



**GRAM PANCHAYAT SPATIAL  
DEVELOPMENT PLAN**

---

**BONGSHAR GAON PANCHAYAT**



**MINISTRY OF PANCHAYATI RAAJ,  
GOVERNMENT OF INDIA**



**PREPARED BY  
INDIAN INSTITUTE OF TECHNOLOGY  
GUWAHATI**

---

**FEBRUARY 2021**



## **EXECUTIVE SUMMARY**

The Panchayats constitute the third tier of government in rural areas. They have been specifically mandated by Article 243G of the Constitution for planning for economic development and social justice within their respective regions. However, in their current setup, the Panchayats neither have the means nor the capacity to undertake such an effort. In order to do any meaningful planning for economic development within their geographical jurisdiction, it is essential for the panchayats to envision and correlate economic development with land use classification, both present and for the future. The land is the most important natural resource, which is indispensable for development activities and for meeting the social, economic, and ecological requirements and aspirations of the people.

Spatial plans are prepared for cities and towns, popularly known as Master Plans and Development Plans, and notified under the respective State Town and Country Planning Acts(T&CP). But there is no provision for preparing Master/ Development Plans for countryside villages, and no serious attempt has been made to prepare Spatial Plans for rural areas for holistic growth and development. Herein lies the importance of preparing a spatially integrated development plan for the rural areas considering the vast rural population of the country who have been deprived of access to basic facilities.

The Spatial Development Plan using the latest Geographical Information System (GIS) technology would be an internal component of the Master Plan to promote growth and guide and regulate present and future development of Rural Areas with a perspective of 20-25 years under the overall supervision of Panchayati Raj Institutions.

Indian states have legislative frameworks in place for spatial-economic planning of urban areas. However, when it comes to rural areas, there is lack of integration of spatial aspects in development plans. In 2016, Ministry of Panchayati Raj came up with the Rural Area Development and Plan Formulation and Implementation (RADPFI) Guidelines. This exercise is to verify its applicability at the ground level. The 73rd amendment to the Constitution of India has paved the way for democratic governance in rural areas. Taking it further ahead the XIV Finance Commission award has created an opportunity for responsive local governance at Gram Panchayat level through Gram Panchayat Development Plan (GPDP), that are to be prepared by the Gram Panchayats incorporating the functions devolved to them as per state Panchayat Acts. Herein lies the importance of preparing a template for a spatially integrated version of the GPDP, namely the GPSDP (Gram Panchayat Spatial Development Plan). However, it has to be noted that GPSDP is not a separate plan but an integrated plan along with GPDP but for a long-term perspective.

The Ministry of Panchayati Raj has assigned the task of preparing a model GPSDP to Indian Institute of Technology Guwahati. The Gram Panchayat chosen for this demonstration project is Bongshar GP situated in Sualkuchi block, Kamrup District, Assam. It is located at a distance of 25 km from the Guwahati city. The geographical area is 9.57 sq. km. Total number of households is 1886 and the present total population of the GP is 12570.

The GPSDP incorporates the spatial layers corresponding to attributes like physical Infrastructure, Social Infrastructure, land use in Abadi area, Agriculture, overall land and Water Management plan etc. Panchayat members through Panchayat meetings verified the spatial proposals made by the team and this spatial plan is a participatory plan of the GP. The project also emphasis on future land and water management plan with respect to recent one. A twenty years phasing vision plan has also been prepared for the proposed interventions. This is call for action and the MoPR has taken up the task at the right time.

## VISION

*“Sustainable development of the Nation’s Soul, that is the village, with holistic spatial planning with appropriate technological intervention and promotion with a human touch as a driver of solutions”*

## OBJECTIVES

The main objectives of the study are as follows:

1. Creation of **resource information system for sustainable development** at Gram Panchayat level using spatial planning.
2. To propose a **holistic and sustainable development program** and planning to enhance present situation of Gram Panchayat.
3. To propose a **sustainable land and water management plan** for creating framework for future policy decisions.
4. To suggest the **remedial development measurement** at Gram Panchayat level considering land and water resources for optimal utilization on a sustainable basis.

## CONTENTS

Chapter No.	Title	Page No.
<b>1</b>	<b>Introduction</b>	1-14
	1.1 Importance of Spatial Planning in the Development of Gram Panchayat	1
	1.2 Gram Panchayat Spatial Development Plan: Bongshar Gaon Panchayat	2
	1.2.1 Background History	3
	1.2.2 Socio-demography	4
	1.2.3 Culture	5
	1.2.4 Religion	6
	1.2.5 Climate	6
	1.2.6 Rainfall Run-off Estimation	6
	1.2.7 Geology & Geomorphology	8
	1.2.8 Lithology	10
	1.2.9 Topography	11
	1.2.10 Regional Connectivity	12
	1.2.11 Administrative set-up in Gaon Panchayat	12
	1.2.12 Methodology	14
<b>2</b>	<b>Spatial Analysis and Proposal for Gaon Panchayat Spatial Development Plan</b>	15-74
	2.1 Utilization of land use & land cover (LULC)	15
	2.2 Existing Land & Water Management	16
	2.3 Land use & Management of Abadi Area	17
	2.3.1 Physical Infrastructure	19
	2.3.2 Social Infrastructure	39
	2.3.3 Other Social Infrastructure	42
	2.4 Agriculture	43
	2.5 Poultry & Animal Husbandry	54
	2.6 Upper land area in the village	55
	2.7 Natural Resource	56
	2.8 Proposed Reclamation of Wasteland/Wetland	61
	2.9 Solid Waste Management Plan	64
	2.10 Growth Projection	68

