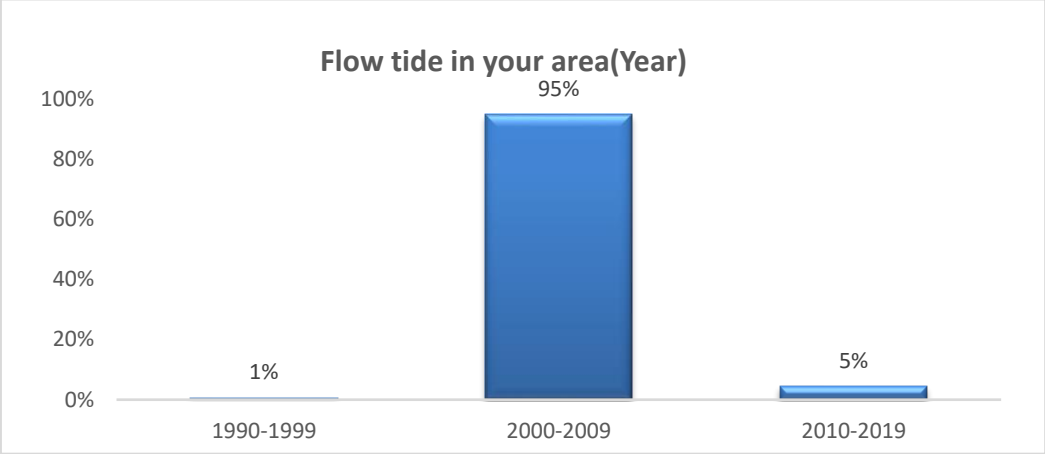


Figure 8-44 Flow Tide in Rangabali Upazila

8.2.6 Infrastructure and Drainage

8.2.6.1 Drainage Type

Almost 91.14% people opined they got no drainage facility. Only according to 0.18 % of the respondents, they got pucca drain in proximity to their houses. Other catagories with percentage is shown is the following chart.

Table 8-11 Drainage Type

Drain Type	Frequency	Percentage
Katcha	2	0.18
No Drain	998	91.14
Pucca	95	8.68

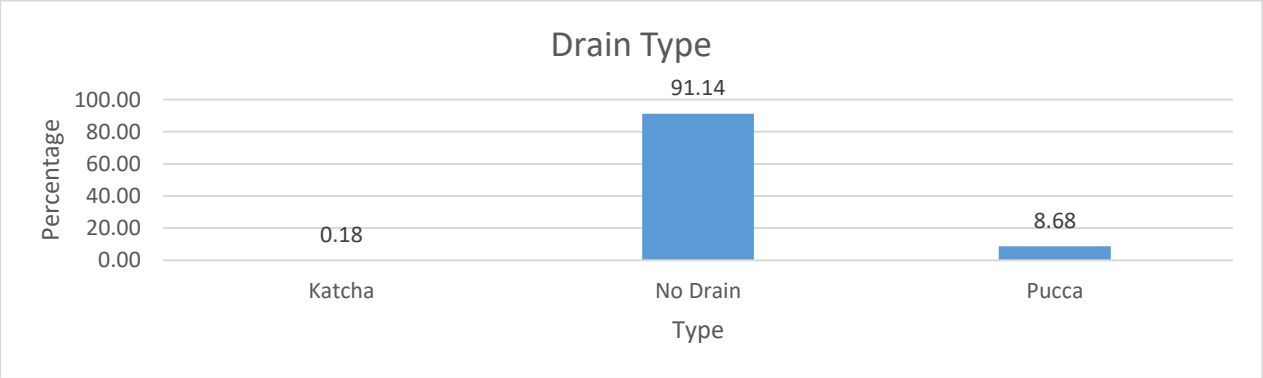


Figure 8-45 Drainage Type

8.2.6.2 Height of the Embankment

In the coastal area it needed to protection from the flood or inundate. Embankment of height between 10 to 15 ft. having the most percentages (64%) in the study area. 12.5% of the embankment having height with 5 ft. or less in the Rangabali upazila.

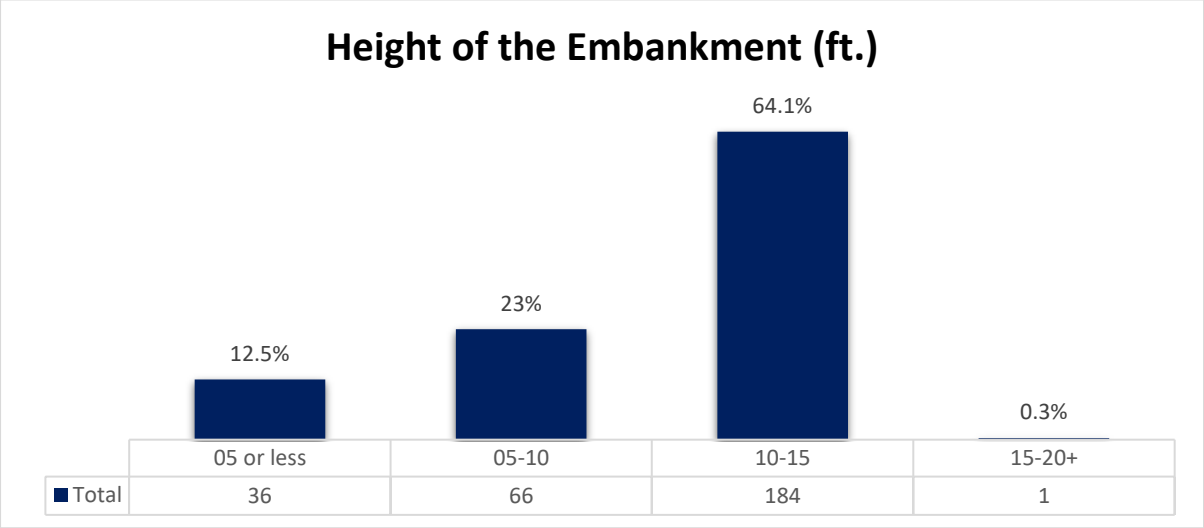


Figure 8-46 Height of the Embankment

8.2.6.3 Increasing the Height of Embankment

Almost 89.9 % of the respondents thinks that height of the embankment is not enough and needs to be get higher. Other categories with percentage are shown is the following table.

Table 8-12 Increase the Height of Embankment

Categories	Frequency	Percent
No	29	10.1%
Yes	258	89.9%
Grand Total	**287**	**100.0%**

8.2.7 Disease and Healthcare

8.2.7.1 Infected by Diseases

The survey conducted to identify the family members being attacked by disease in last or recent past. The table shows, that the 25% of the individuals express that they are attacked by disease in the last year in the recent past, and 75% have no recent record about being attacked by any disease.

Table 8-13 Infected by Diseases

Categories	Frequency	Percent
Yes	72	25%
No	215	75%
Grand Total	**287**	**100%**

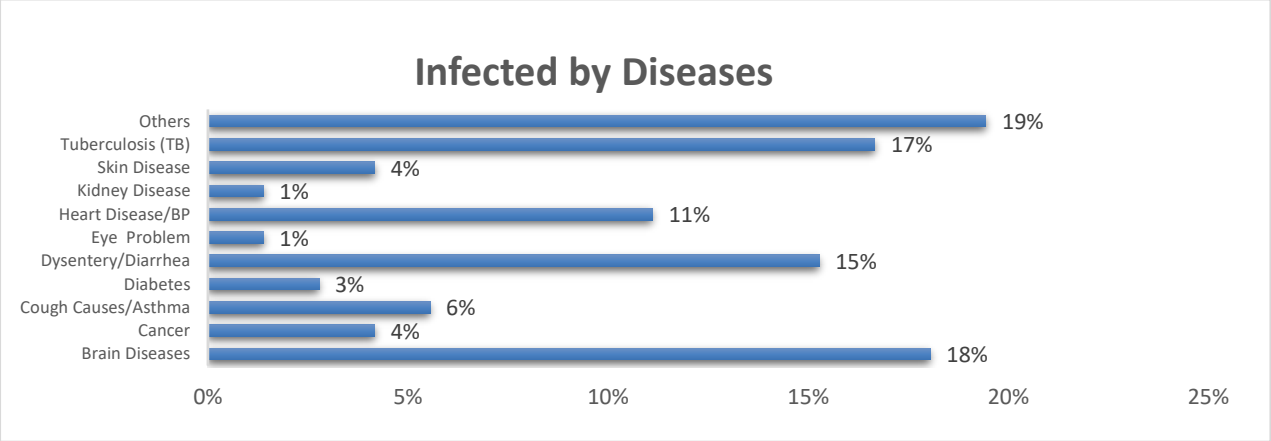


Figure 8-47 Infected by Diseases

8.2.7.2 Type of Diseases

Another Figure below, showing the list of disease attacked by the residents in this area. Common diseases observed in the area are mainly 18% brain disease, dysentery/diarrhea belongs to 15% of the total disease attacked in the last year, heart disease and tuberculosis (TB) also two common observed disease having percentage of 11%% and 16% respectively.

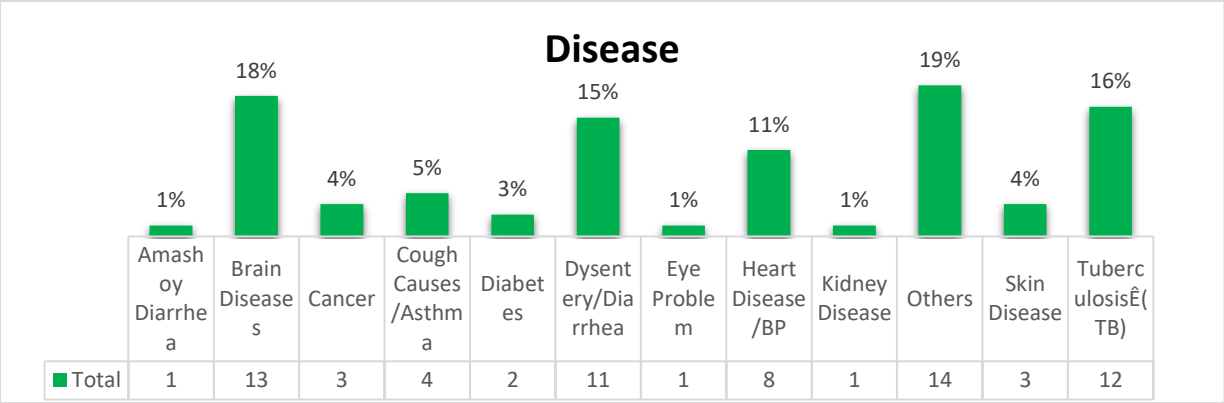


Figure 8-48 Type of Diseases

8.2.7.3 Medical Facility

60% of the respondents goes to village doctor for treatment. Other categories with percentage are shown is the following chart.

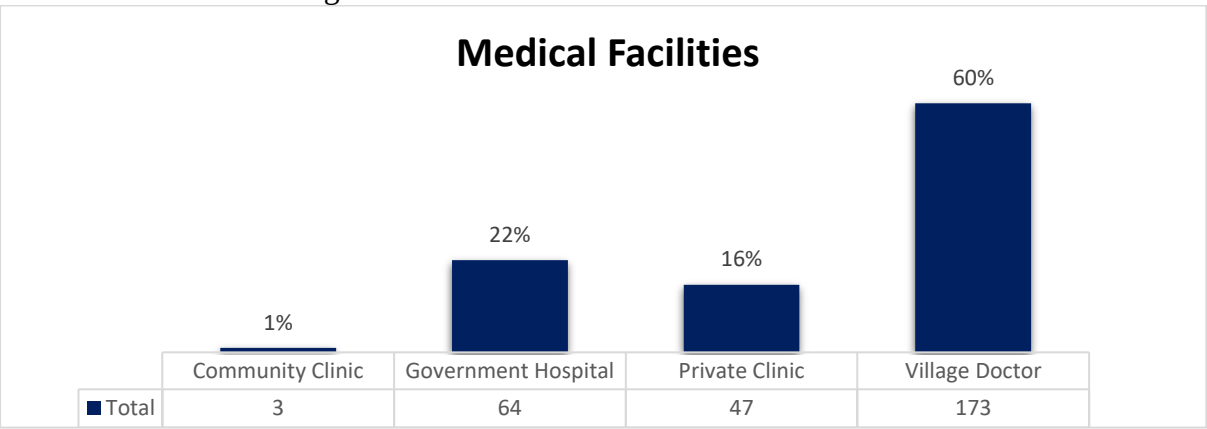
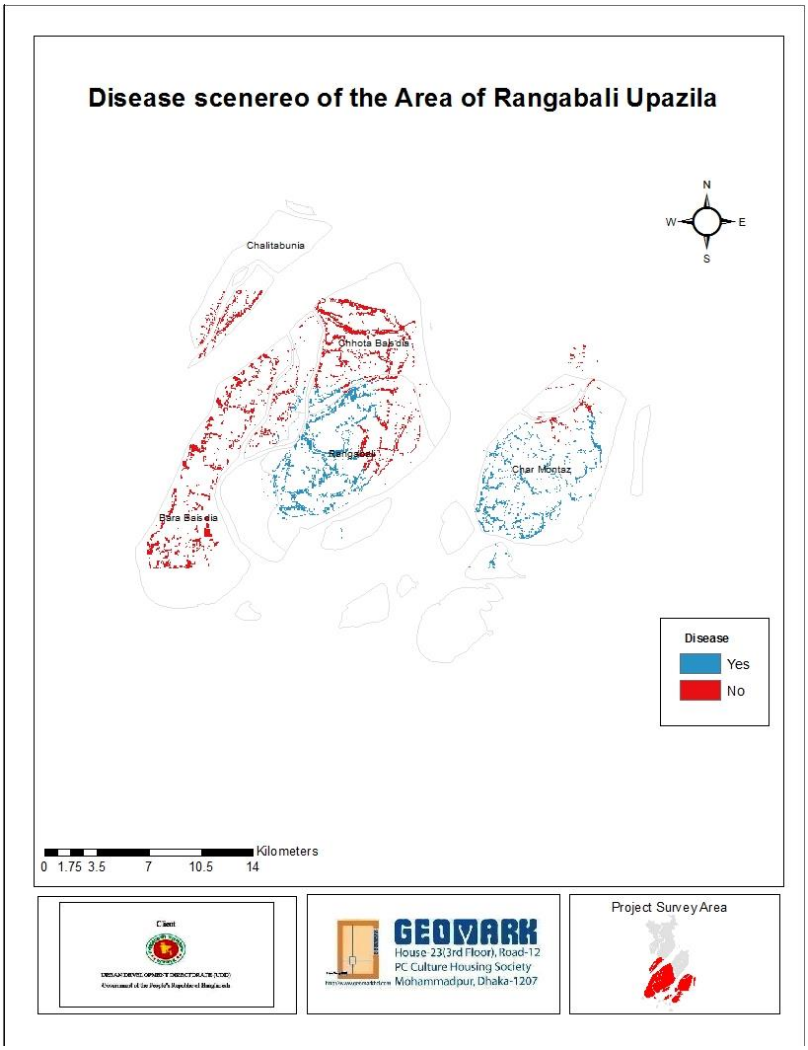


Figure 8-49 Medical Facilities

Limited access of medical facilities could bring bad situation in the community, following map showing how medical facilities distributed in the Rangabali upazila. People of Chalitabunia union along with some other union of the Rangabali, Chhota Baisdia, Bara Baisdia are all mainly depends on the village doctor for their treatment. In Char Momtaz depends on Charity hospitals or community clinic for their treatment.



Map 8-10 Medical Facilities

8.2.8 Utility and Waste Management

8.2.8.1 Source of Fuel

Still, wood is considered as the primary source of fuel in Rangabali Upazila according to 87% of the people. Cylinder gas is also getting popularity is some places. Other categories with percentage are shown is the following chart.

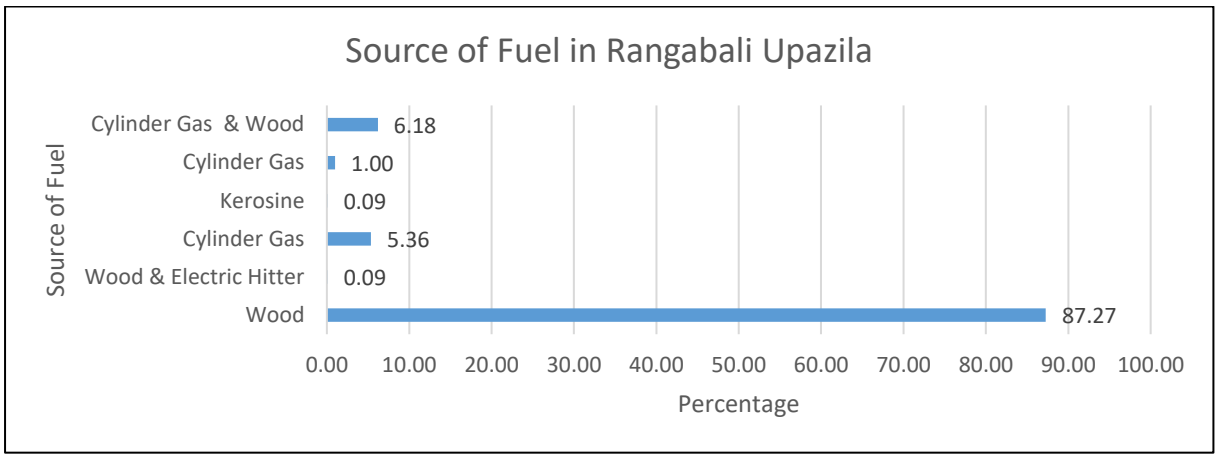
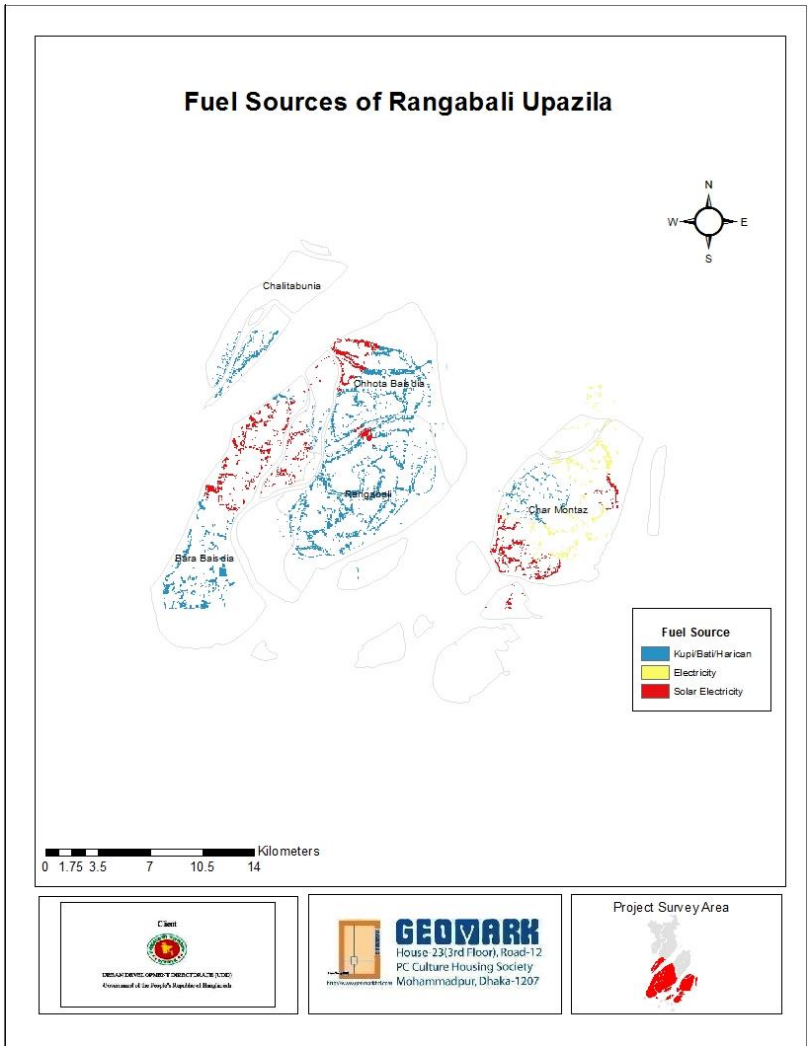


Figure 8-50 Source of Fuel

Thematic map about the fuel source in the Rangabali Upazila, showing that maximum of the house hold across the area uses woods, small portion of the Bara Baisdia and Char Momtaz union found that the along with wood they are using Cylinder Gas.



Map 8-11 Source of Fuel

8.2.8.2 Source of Light

Interestingly, solar power is getting popular in Rangabali Upazila as well as the entire country as a reliable source of renewable and sustainable source of electricity. Light sources in the Rangabali upazila mainly depends on electricity and solar panel, the study shows that the source of light in the area solar electricity contribute the percentage of 95%, other 4% of the light source belongs to the kupi/Bati/Harican.

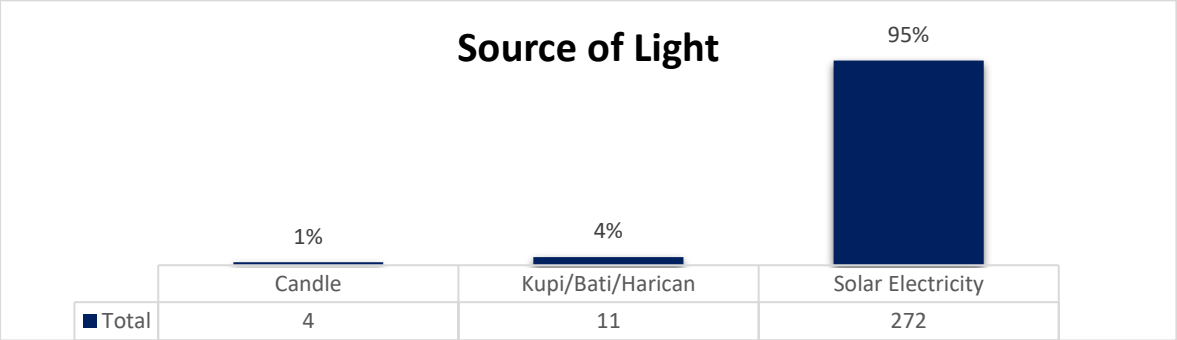


Figure 8-51 Source of Light

8.2.8.3 Waste Disposal system

Waste management in Rangabali Upazila is not yet significantly good. In fact, it's not good at all. Almost 73 percent of the respondents said they still dump the solid waste just outside their house. Which may cause serious health issues. So, solid waste management condition in Rangabali Upazila need more improvement. And another thing to be concerned is they dump waste directly into the river or canal which is constantly polluting the water of that system. Which has immediate negative impact on the biodiversity and water ecosystem of the area. As the area is in a close proximity to the Bay of Bangal, the polluted river water must enter the sea and therefore endangered the life and ocean ecology.

Figure 8-52 Waste Disposal location

8.2.9 Water Supply and Drainage

8.2.9.1 Water logging

Water logging is one of the major issues in Rangabali Upazila. Almost 94 percent respondents complained about water logging.

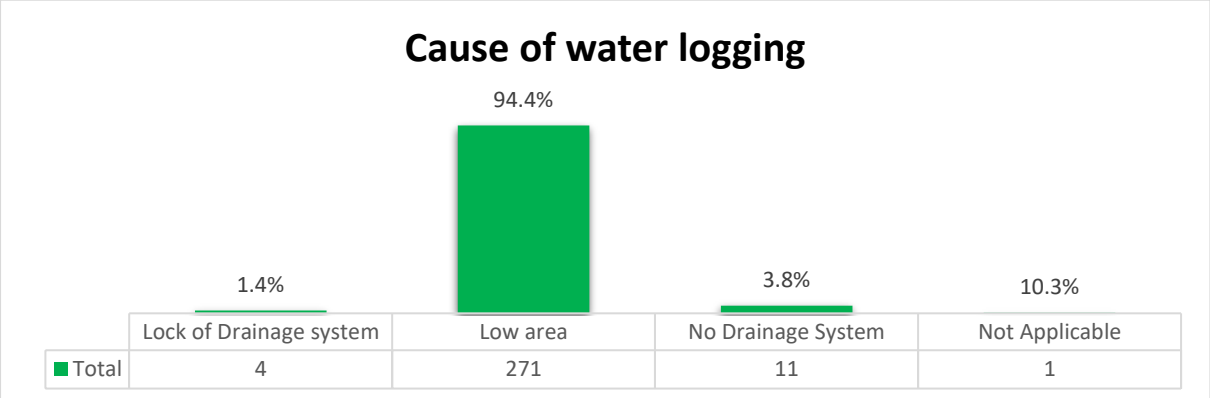


Figure 8-53 Cause of water logging

8.2.9.2 Operational switch gates

Switch gates maintain and control the flow of water. If the system fails, water logging and other related problems may occur. Luckily, 98 % respondent opined that the nearby switch gate was operational.

Table 8-14 Operational switch gates

Categories	Frequency	Percentage
Yes	280	98%
No	7	2%
Grand Total	287	100%

8.2.9.3 Water quality

It is a good thing that almost 97% the respondents believe that the water quality is good enough and it's perfectly drinkable. Percentage is shown in the following table.

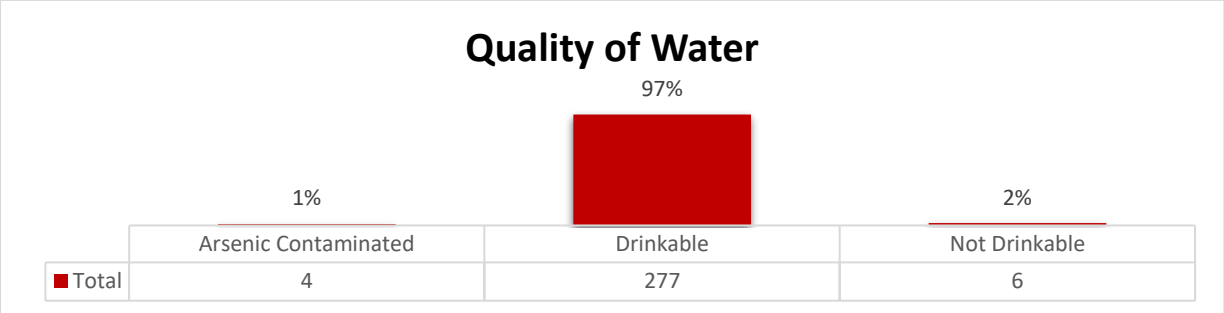


Figure 8-54 Quality of Water

8.2.9.4 Source of Drinking Water

99% of the people are dependent on their personal Tube Well as a clean source of drinking water. Following chart is showing the sources with percentage.

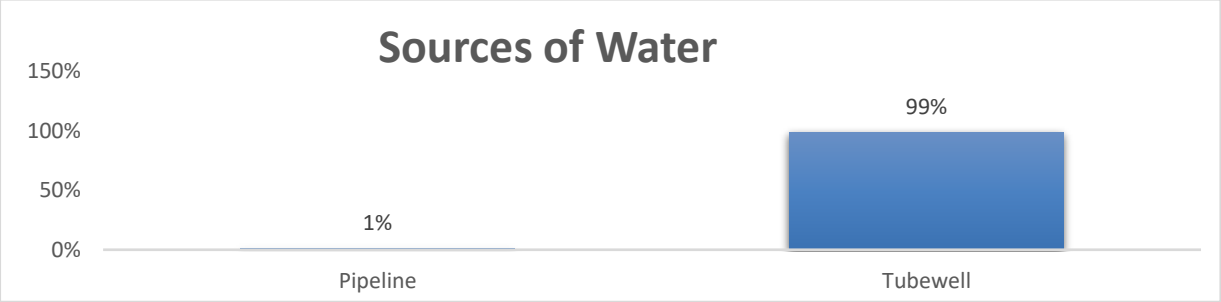


Figure 8-55 Sources of Water

8.2.9.5 Arrangement for Drinking Water During Flood

It is easy to find out the water sources in this area but in the time of flood it seems to be quite difficult to finding the water sources, but the following table, shows below exhibits that the, 2% of the individuals express that it is no problem to find out the water sources and rest of the 98% have a problem to finding the drinkable water.

Table 8-15 Arrangement for Drinking Water During Flood

Categories	Frequency	Percent
No	6	2%
Yes	281	98%
Grand Total	**287**	**100%**

8.2.9.6 Water Supply Sufficiency

Sufficient supply of water is an essential requirement for human being to live. From our survey, we collected information about the supply of water which is listed in percentage in following table.

Table 8-16 Water Supply Sufficiency

Categories	Frequency	Percent
No	33	11%
Yes	254	89%
Grand Total	**287**	**100%**

8.2.9.7 Problem to Collect Water

Rangabali is located in the southern part of Bangladesh which is the coastal region of the country. It is obvious that is difficult to find drinkable pure water there. People living there often face difficulties collecting the water. According to the study, 48% of the household not facing such problem of collecting drinking water. Water source is so far from the house this type of problem facing 17% of the family in the study and 35% of the family express that the collection time water is taken too long for them.

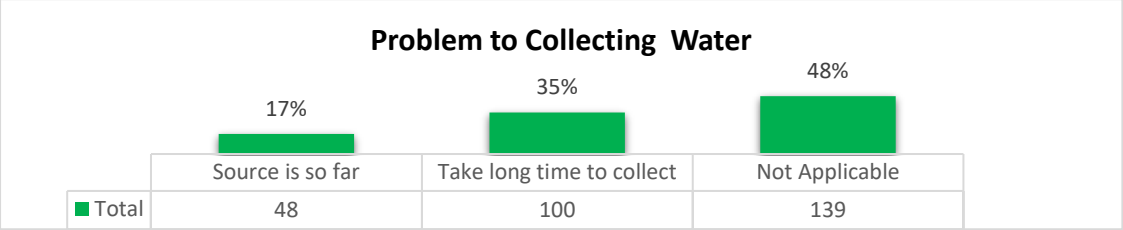


Figure 8-56 Problem to Collecting Water

8.2.9.8 Arrangement for Collecting Rain Water

In char area, most of the water is saline water therefore not usable for drinking and other purposes. Treatment of saline water is also costly. So, rain water harvesting can the most reliable source of water. Almost 90% of the respondents said they have rain water harvesting plant installed in their home. Following table is showing the rain water harvesting scenario of Rangabali Upazila.

Table 8-17 Arrangement for Collecting Rain Water

Categories	Frequency	Percent
Yes	259	90%
No	28	10%
Grand Total	**287**	**100%**

8.2.10 Other Infrastructure and Facility

8.2.10.1 Problem of Main Road

According to 40% of the respondents, their main road is narrow and other 56% opined that the roads are damaged at some places. Following chart is showing the category of the problems of main road.