<b>Chapter No.</b>	<b>Title</b>	<b>Page No.</b>
	2.11 Livelihood Opportunities & Future Prospect	69
	2.12 Skill Development	69
	2.13 Resource Envelope	74
<b>3</b>	<b>20 Years Vision Plan</b>	<b>75-79</b>
	3.1 Proposed 5 Year Vision Plan for Bongshar GP	76
	3.2 Proposed 10 Year Vision Plan for Bongshar GP	77
	3.3 Proposed 20 Year Vision Plan for Bongshar GP	78
<b>4</b>	<b>Conclusion</b>	<b>80</b>
	<b>References</b>	<b>81</b>
	<b>Appendix</b>	<b>82</b>

## LIST OF FIGURES

Figure No.	Title	Page No.
Fig 1.1	Aerial View of Bongshar GP	2
Fig 1.2	Geographic Location of Bongshar GP	3
Fig 1.3	Socio-demographic aspect of Bongshar GP	4
Fig. 1.4	Ojapali	5
Fig 1.5	Nagara Naam	5
Fig 1.6	Shri Shri Bhringewwar Devalaya	6
Fig 1.7	Shri Shri Laxmi Narayan Mandir	6
Fig 1.8	Rainfall Run-off map Bongshar	7
Fig 1.9	Drainage map: Bongshar	8
Fig 1.10	Geomorphology map: Bongshar	9
Fig 1.11	Percentage Distribution of Geo-morphic area	9
Fig 1.12	Lithology Map of Bongshar GP	10
Fig 1.13	Percentage Distribution of Lithologic area	10
Fig 1.14	Topographic map of Bongshar	11
Fig 1.15	Regional Connectivity of Bongshar GP	12
Fig 1.16	Administrative Set-up in Bongshar	13
Fig 1.17	Methodology	14
Fig 2.1	LULC Map of Bongshar	15
Fig 2.2	Land Use Distribution of Bongshar	16
Fig 2.3	Existing Land & Water Management Plan	17
Fig 2.4	Land Use & Management of Abadi Area	18
Fig 2.5	Percentage Distribution of Housing Type	19
Fig 2.6	Housing Type	20
Fig 2.7	Percentage Distribution of Housing Condition & Style	20



<b>Figure No.</b>	<b>Title</b>	<b>Page No.</b>
Fig 2.8	Housing Condition	21
Fig 2.9	Housing Type & House Built under Govt. Scheme	21
Fig 2.10	Proposed Expansion of Housing	22
Fig 2.11	Household Projection	23
Fig 2.12	Proposed Household Amenities	23
Fig 2.13	Proposed Housing type	24
Fig 2.14	GHSAP Seismic Hazard Map for Assam	24
Fig 2.15	Plan Variations of Typical Assam Type Houses	25
Fig 2.16	Rainwater Harvesting	28
Fig 2.17	Spatial map of Bongshar Village Roads	29
Fig 2.18	Percentage Distribution of Village Roads & State Highway	30
Fig 2.19	Village Roads	30
Fig 2.20	Drainage line under construction	30
Fig 2.21	Proposed Road Network	31
Fig 2.22	Embankment cum road	32
Fig 2.23	Proposed Road Development	32
Fig 2.24	Spatial Map Showing locations of Industries	33
Fig 2.25	Silk Weaving & Products	35
Fig 2.26	Silk Processing Technology	37
Fig 2.27	Upgraded Muga Reeling Machine	38
Fig 2.28	Motorized Re Reeling Machine for Muga	39
Fig 2.29	Health Centre	40
Fig 2.30	Educational Institutes in Bongshar	40
Fig 2.31	Spatial Map Showing Health & Educational Institute	41
Fig 2.32	Other Social Infrastructure in Bongshar GP	42