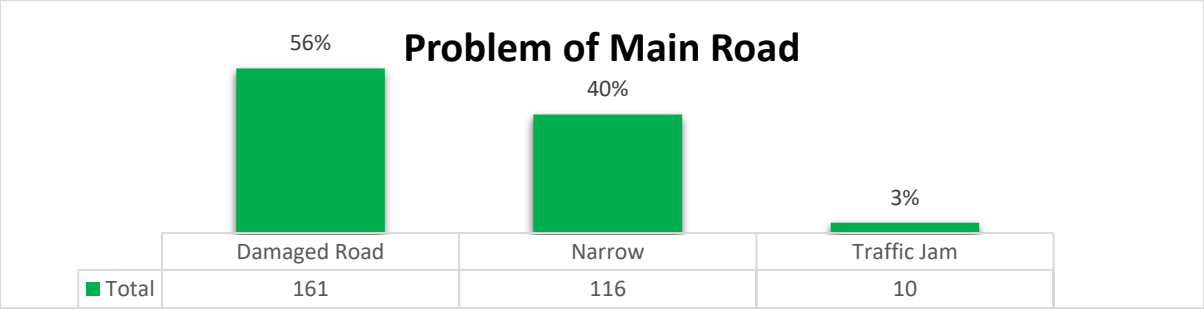
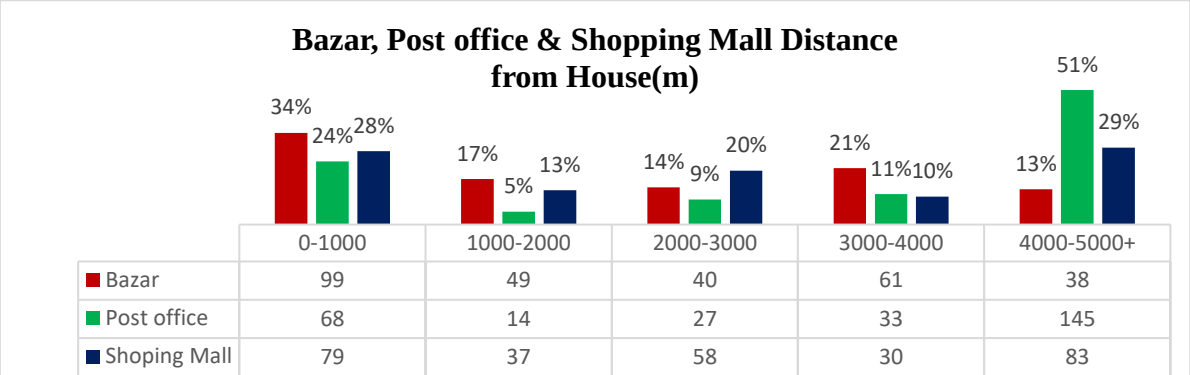


Figure 8-57 Problem of Main Road

8.2.10.2 Bazar, post office and Shopping Mall Distance

Distance from the house distributed in five categories in the study 13% of the Bazar (4000-5000) meter away from the home, maximum 34% distance from the house to bazar having the

distance category of 0-1000 meter. Minimum distance of less than 1000 meter to the post office only 24% in the study, 5% of the post office not more than 2000 meter away and maximum 51% of the post offices lies in the 4000-5000+ meter category. 29% of the shopping malls are more than 4000 meters away from the respondent's home, beside same as 28% of the shopping malls distance less than 1000 meter away from the home of the respondents.



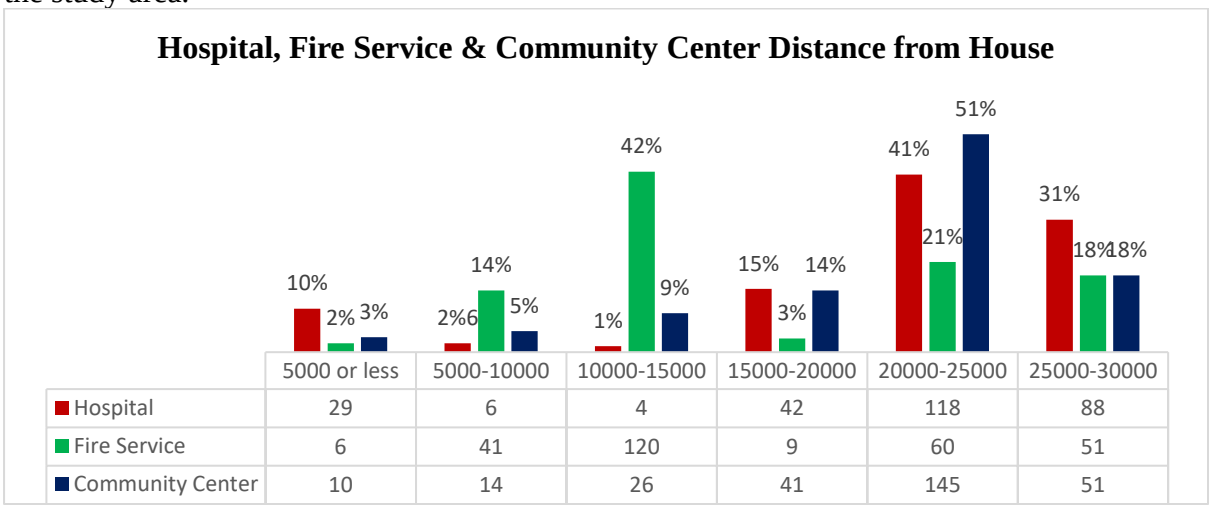
	0-1000	1000-2000	2000-3000	3000-4000	4000-5000+
Bazar	99	49	40	61	38
Post office	68	14	27	33	145
Shoping Mall	79	37	58	30	83

Figure 8-58 Bazar, post office and Shopping Mall Distance

8.2.10.3 Hospital, Fire Service & Community Center Distance from House

Following figure shows that 10% of house less than 5000 meter away from hospital in the Rangabali upazila, and maximum 31% house are more than 25000 meters away from respective house. For the fire service distance from home distributed in the something like equal distribution for the distance from respondents' home, only 2% of fire service distance from home having less than 5,000 meter and maximum 42% of the house situated from maximum 15,000 meter away from fire service facilities in the Rangabali upazila.

Distance of maximum 25,000 meter away from home, 34% community center lies in this category.0nly 3% distance of less than 5000 meters from the home of the respondents, and maximum 25000-30000+ meter away from the home to community center having only 18% in the study area.



	5000 or less	5000-10000	10000-15000	15000-20000	20000-25000	25000-30000
Hospital	29	6	4	42	118	88
Fire Service	6	41	120	9	60	51
Community Center	10	14	26	41	145	51

Figure 8-59 Hospital, Fire Service & Community Center Distance from House

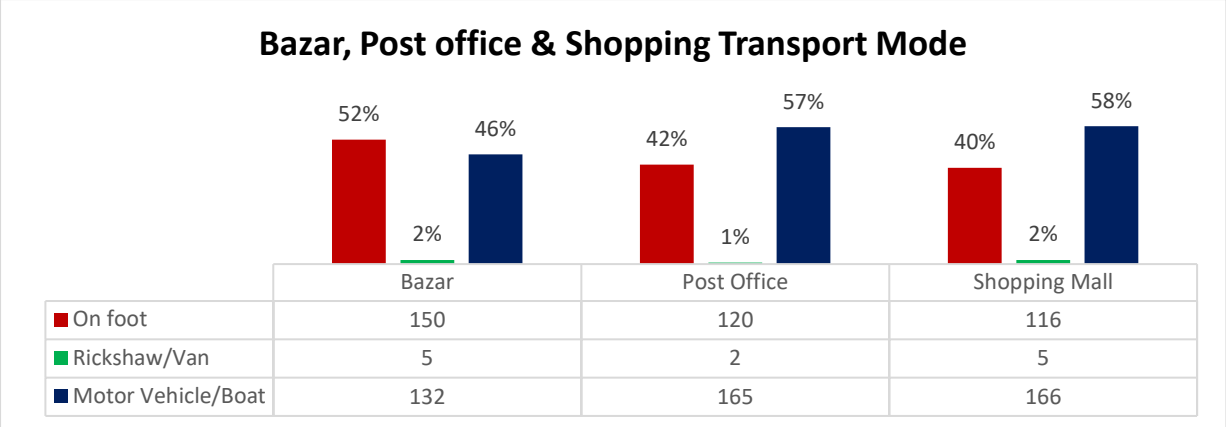
8.2.10.4 Bazar, post office and Shopping Mall Transport Mode

Transport mode from home to bazar, post office and shopping mall distributed in three categories (On foot, Rickshaw/Van & Motor Vehicle/Boat),

In the figure 3.10.3, 52% of the respondents goes bazar on foot, 46% of them take Motor Vehicle/Boat and only 2% of the respondents uses Rickshaw/Van.

In the Rangabali upazila, 58% of the of the respondents uses Motor Vehicle/Van for reaching shopping mall, and 40% of the respondent goes to the shopping mall on foot.

For post office transport mode maximum 57% of the residents uses Motor vehicle/Boat, 42% of them prefer to on foot and only 1% use Rickshaw/Van.



	Bazar	Post Office	Shopping Mall
On foot	150	120	116
Rickshaw/Van	5	2	5
Motor Vehicle/Boat	132	165	166

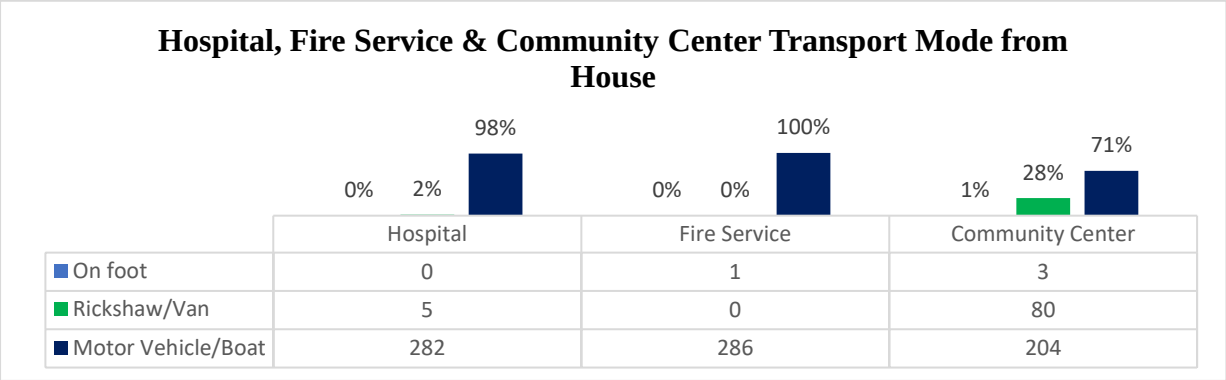
Figure 8-60 Bazar, post office and Shopping Mall Transport Mode

8.2.10.5 Hospital, Fire Service & Community Center Transport Mode

In the case of transport mode from house to the Hospital, Fire service & Community Center, all the transport options are categories into three option,

In the study transport mode for all three destination no residents prefer or not possible to prefer go to on foot. For the Hospital transport, 98% of the respondents prefer to take Motor Vehicle/Boat, and only 2% of the respondents uses Rickshaw/van.

In the figure 3.10.4, 100% of the respondents uses Motor Vehicle/Boat for the transportation to get fire service in the Rangabali upazila. For the Community center transport mode, 71% of the transport mode belongs to the Motor Vehicle/Boat, 28% use Rickshaw/Van.

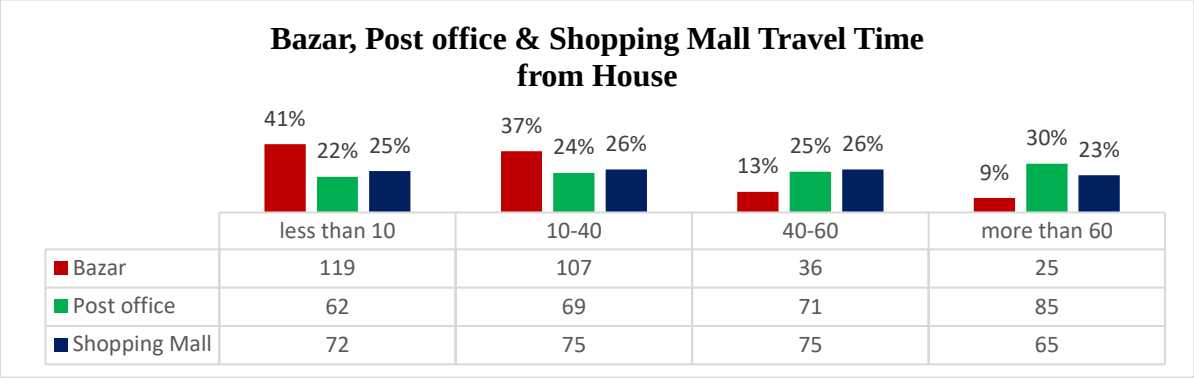


	Hospital	Fire Service	Community Center
On foot	0	1	3
Rickshaw/Van	5	0	80
Motor Vehicle/Boat	282	286	204

Figure 8-61 Hospital, Fire Service & Community Center Transport Mode

8.2.10.6 Bazar, Post office & Shopping Mall Travel Time

Travel time for Bazar, shopping Mall & Post office distributed within maximum 60 or more minutes, 41% respondents exhibits that to get a nearest bazar it takes less or 10 minutes, in the same time limit 25% of the respondents get into the shopping mall and 22% for the post office. Maximum 30% of response belongs to the more than 60 minutes time limit for the travel time to the post office.

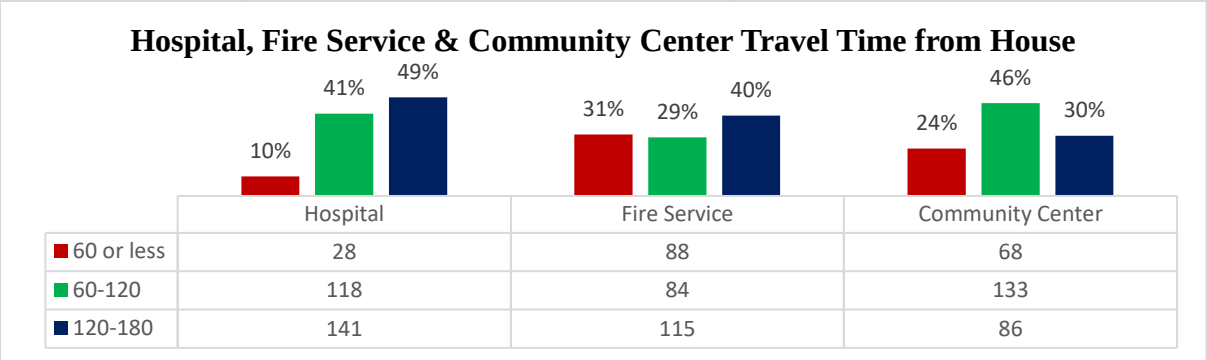


	less than 10	10-40	40-60	more than 60
Bazar	119	107	36	25
Post office	62	69	71	85
Shopping Mall	72	75	75	65

Figure 8-62 Bazar, Post office & Shopping Mall Travel Time

8.2.10.7 Hospital, Fire Service & Community Center Mall Travel Time

Time limit of the travel time categorized into three categories, for the travel time to the hospital 49% of the respondents express that it takes maximum 180 minutes to reach the hospital from their home and only 10% takes 60 or less time to the hospital.



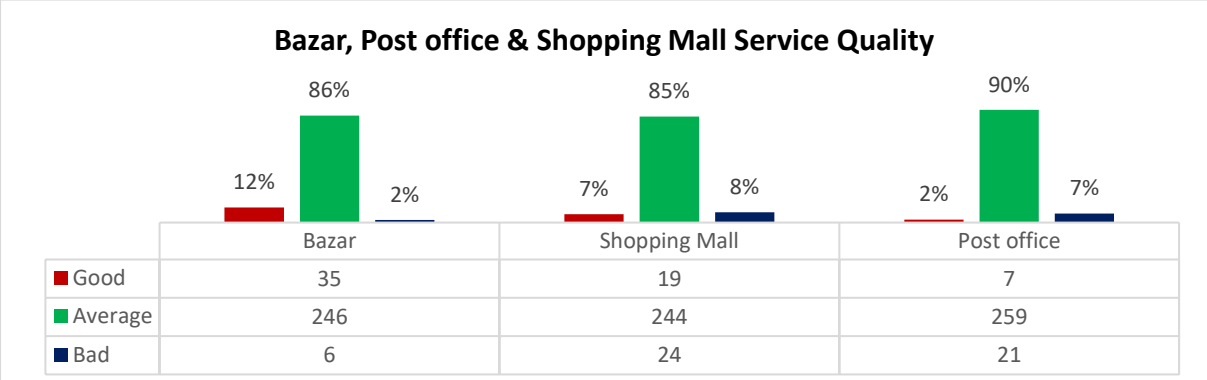
	Hospital	Fire Service	Community Center
60 or less	28	88	68
60-120	118	84	133
120-180	141	115	86

Figure 8-63 Hospital, Fire Service & Community Center Mall Travel Time

8.2.10.8 Bazar, post office and Shopping Mall Service Quality

Service quality of bazar 86% of the individuals satisfied as an average level, 12% express bazar service is good and only 2% said that service quality of bazar is bad. For the service quality of shopping mall, shows that 85% of the residents said that service quality of shopping is average type, 7% of them express that it is good and only 8% marked as bad service quality.

Post office service quality distributed mainly in average categories, 90% of the feedback of the service quality is average, 7% belongs to the bad service quality, and only 2% opinion belongs to the good service quality.



	Bazar	Shopping Mall	Post office
Good	35	19	7
Average	246	244	259
Bad	6	24	21

Figure 8-64 Bazar, post office and Shopping Mall Service Quality

8.2.10.9 Hospital, Fire Service & Community Center Service Quality

According to the respondents in study 88% express that service quality of hospital is average in quality, 5% belongs to the good service quality and 7% express that the service quality of hospital is bad in the study area. Service quality of fire service is distributed same among the three option Good, Average and Bad where's 13% goes to the good service quality, 82% and only 6% for the average and bad service quality respectively. 80% opinion belongs to the average service quality for community center only 1% express that the service is good and rest 19% belongs to the bad service quality.

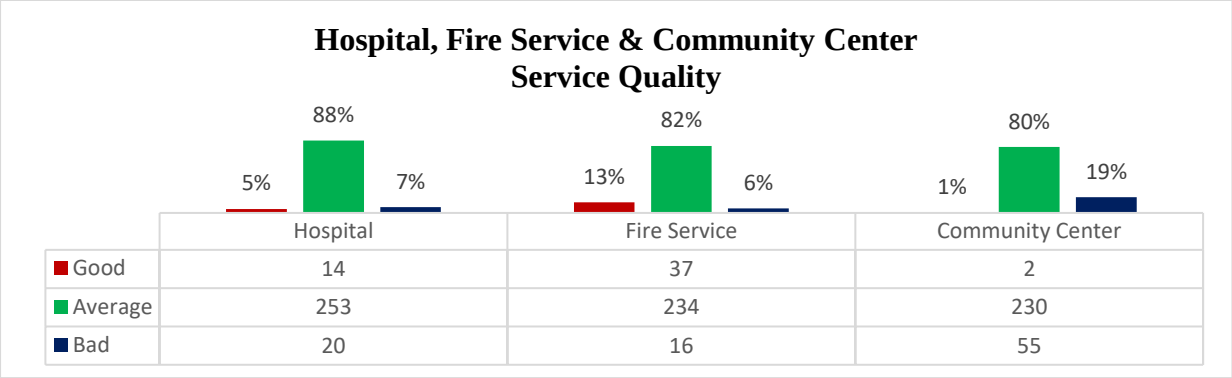


Figure 8-65 Hospital, Fire Service & Community Center Service Quality

8.2.10.10 Location of Recreational Place

Recreation location is such a place where people spend time for refreshment, who are going to place for recreation 85% of the choose the naturally beautiful place in the study area, 5% of them prefer playground and 10% choose shopping mall for recreation.

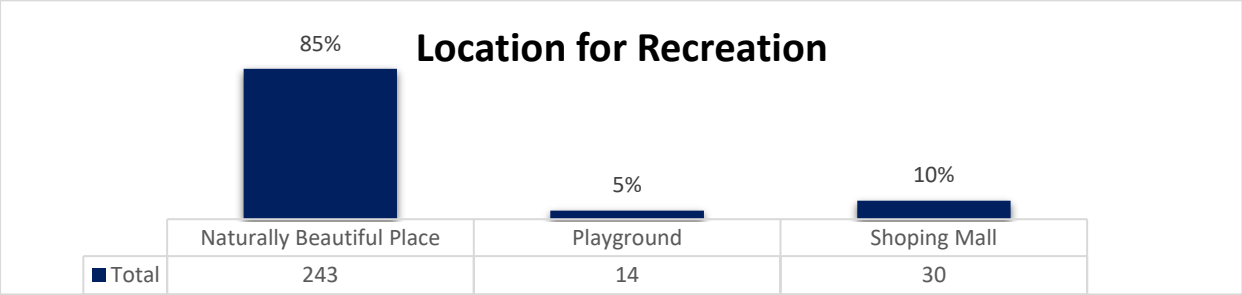


Figure 8-66 Location for Recreation

8.2.10.11 Passing Leisure Time

Leisure time is when you are not working and you can do things that relax and enjoy. In Gallachipa and Rangabali Upazilas, most people spend their leisure time in going to relative's house, which is the highest. 55% and the lowest reading book is 2%.

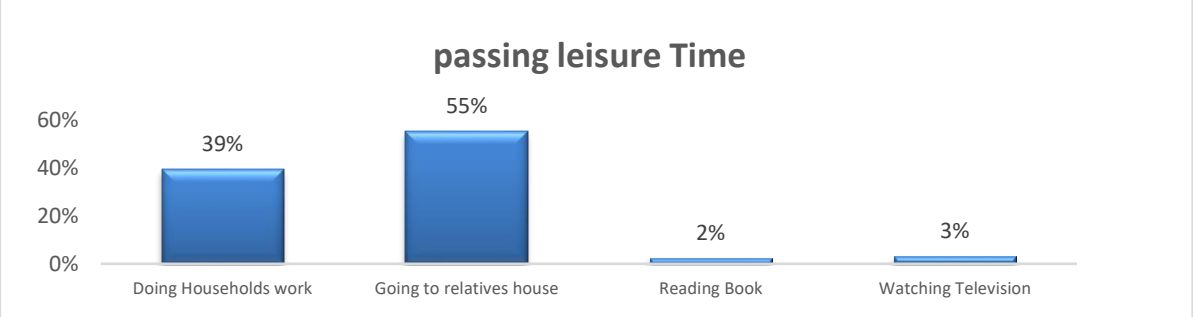


Figure 8-67 passing leisure Time

8.2.10.12 Recreation Type

The type recreation is a very big factor in socio-economic condition. In below table and Figure show that most of the respondent in Rangabali and Rangabali Upazila say that the Highest Irregular type recreation in this area are 99% and lowest is 1%.

Table 8-18 Recreation Type

Categories	Frequency	Percent
Irregular	285	99%
Regular	2	1%
Grand Total	287	100%

8.2.10.13 Distance of Recreational place

In the study shows that 55% of the recreation location situated within the 500 meters from house, 14% within 1,000 meter and maximum distance more than 2,500 meters belongs to 11% recreation facilities in this area.

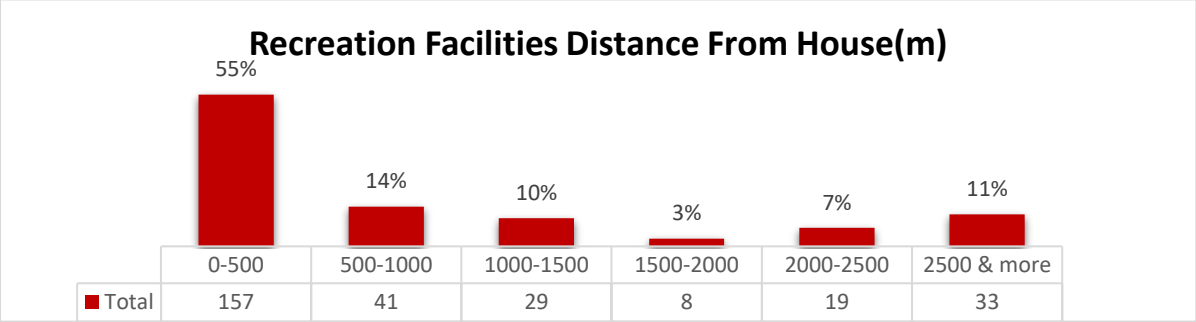


Figure 8-68 Recreation Facilities Distance from House

8.2.10.14 First Problem of this area

Several of problem identified by the residents of the area ,among all the problem 48% of the respondents think that load shedding is the main problem in this area, 22% of the residents think that water road & transport problem is the first problem and almost 6% residents given their opinion in the favor of water logging is their first problem in the Rangabali upazila.

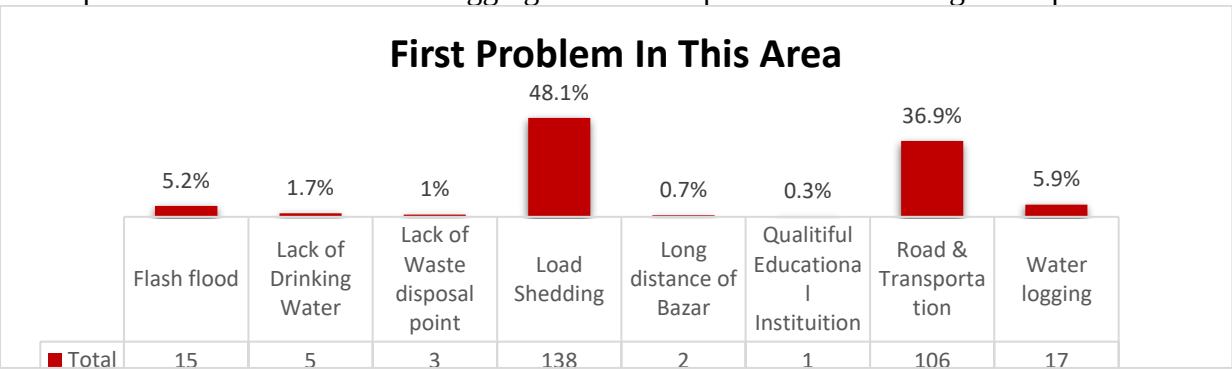
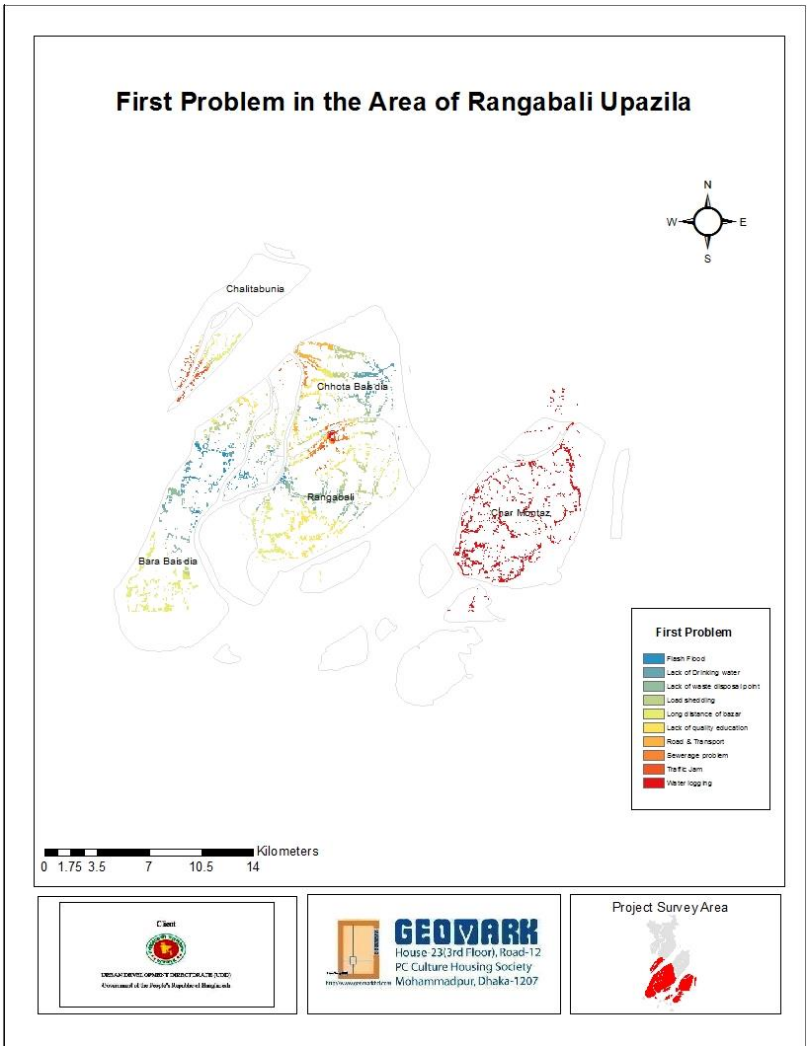


Figure 8-69 First Problem in This Area

In the southern part of the upazila, mainly the respondents of Char Momtaz express that their first problem is the water logging. On the other hand, in the northern part of the upazila, where Chaliabunia union experiencing mixed of problems like water logging as well as traffic jam, the traffic jam along with road & transport and sewerage problem also experiencing in Rangabali, Chhota Baisdia. Map is shown below.



Map 8-12 First Problem in This Area

8.2.11 Sanitation and Hygiene

8.2.11.1 Type of Sanitation

Maximum sanitation type in the area is Tin shed, tin shed sanitation type belongs to the 72% of the total sanitation in the area, 16% of the sanitation is Katcha and only 5% of the sanitation found as a Pucca in the Rangabali upazila study area.

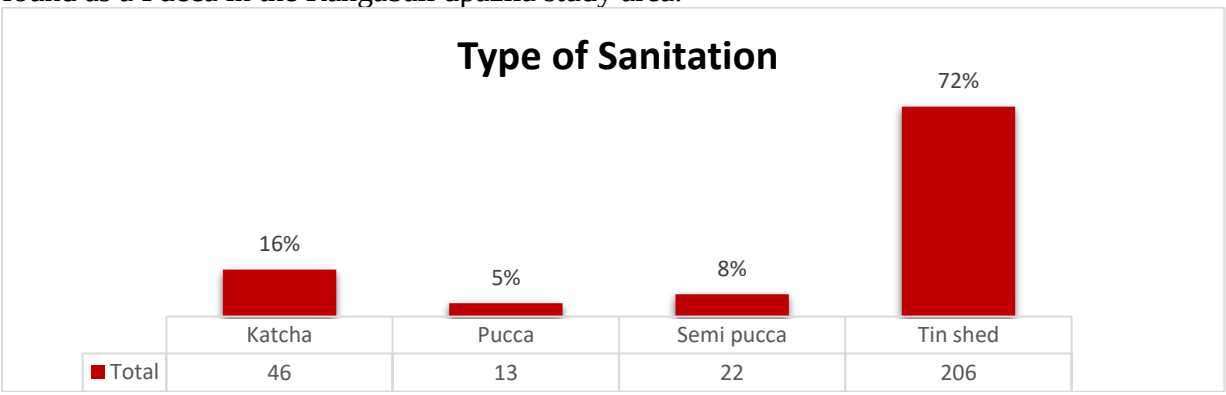


Figure 8-70 Type of Sanitation

8.2.11.2 Hygienic sanitation

Figure 8-71 Hygienic sanitation

Categories	Frequency	Percent
Yes	137	48%
No	150	52%
Grand Total	**287**	**100%**

8.2.12 Land use Change and Other Problems

8.2.12.1 Land use Change

In any type of development plan, one of the most important things to consider is land use change. Rangabali is the southern coastal Upazila of Bangladesh. Agriculture was considered the main occupation in the region, but the sector is suffering the most due to climate change. People are trying to find alternative ways of living. In recent times, the main profession has been considered as fishing and marketing. Most people are directly and indirectly involved in fishing, drying and selling.

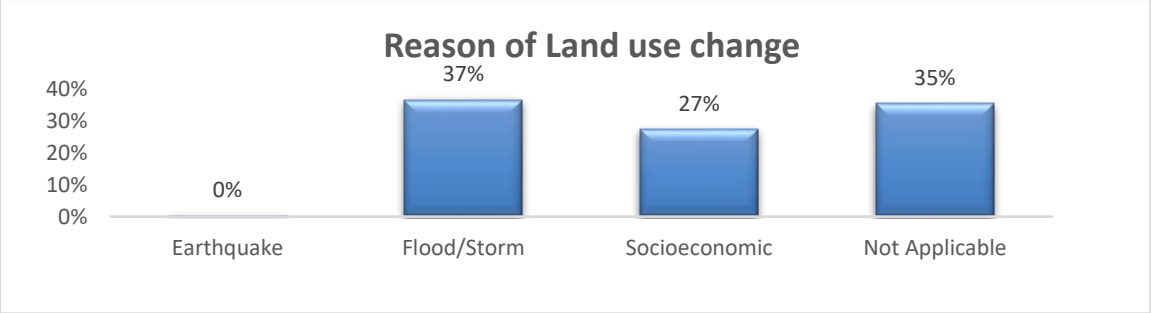


Figure 8-72 Reason of Land use change

8.2.12.2 The Area of Land You Want to Give (sq. ft.)

This is an important issue for the development sector. Therefore, we have collected such data. A large part of the land in the Rangabali Upazila is a Khas (state-owned) property that is part of the newly formed delta. Most of the people migrate from other Upazilas. Since the property is government-owned, they have no choice but to agree to give the land. The following chart shows the amount of land they want to give. In the Rangabali upazila 73% of the respondents express that they want to give land for widening the land, 19% of them want to give maximum 50 sq.ft from their property, 25% of them are willing to give maximum 100 sq.ft land for the purpose of the widening the road.

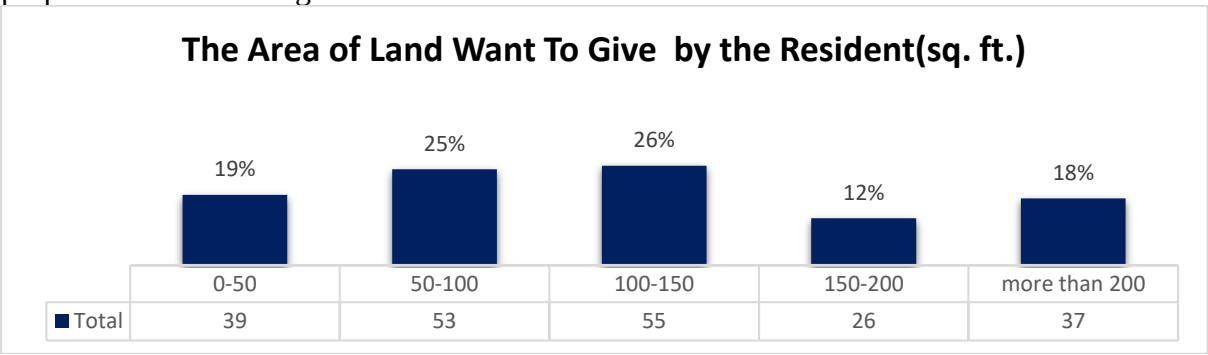


Figure 8-73 The Area of Land willing to Give

8.2.12.3 Widening of Road

86% of the road to Rangabali are Upazila widening. Only 14% of the roads are narrow. We found that the road is widening but needs to make pucca all the road. Cycloneand tidal search come to this area every year and the road frequently needs repair every year.

Widening of Road	Frequency	Percentage
Yes	703	86
No	115	14

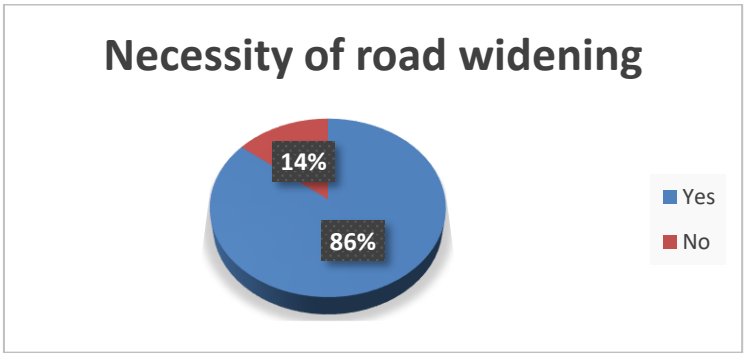


Figure 8-74 Necessity of road widening

8.2.13 Educational Condition

8.2.13.1 School Going Children

66% of children go to school in Rangabali Upazila other 34% are not going to school. Our government has already given a different incentive package for our school going children. If our local government is aware of this issue then they can solve the problem.

Table 8-19 School Going Children

Categories	Frequency	Percent
Yes	190	66%
No	97	34%
Grand Total	**287**	**100%**

8.2.13.2 Cause of School Dropping

There is different reason behind the status of not going to the school, 88% children not going to the school because the parents think that children are under aged for going to school, 6% children do that because of the poverty and also 6% children do so because their parents are not willingness to send them to school.

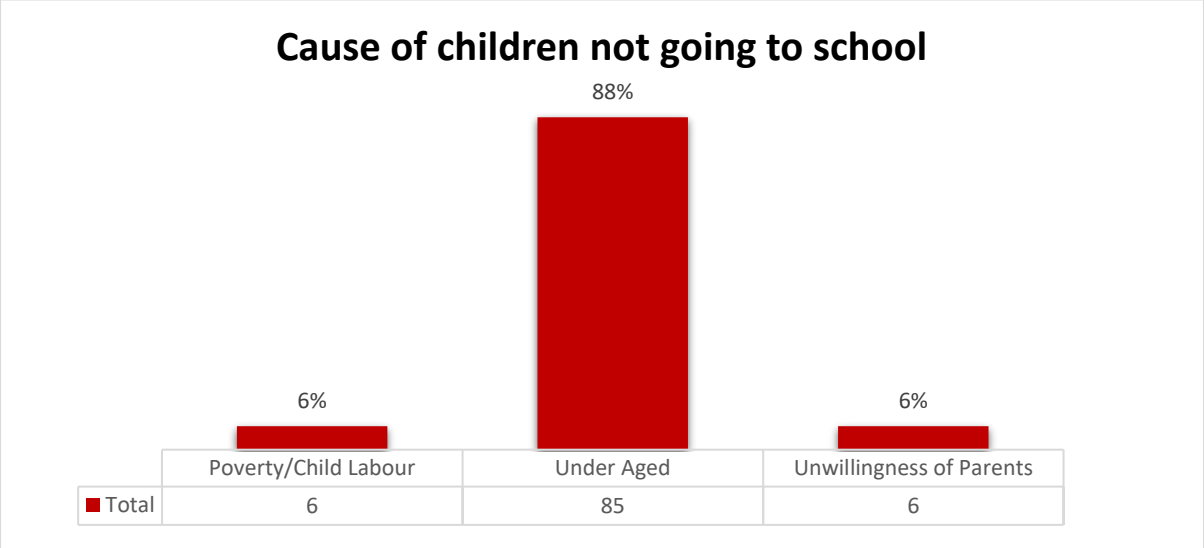


Figure 8-75 Cause of children not going to school

8.3 SWAT Analysis of Rangabali Upazila based on socio-economic survey findings

Strengths	**Weakness**
✓ From the topographic profile of Rangabali Upazila it is understood that the Upazila being a coastal area, it is Surrounded with rivers and cannels and a good number of Ponds which provides a natural water collection setup in this Upazila. ✓ Availability of natural water flow strengthens the agricultural production of the Upazila. ✓ Proximity to the Bay of Bangal. ✓ Available electricity supply in the urban area. ✓ The Fishing and agricultural economic base of this area opens the face of a mixed fishing and agro-based economic development of this Upazila. ✓ A good number of islands with fertile land, forest and advantage point on fishing and sea fish processing. ✓ Peoples Indigenous experience on fighting natural disaster. ✓ Population density in rural area is not that high in comparison to urban area. ✓ Galachipa Paurashava is a relatively new urban area and most of the residents are migrated from nearby districts in search of living.	✓ Majority of the houses were built without any approved plan in urban area. ✓ Majority of the houses in rural area and islands are temporary, especially in islands where people go for fishing. ✓ Lack of the formal drainage system and safe septic tank in urban area. ✓ In rural area, no formal drainage system exists. These areas are fully dependent on natural drainage system like cannels and rivers. ✓ Embankment height is not sufficient as per requirement ✓ Pure drinking Water collection problem for the people of some union. Distance from pure water source and salinity were identified as the main reason. ✓ The inadequacy of the transport network, especially in rural area and trade route. And islands are separated by Bay of Bengal. due to heavy current, transporting goods from islands is not an easy task. ✓ Poor infrastructural facilities for waste disposal. ✓ Water logging during the rainy season and high tide of sea causes temporal flood in islands. ✓ Lack of drinking water, transport mode, good educational institution ✓ Highly prone to natural disaster like Cyclone, Storm Surge, Flood etc. ✓ Lack of adequate Cyclone shelter.
Opportunities	**Threats**
✓ Availability of rain water collection facility. ✓ Significant number of Solar electric panel installed.	✓ The frequent occurrence of a climatic disaster like Cyclone which can change the socio-economic and natural setting of this area.

✓ Sufficient greenery to support environmental sustainability. ✓ Sufficient space available for future development. ✓ Lands are very much fertile. ✓ In Rangabali, a significant amount of Khash land (Government owned Land) available which can be used for road widening and other development purpose. ✓ Improving road network connectivity within and outside the Upazila. ✓ Improvement is necessary in water transport as well to ensure proper trade route with islands. ✓ Prioritizing sewerage and sanitation system which would improve the living environmental quality of this Upazila. ✓ Fishing and Agro-based economic development can improve the life of rural people.	✓ Frequent Flood and water logging can disrupt the agricultural production. ✓ Salinity can reduce lands fertility. ✓ Climate change effect especially temperature rising can degrade the living environmental quality of Rangabali Upazila. ✓ Encroachment of canals or other water bodies for purpose of development can disrupt the natural drainage system in the urban and rural area.

8.4 Planning Recommendation for Rangabali Upazila based on socio-economic survey findings

- ✓ Improving water transportation with islands.
- ✓ Recover of encroached cannel and rivers is necessary to ensure proper flow of natural drainage and also to ensure the availability of sufficient natural water collection for agriculture.
- ✓ Rain water harvesting is already popular in the area, so, improving the facility can enhance efficiency.
- ✓ A significant number of Solar electric panel is already installed in the region. Future development can reduce dependency on national electric grid and the Upazila will be self-sufficient on electricity.
- ✓ Improving road network connectivity within and outside the Upazila can enhance trade efficiency.
- ✓ Prioritizing sewerage and sanitation system would improve the living environmental quality of this Upazila.
- ✓ Facilitating Agro-based economic development can improve the life of rural people.
- ✓ Promoting Sustainable development.
- ✓ Imposing planning regulations and design approval for new constructions as well as monitoring existing unplanned developments.
- ✓ Improving the living of Fishermen community.
- ✓ Developing tourist spots in islands. Sonar Char can be an ideal place.
- ✓ Improving education, healthcare facility, and early warning system.

Chapter 9 Others Survey

9.1 Educational survey

9.1.1 Availability of hostel

According to educational institution survey we found that almost 87% of the educational institution of Galachipa and Rangabali Upazila doesn't have any hostel facility.

Figure 9-1 Availability of Hostel

9.1.2 Availability of Intuitional transport facility

According to educational institution survey we found that almost 95% of the educational institution of Galachipa and Rangabali Upazila doesn't have any Intuitional transport facility.

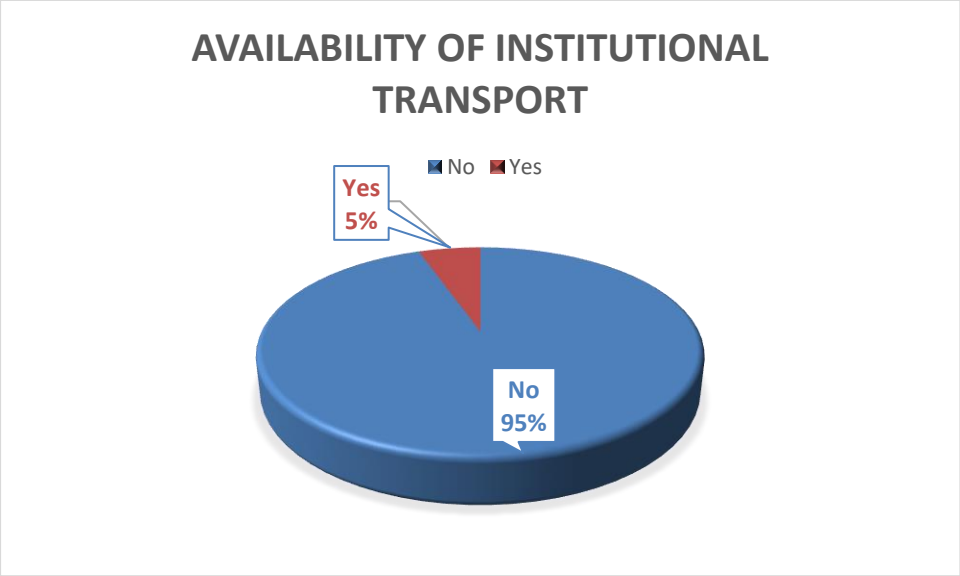


Figure 9-2 Availability of Intuitional transport facility

9.2 Health facility

From our health facility survey, we found that health facility in both Galachipa and Rangabali Upazila is not good enough. Number of doctors and their working hours was not sufficient in proportion to available patients. A summery table has been given below.

Table 9-1Health Facility Scenereo

Location of Health Facilities Center	No. of Patient	No. of Doctor (Permanent)	No. of Nurse (Permanent)	No. of Doctor (Consultant)	Doctor Working Hour
Dakua	0	2	0	0	6
Sobuj Bag, Girls School Road	8	2	1		9
Mazgram	20	0	1	0	3
Char Montaz Sulij Bazar	2	1	0	1	8
Chor Chandrain	100	1	0	0	10
Char Montaz Sulij Bazar	20	1	0	0	10
Pankhali	10	0	10	0	8
Maddo Horedevpur	0	2	0	0	8
Moddho Dakua	22	1	0	1	3
Fulkhali 3 No Ward Dakua	0	2	0	0	6
Char Bestin Bazar		1	0	0	8
Boro Char Kajal 2 No word	2	1	0	0	6
Char Kopal Vera	0	1	1	1	6
Wopada Road Samulibag		1	0	0	12
Golachipa Upozila Helth Complex	77	8	25	1	8
Uttar Char Biswas	No	1	3	0	6
Chiknikandi Bazar	1	1	0	1	6
Ulania Bazar	1	1	0	0	6
Char Agasti	00	1	0	0	6

9.3 SWAT Analysis based on Others survey findings

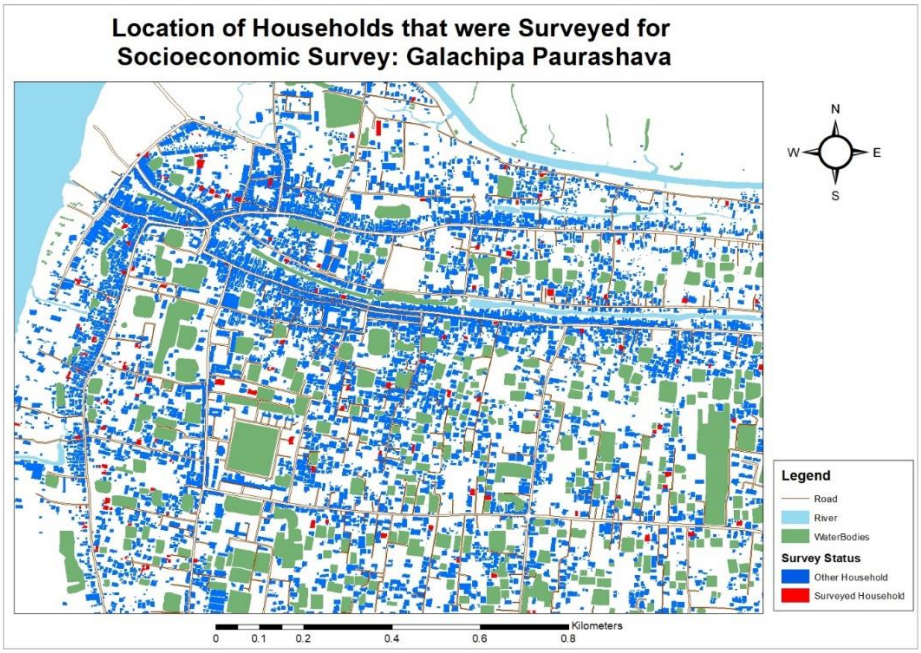
Opportunities and Strengths	Threats and Weakness
✓ People are willing to take education. ✓ Enabled people have the tendency to spend on child education. ✓ Some govt. hospitals are available in urban areas. ✓ Available space for construction of new medical and educational facility. ✓ People has indigenous knowledge to fight natural disasters. ✓ Except Agriculture and Fishing, there are some light manufacturing and processing industries to support the regional economy.	✓ Availability educational facility was not adequate for the people of the project area. ✓ In rural areas people are mostly dependent on unskilled village doctors. ✓ Hospitals are not well equipped with emergency medical accessories. ✓ In islands, health care is hardly available. ✓ Distance from available educational institutions and hospitals makes it more difficult to avail them.

9.4 Planning Recommendation based on Others survey findings

- ✓ Promoting child education.
- ✓ Improving medical facility and build hospital in remote areas.
- ✓ Reduce dependency on unskilled village doctors.
- ✓ Establishing agro-based processing industries to strengthen the back bone of the economy.
- ✓ Establishing medical facility in islands.

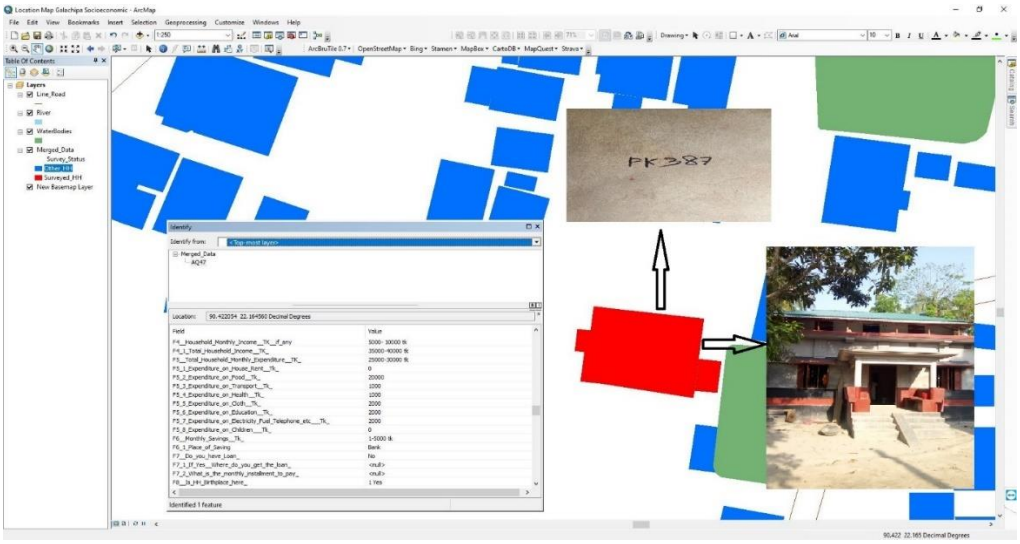
Chapter 10 Linkage with Physical Feature Survey Data

While collecting the Socioeconomic data, the same Grid ID and Structure ID has been assigned to Identify in which structure the socioeconomic data belongs to. Later using the Grid ID and Structure ID in their attribute, a unique ID has been created to link the Socioeconomic database with their physical feature counterpart. And using that unique ID we managed to link both the database. Map 8-1 is showing the Red marked structures from which socioeconomic data were collected.



Map 10-1 Location of Households that were surveyed for Socioeconomic data

Both the physical feature and socioeconomic attributes were embedded within the physical feature shapefile. Socioeconomic survey has been completed but as because, Physical feature survey work is still ongoing, all physical feature data haven't been collected yet. Once physical feature survey completed, the entire physical feature database linked with socioeconomic data will be provided. For the time being, a sample has been provided in map 8-2.



Map 10-2 Socio economic data within Physical feature shapefile's attribute

Chapter 11 Disaster Resilience

11.1 Recent disaster case study (CycloneAmphan)

Galachipa and Rangabali upazila of Patuakhali District is highly prone to natural disasters. Cyclone, Storm Surge and flood are very common scenario here. Super Cyclonic Storm Amphan was a powerful and deadly tropical Cyclonethat caused widespread damage in the project area Galachipa and Rangabali Upazila in 20 May, 2020. Four deaths were reported from Patuakhali, Pirojpur and Bhola districts after Cyclone'Amphan' battered the coastal region with wind speed of 160-180 kph. The maximum sustained wind speed within 74 kms of the Cyclonecentre was about 160 kph rising to 180 kph in gusts/squalls. Meanwhile, the Metrological Office said low-lying areas of the coastal districts of the coastal areas were inundated by storm surge of 10-15 feet height above the normal astronomical tide (Prothom Alo, 20 May 2020).

For highly disaster-prone areas like Galachipa and Rangabali Upazila, it is mandatory to incorporate disaster resilience and mitigation strategy in planning documentation. In this report, disaster resilience capacity has been mapped for all regions of the project area showing the level of resilience.

Some photos of "CycloneAmphan damage" taken by Geomark Field Team are shown below;

Figure 11-1 Damages from CycloneAmphan

11.2 Multi-criteria analysis of Infrastructural and Economic strength towards Disaster resilience

Both Galachipa and Rangabali Upazila are in coastal region and proximity to the Bay of Bengal makes them extremely vulnerable to Natural Disaster like Cyclone, Storm surge, Flood etc. these Upazilas have a number of islands and some of them are located in remote locations of Bay of Bengal. Due to strong sea current, it is hard to reach those remote islands. However, these islands are highly economically potential due to deep sea resources, fishing and tourism. Majority of the Peoples from islands of Rangabali Upazila are basically seasonal migrants who are migrated from nearby districts in search of livelihood. Their main occupation is deep sea fishing. These peoples are the primary victims of natural disasters like Cyclone, Storm surge, Flood etc. because they are directly exposed to harsh tropical climate without any protection. But in urban areas, the situation is relatively better due to availability of emergency services, developed infrastructures and better economic conditions. This study intends to identify the regions with greater disaster resilience and also regions with less resilience so that, these knowledges can be helpful for disaster resilience plan making for the area. Multi-criteria analysis technique has been incorporated to perform the task.

Physical infrastructures like road, Cycloneshelter, local administration setup like union headquarters, Hospital and health centers, growth centers like Hat-Bazars are crucial for minimizing and mitigating the overall damage caused by natural disasters. In time of emergency, if there is not enough shelter available, buildings of School. College and other educational institutions can also be used as shelter. Roads play crucial role in transporting necessary supplies, evacuate vulnerable population, to run rescue operations and aid distribution. Union headquarters are the root level government setup which ensures government intervention and control over critical situation. Adequate number of hospitals and healthcare facilities are required for tackling medical emergencies. And growth centers play important role to maintain the local and regional economy, trade and commerce of the particular area. disaster control and mitigation are mostly dependent of the regional economy. So, regional people's monthly income and savings pattern is also an important variable in context of disaster resilience.

As infrastructural strength and economic condition have critical influence in disaster resilience, multi-criteria analysis has been done in two steps. First, physical infrastructure strength has been calculated by evaluating multiple criteria on different existing infrastructural setup. Then, by incorporating economic aspects to the model, Disaster resilience capacity of different regions have been calculated. For both the cases, ground condition has been marked as excellent, good, moderate, bad and worse category. The model is shown in the following figure; These criteria have been used for evaluating infrastructural strength,

- ✓ Distance from road.
- ✓ Distance from hospital.
- ✓ Distance from Cycloneshelter.
- ✓ Distance from Union headquarter.
- ✓ Distance from nearby growth center.
- ✓ Distance from school, college and other educational institutions.
- ✓ Distance from other facility like food storages.

Two additional criteria have been used in the model to integrate economic aspects to the model to evaluate disaster resilience. Those are.

- ✓ Monthly family income
- ✓ Monthly savings.

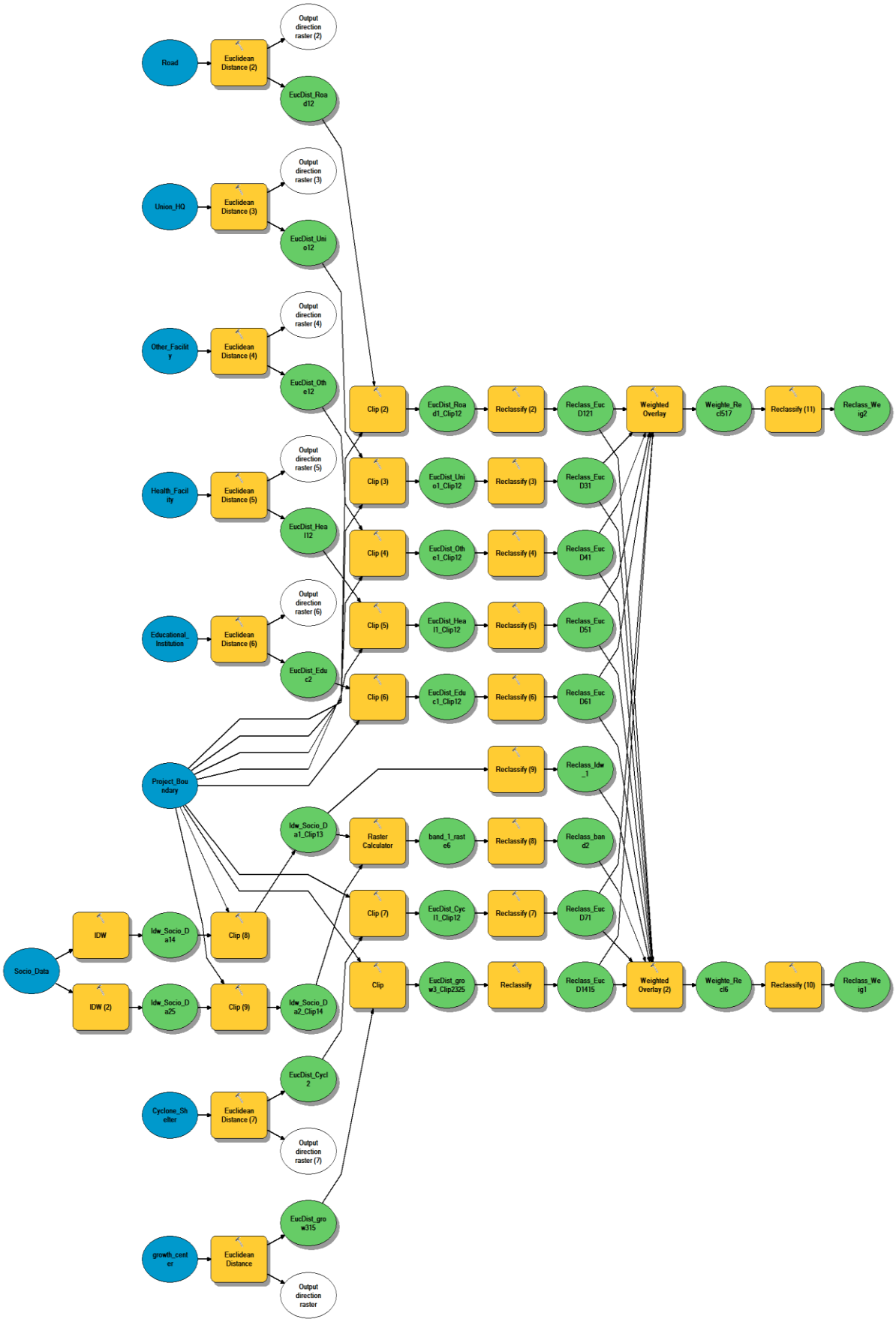
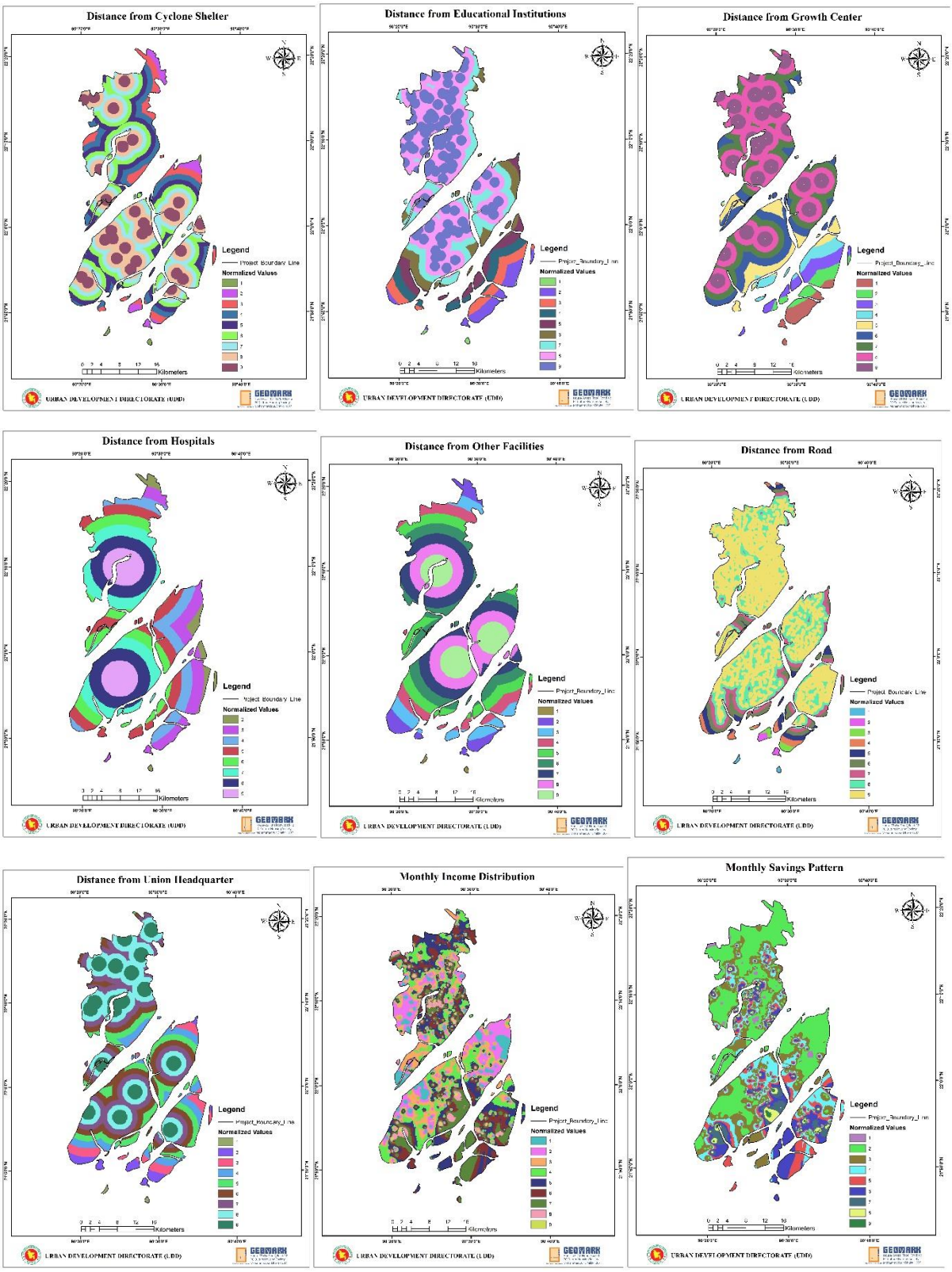


Figure 11-2 Model work flow

The criteria Maps were as follows;



Map 11-1 Criteria Maps

11.3 Infrastructural strength

From multi-criteria analysis of Infrastructural strength showed that being the urban area, Galachia Paurashava and Rangabali town have the best infrastructural setup than the rural areas. In time of disaster, resource mobilization and people's evacuation will be faster in these urban areas. So, disaster mitigation is lot easier in these urban areas of the project area. Galachipa, Amkhola, Dakua, Golkhali, and Chiknikandi union of Galachipa Upazila and Rangabali, Bara Baisdia, chhoto Baisdia, and part of Char Kajal union of Rangabali Upazila have relatively good infrastructural capacity to fight any disaster at some extend but still they are not even close to enough. Bakulbaria, and Chaltibunia union of Galachipa Upazila are badly vulnerable due to low infrastructural development. The worse scenario can be seen in the lower portion of Bara Baisdia, Char Montaz, Sonar Char and other small islands of Rangabali Upazila. Any kind of infrastructural development can hardly be seen in those areas except some Cycloneshelter. Detail is shown in map 11.4.

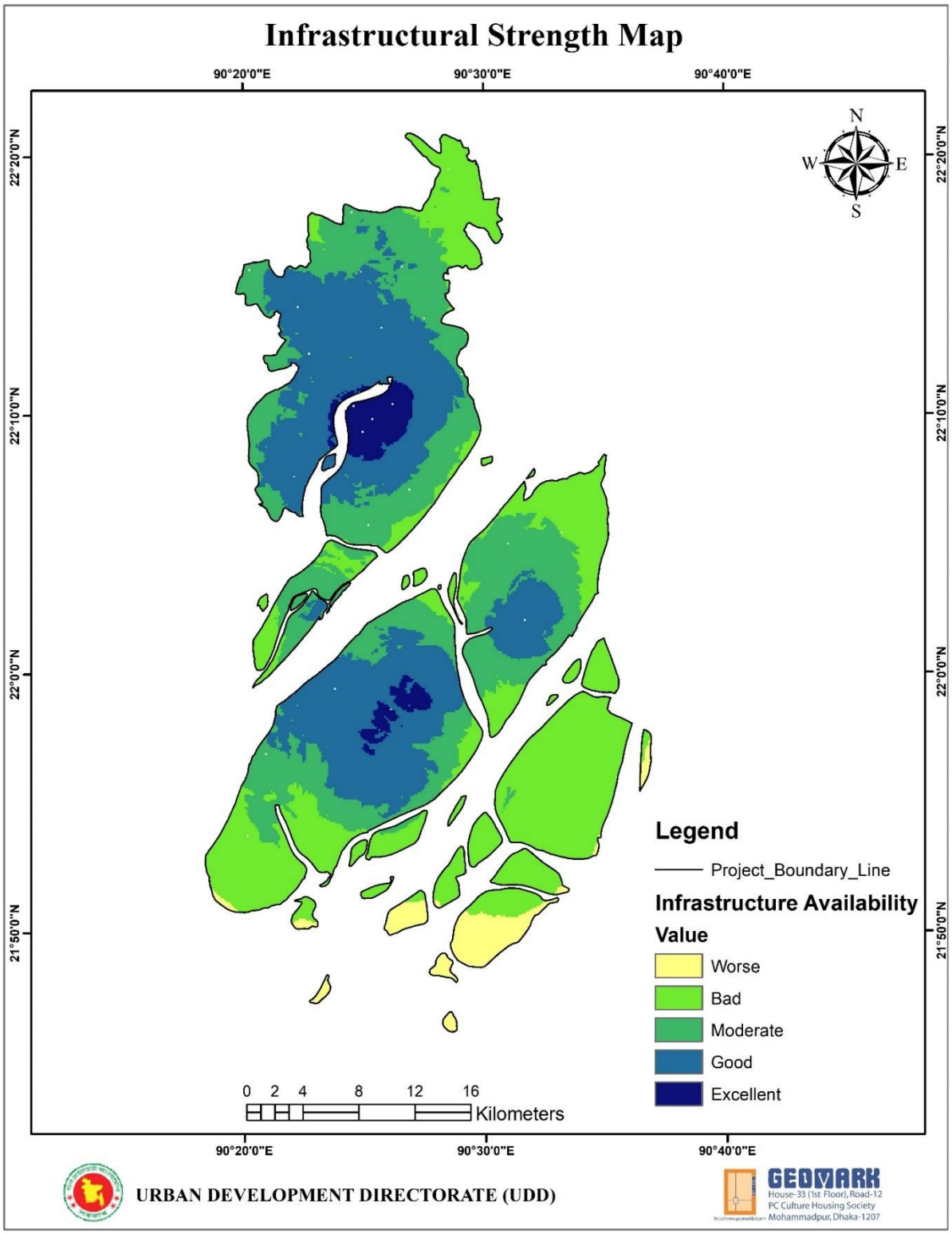
The following table shows the assigned weight of different variables;

Table 11-1Weightage Table

Variable	Influence (%)	Normalized Field Value	weighted Value
Distance from Road	16	1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9
Distance from Union Headquarters	14	1	1
		2	2
		3	3
		4	4
		5	5
		6	6

		7	7
		8	8
		9	9
Distance from Union Hospital	14	1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9
Distance from Educational Institutions	14	1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9
Distance from CycloneShelters	14	1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9

Distance from Growth Centers	14	1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9
Distance from other Facilities	14	1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9



Map 11-2 Infrastructural Strength

11.4 Disaster resilience capacity zoning

Economy plays the most vital role for the sustainability of any region. Being resilience to disaster means to become economically sustainable to support quick recovery after disaster event and infrastructurally strong to ensure proper mobility and emergency facility support. From multi-criteria analysis of Disaster resilience capacity zoning showed that Galachia Paurashava and Rangabali town have the best economic and infrastructural setup than the rural areas. Better communication facility and job opportunity makes the economy of those two urban areas stronger than other surrounding rural regions. Rural areas are mostly dependent on these two urban areas for trade and commerce. Peoples income is also higher in the urban areas of Galachipa and Rangabali Upazila, therefore, they also have the maximum amount of savings in the region. So, with the help of strong economy and excellent infrastructural setup, urban areas of Galachipa and Rangabali Upazila have relatively good resilience against potential disasters. Galachipa, Amkhola, Dakua, Golkhali, and Chiknikandi union of Galachipa Upazila and Rangabali, Bara Baisdia, chhoto Baisdia, and part of Char Kajal union of Rangabali Upazila have relatively good economic endurance and infrastructural capacity to fight potential disasters at some extend but still they are not even close to enough. In these unions, economy is basically Agriculture based. So, damage of agricultural products due to disaster events affects the economy of these regions significantly. So, people living in these unions earn less than that of urban areas and they don't have much savings as well. Poor infrastructural setup and weak economy make peoples living in these areas more vulnerable and less resilience than peoples from urban areas to potential disasters. Bakulbaria, and Chaltibunia union of Galachipa Upazila are badly vulnerable due to their remote location from urban area, low infrastructural development and significantly low economic base. So, these areas have been categorized in bad resilience category. The worse scenario can be seen in the lower portion of Bara Baisdia, Char Montaz, Sonar Char and other small islands of Rangabali Upazila. Any kind of infrastructural development can hardly be seen in those areas except some Cycloneshelter. The economy is basically based on deep sea fishing and most of the people are seasonal migrants and highly exposed to natural forces like cyclone, storm surge etc. so, these unions and islands have been categorized as worse resilient. Detail is shown in map 11.3.

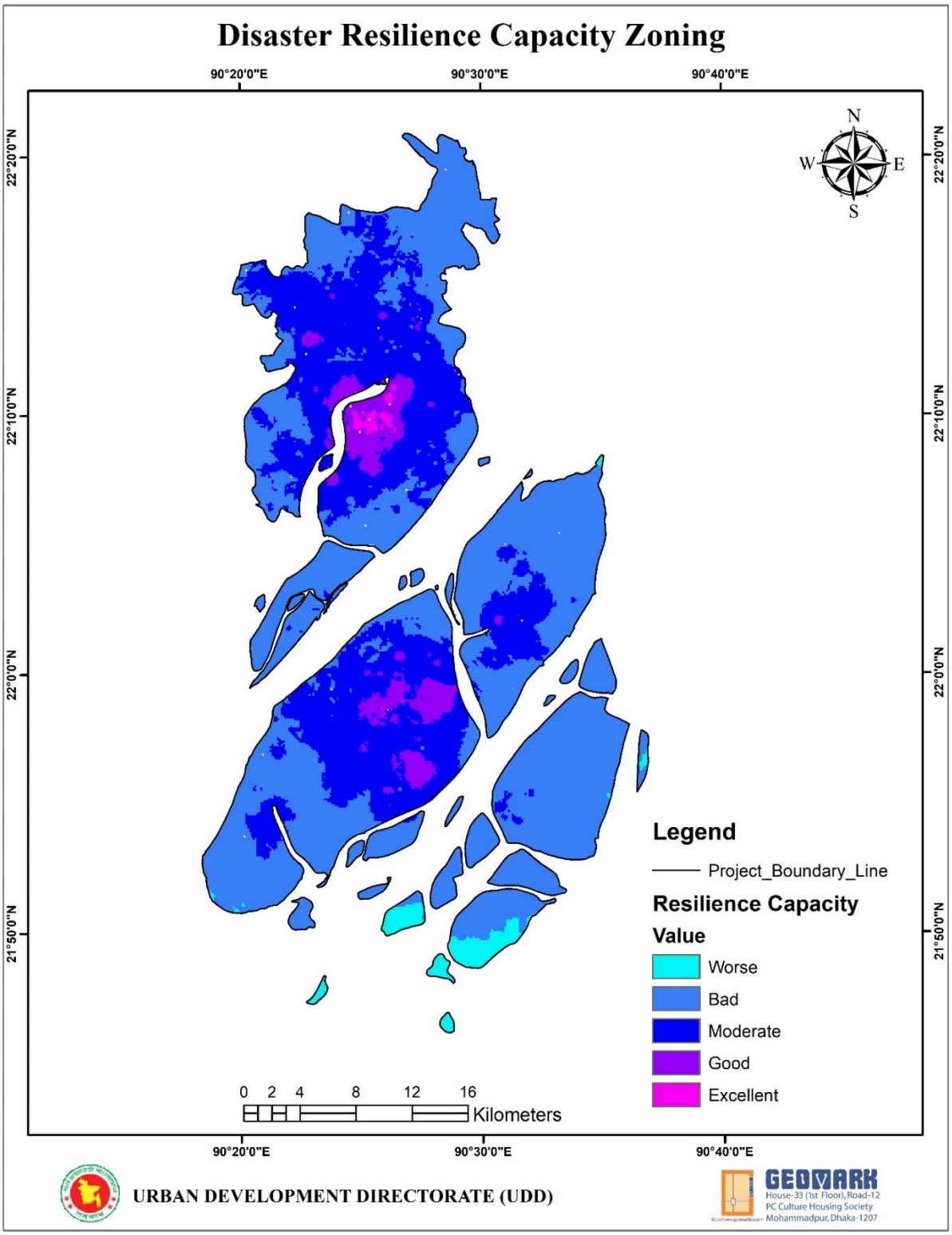
The following table shows the assigned weight of different variables;

Table 11-2 ***Weightage Table***

Variable	Influence (%)	Normalized Field Value	weighted Value
Monthly Income	11	1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9
Monthly Savings	11	1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9
Distance from Road	11	1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9

Distance from Union Headquerters	11	1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9
Distance from Union Hospital	11	1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9
Distance from Educational Institutions	11	1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9
Distance from CycloneShelters	11	1	1
		2	2

		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9
Distance from Growth Centers	12	1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9
Distance from other Facilities	11	1	1
		2	2
		3	3
		4	4
		5	5
		6	6
		7	7
		8	8
		9	9



Map 11-3 Disaster Resilence Capacity Map

Chapter 12 Recommendations for regional plan and sub regional structure plan with social justice and equity

12.1 Introduction

The success of development plan of any level depends on the synchronization among different tires of planning and policy making for both the case of top down or bottom up approaches. The main goals of regional plan and sub regional structure plan is to strengthen regional economy by focusing more on potential economic zones as well as putting emphasis on economically deprived regions to integrate them on production chain. Thus, regional plan and sub regional structure plan helps to ensure equity in economic development and enhance overall economic prosperity. Considering the problems and potentials within the region, recommendations have been provided for the regional development plan and sub-regional structure plan. These recommendations comply with the strategic objectives of National Five-Year Plan and also addresses the poverty reduction objectives as set forth in the 6th and 7th five-year plans. The main areas to be focused on regional plan and sub regional structure plan are as follows:

- ✓ To provide Facilitating to enable sustainable economic opportunities for coastal communities
- ✓ Development of social facilities including education, health, water and sanitation
- ✓ Ensuring social equity among communities.
- ✓ Reducing economic disparity among community.
- ✓ Mitigation of natural disasters
- ✓ Developing productive economic activities by promoting the basic economic products which are agriculture and fishing in this region.
- ✓ Management of the coastal environment by enhancing its protection and regeneration
- ✓ Management of the water resources in the region
- ✓ Development infrastructure for rural market, growth center and road transport.

12.2 Recommendations for regional plan considering social justice and equity

- ✓ Promote acceleration of GDP growth, employment generation and rapid poverty reduction
- ✓ Identifying potential tourist spots scattered over different places in this region and modernizing and regenerating existing ones like Sonar Char.
- ✓ Diversification of agricultural crops.
- ✓ Identification of agro-ecological zoning to identify areas suitable for different crops
- ✓ Formulate the policy of road development to ensure regional connectivity.
- ✓ Promoting eco-tourism as alternative income from ecosystem.
- ✓ Develop active flood control plan on the basis of river basin management.
- ✓ Strengthening and ensuring proper management and functioning of the coastal polders/
- ✓ embankments
- ✓ Housing and critical services building like hospital, road networks etc. should be resistant to flood and cyclone.
- ✓ Adopt hazard sensitive land use zoning.

12.3 RECOMMENDATIONS FOR SUB REGIONAL PLAN CONSIDERING SOCIAL JUSTICE

- ✓ Promotion of equitable, environment-friendly, inclusive, and socially sustainable economic growth.
- ✓ Improve institutional capability for training, planning, safety, and environmental control.
- ✓ Improve embankments and polders to prevent salinity intrusion along the coast.
- ✓ Prevent Cannel encroachment.
- ✓ Conserve and sustainably use the oceans, seas, and marine resources for sustainable
- ✓ Development and prevent over fishing.
- ✓ Develop a market economy structure with appropriate government interventions.
- ✓ Develop agro-based product processing and packaging industries.
- ✓ Formulate a proper solid waste management plan.
- ✓ Develop a development strategy to ensure proper expansion of education.
- ✓ Expand and improve farm-to-market rural roads to expand market economy.
- ✓ Restrict conversion of agricultural land for non-agricultural uses such as housing and settlement.
- ✓ Conserve and preserve wetlands and ecosystems.
- ✓ Promote safe and reliable waterway transport for rivers as well as through Bay of Bengal to access remote Char areas.
- ✓ Ensure long-term water and food security, economic growth as well as environmental
- ✓ sustainability through infrastructure development and effective management
- ✓ Establish remote water treatment plant for wastewater.
- ✓ Formulate a proper land use plan
- ✓ Establish Especial Economic Zones to reallocate small and medium heavy polluting industries, from residential/commercial areas.

Chapter 13 Conclusion

In order to formulate a plan, it is required to incorporate each and every aspect that have planning implication. Socioeconomic aspects are considered crucial for the overall sustainability of any type of development plan. Existing economic condition, Social norms, cultural heterogeneity, indignity, demography, religious groups, income and expenditure pattern, savings and affordability, occupational class, recreation, education, health, resilience all these factors are non-negatable to understand the very basic about any area to be planned because without the knowledge of these aspects no one can draw a clear view of the project area and it's dynamics. In this project, unique ID has been assigned for each of the houses from which data sample have been collected. Photo of the painted unique ID has been taken so that they can be easily identified for future reference. This project's work program and time schedule have been developed based on the guidelines of the Terms of Reference (ToR). Modern tools and technologies such as online survey platform have been incorporated to conduct socioeconomic and other surveys to ensure delivery of the data in a comfortable format for data analysis and better visualization.

PART-C
APPENDIX- UNION WISE DATA COLLECTION PICTURE
GALACHIPA & RANGABALI UPAZILA

UNION WISE DATA COLLECTION PICTURE
GALACHIPA UPAZILA

Photo 01: Picture of house in Amkhola Union

Photo 02: Picture of house in Bakulbaria Union

Photo 03: Picture of house in Char Biswas Union

Photo 04: Picture of house in Char Kajal Union

Photo 05: Picture of house in Chiknikandi Union

Photo 06: Picture of house in Dakua Union

UNION WISE DATA COLLECTION PICTURE
GALACHIPA UPAZILA

Photo 07: Picture of house in Galachipa Union

Photo 08: Picture of house in Gazalia Union

Photo 09: Picture of house in Golkhali Union

Photo 10: Picture of house in Kalagachia Union

Photo 11: Picture of house in Panpatti Union

Photo 12: Picture of house in Ratandi Taltoli Union

UNION WISE DATA COLLECTION PICTURE
GALACHIPA UPAZILA

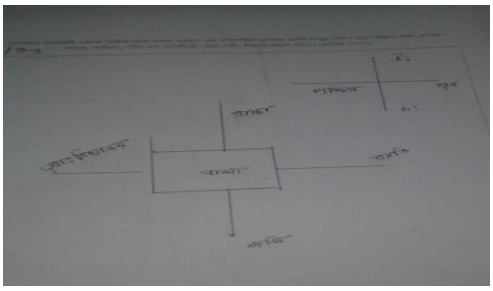
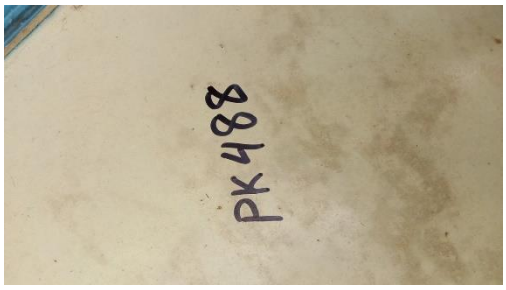



Photo 01: Picture of Mental Map and Unique ID in Chiknikandi Union

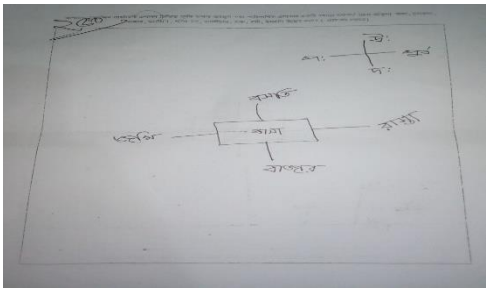
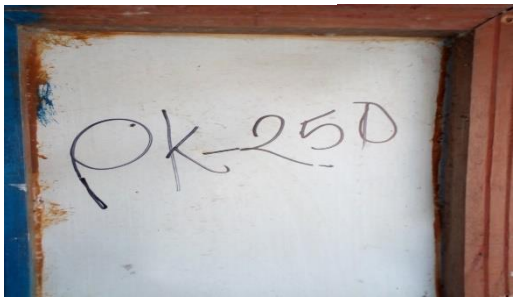



Photo 02: Picture of Mental Map and Unique ID in Bakulbaria Union

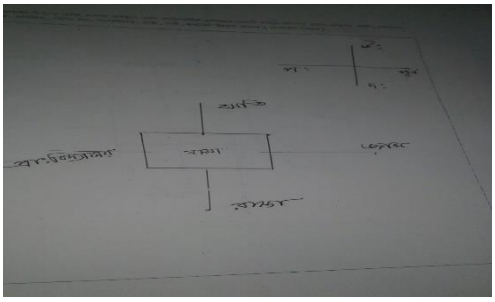
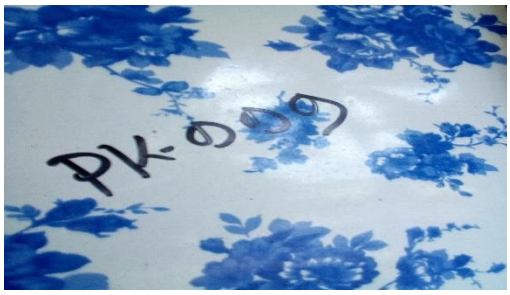



Photo 03: Picture of Mental Map and Unique ID in Char Biswas Union

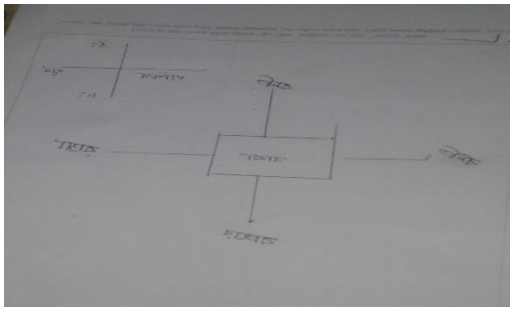



Photo 04: Picture of Mental Map and Unique ID in Char Kajal Union

UNION WISE DATA COLLECTION PICTURE
GALACHIPA UPAZILA

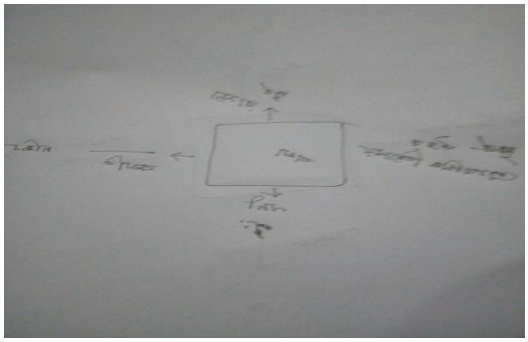
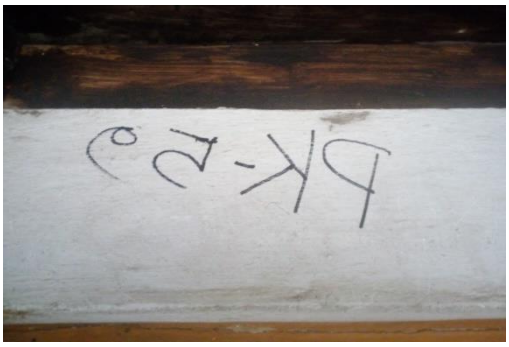



Photo 05: Picture of Mental Map and Unique ID in Chiknikandi Union

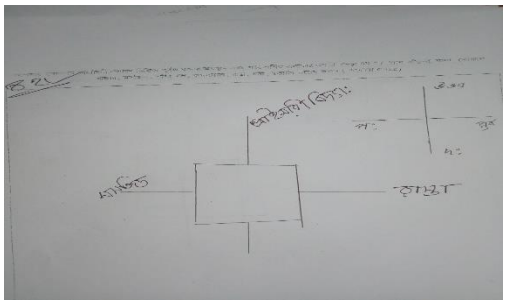
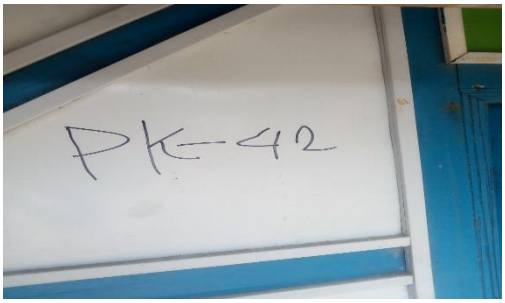



Photo 06: Picture of Mental Map and Unique ID in Dakua Union

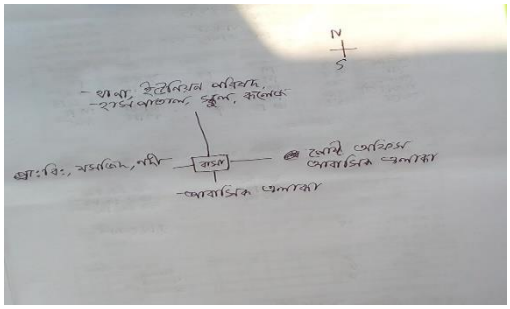
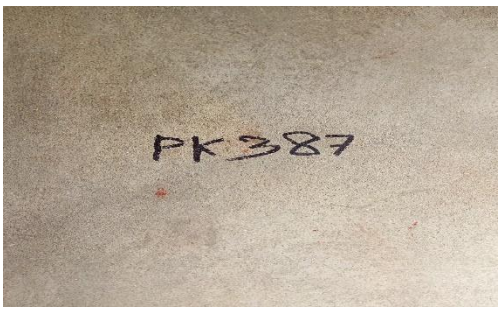



Photo 07: Picture of Mental Map and Unique ID in Galachipa Union

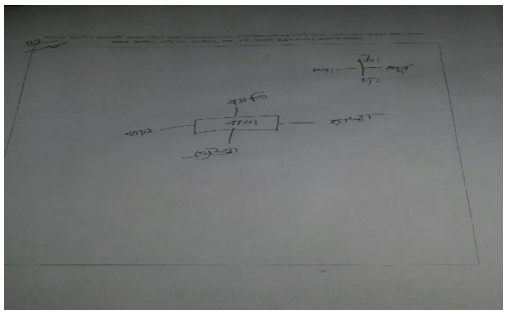



Photo 08: Picture of Mental Map and Unique ID in Gazalia Union

UNION WISE DATA COLLECTION PICTURE
GALACHIPA UPAZILA

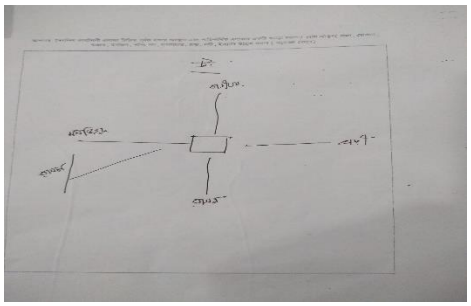



Photo 09: Picture of Mental Map and Unique ID in Golkhali Union

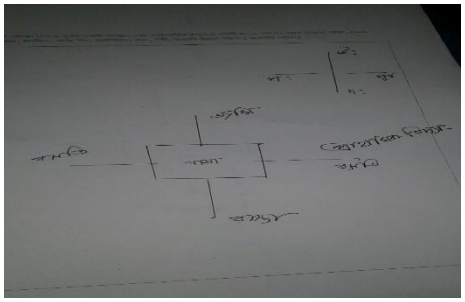
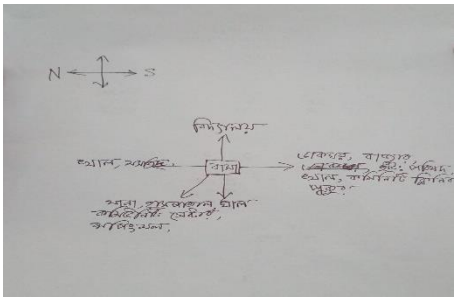



Photo 10: Picture of Mental Map and Unique ID in Kalagachia Union



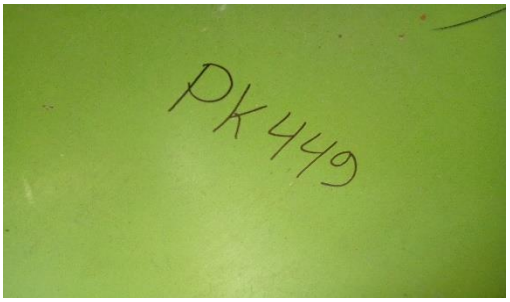


Photo 11: Picture of Mental Map and Unique ID in Panpatti Union

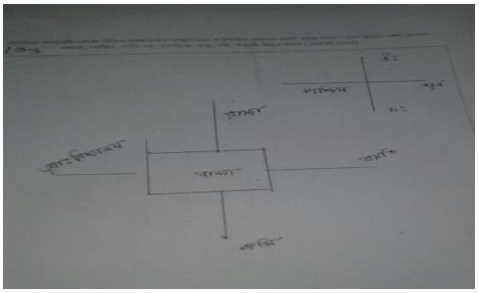
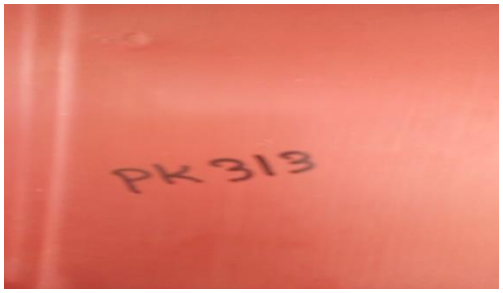



Photo 12: Picture of Mental Map and Unique ID in Ratandi Taltoli Union

UNION WISE DATA COLLECTION PICTURE
RANGABALI UPAZILA

Photo 01: Picture of house in Bara Baisdia Union

Photo 02: Picture of house in Chhoto Baisdia Union

Photo 03: Picture of house in Char Montaz Union

Photo 04: Picture of house in Rangabali Union

Photo 05: Picture of house in Chalitabunia Union

UNION WISE DATA COLLECTION PICTURE
RANGABALI UPAZILA

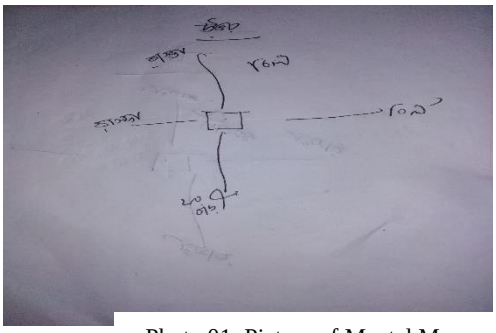



Photo 01: Picture of Mental Map and Unique ID in Bara Baisdia Union

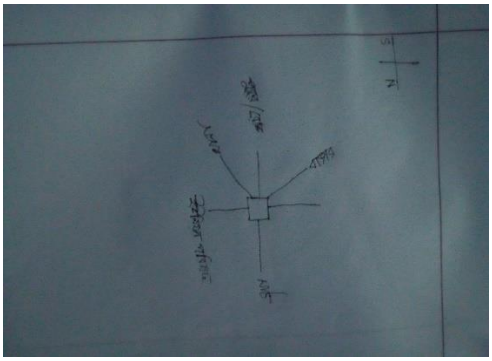



Photo 02: Picture of Mental Map and Unique ID in Chhoto Baisdia Union

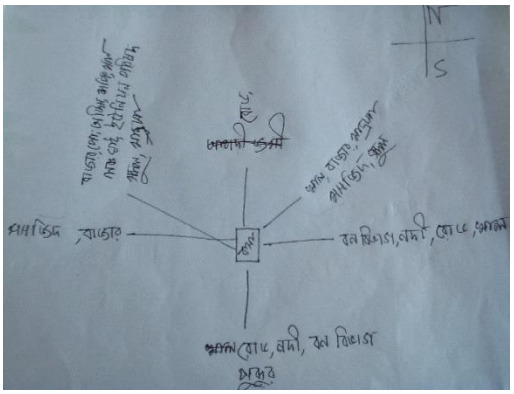
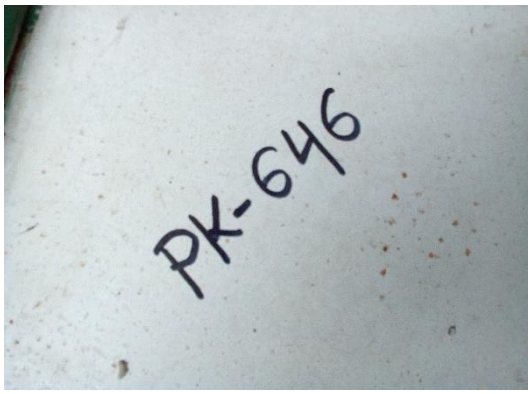



Photo 03: Picture of Mental Map and Unique ID in Char Montaz Union

UNION WISE DATA COLLECTION PICTURE
RANGABALI UPAZILA

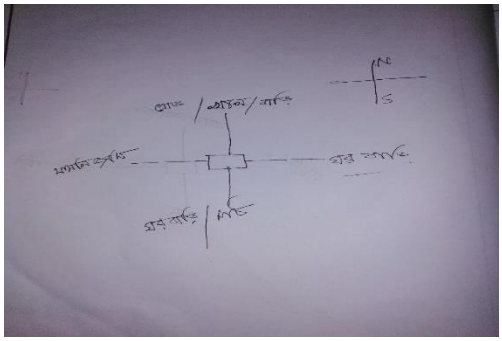



Photo 04: Picture of Mental Map and Unique ID in Rangabali Union

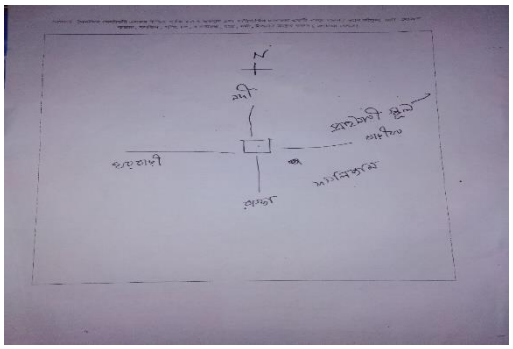
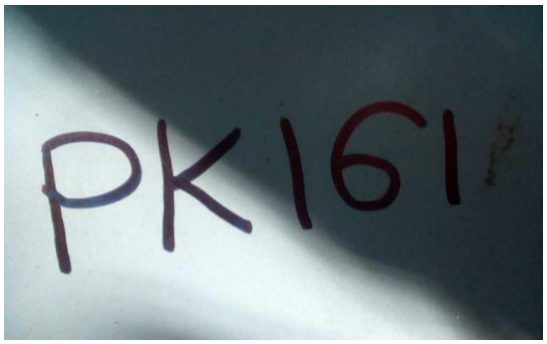



Photo 05: Picture of Mental Map and Unique ID in Chalitabunia Union