<b>Figure No.</b>	<b>Title</b>	<b>Page No.</b>
Fig 2.33	Agriculture Cropping Intensity	43
Fig 2.34	Percentage Distribution of cropping intensity	44
Fig 2.35	Rice Cultivation	44
Fig 2.36	Mustard Cultivation	45
Fig 2.37	Sugarcane Cultivation	45
Fig 2.38	Jute Cultivation	46
Fig 2.39	Vegetable Cultivation & Horticulture Plantation	47
Fig 2.40	Organic Farming	50
Fig 2.41	Piggery & Poultry Farm	55
Fig 2.42	Water from tap & tube well	57
Fig 2.43	Groundwater Quality	60
Fig 2.44	Proposed Wasteland Reclamation	61
Fig 2.45	Proposed Reclamation of Wasteland for Housing, Recreational, & Enterprise	62
Fig 2.46	Proposed Utilities for Bongshar GP	63
Fig 2.47	Dustbin & Landfill locations in Bongshar GP	64
Fig 2.48	Dumping Site in Bongshar	64
Fig 2.49	Mushroom Production	65
Fig 2.50	Livestock Feed	66
Fig 2.51	Bio-char Production	66
Fig 2.52	Batch AD- System using Rice straw & Cow dung	67
Fig 2.53	Solid Waste Management Plan	67
Fig 2.54	Population Projection of Bongshar GP	68
Fig 2.55	Household Projection of Bongshar GP	68
Fig 3.1	Element of Spatial Planning	75

## LIST OF TABLES

<b>Table No.</b>	<b>Title</b>	<b>Page No</b>
2.1	Foundation Details	25
2.2	Structural Details	26
2.3	Roof & Floor System	27
2.4	Road Transportation	29
2.5	Industries Details	34
2.6	Items Produced from Different Fabrics	36
2.7	Educational Institutes	41
2.8	Other Social Infrastructure	42
2.9	Economically Important Plants	48
2.10	Food Processing items	52
2.11	Study of Upper land in the Village	55
2.12	Soil Characteristics of Bongshar	56
2.13	Livelihood Opportunities	69
2.14	Skill Development using Rural Technology	70
3.1	Proposed 5 Years Vision for Bongshar GP	76
3.2	Proposed 10 Years Vision for Bongshar GP	77
3.3	Proposed 20 Years Vision for Bongshar GP	78

## **STUDY TEAM**

### **Members:**

Prof. T. G. Sitharam, Director, Indian Institute of Technology Guwahati  
Prof. Sanjukta Patra, Head, Centre for Rural Technology  
Prof. Rajib K. Bhattacharjya, Professor, Department of Civil Engineering  
Dr. Sudip Mitra, Associate Professor, Centre for Rural Technology  
Dr. Shakuntala Acharya, Assistant Professor, Department of Design  
Dr. Rishikesh Bharti, Assistant Professor, Department of Civil Engineering  
Dr. Shareka Iqbal, Assistant Professor, Department of Design  
Dr. Siddhartha Singha, Assistant Professor, Centre for Rural Technology

### **Research Assistance:**

Dhruba Jyoti Sarmah, Associate Project Scientist  
Dibojit Pathak, JRF  
Antony Joh Moothedan, JRF  
Partha Protim Saikia, Jr. Technician, Centre for Rural Technology

## Acknowledgment

*On the submission of the report for Bongshar GP in Sualkuchi, District Kamrup, a great step towards an empowering future for our country, we wish to thank **the Ministry of Panchayati Raj, Government of India**, for bringing about a reworking of the planning thought of the region. We are happy that under the aegis of **Indian Institute of Technology, Guwahati**, we could bring out planning solutions for this Gaon Panchayat and complete the immense job responsibility entrusted to us, even in the challenging times of a pandemic.*

*We would also like to thank **Dr.J.B.Ekka**, Chief Secretary, **Smti. Jolly Das Brahma**, Commissioner & Secretary and **Amit Mishra**, Senior Project Manager, Department of Panchayat and Rural Development, Government of Assam, providing their valuable suggestions on the study.*

*We would like to thank **Dr. T. G. Sitharam**, Director, Indian Institute of Technology, Guwahati for his support.*

*We are grateful to **Dr. Dhrubajyoti Malakar, Kanak Das, Debendra Nath Kakati, Rikhab Chandra Baishya, Ramesh Das, Gautam Baishya, Rabin Pathak, Jiten Pathak, Kandarpa Baishya, Indrakanta Baishya, Sanatan Baishya, Subhash Baishya** and all other officials of Bongshar Gaon Panchayat, who made this work possible through their guidance and invaluable support throughout all stages during the progress of the project.*

*Last but not the least; we acknowledge the support we received from each and every member of the Bongshar GP community.*

**Study Team**

# CHAPTER 1

## INTRODUCTION

---

The concept of spatial planning deals with the integration of various physical, social and economic functions over space. Such integration is achieved by planned action over time and brings about balanced regional development. The basic objective of such spatial planning is to distribute the benefits of development among the maximum number of people and to minimize the regional disparities in levels of development. The centralized planning undertaken by the developing countries for economic development has the advantage that the central government has supreme command over the material resources of the country. It attempts to achieve inter-sectoral consistency with set input-output relationships and sets its targeted rates of sectoral and overall growth of the economy.

### **1.1 Importance of Spatial Planning in the Development of Gram Panchayat:**

Spatial plans are prepared for cities and towns, popularly known as Master Plans and Development Plans, would be an overarching planning document that sets out how a particular area/ location in the Panchayat can (as opposed to will) develop and redevelop into the future.

But there is no provision for preparing Master/ Development Plans for countryside villages, and no serious attempt has been made to prepare Spatial Plans for rural areas for holistic growth and development.

The Master Development Plan needs to clearly identify land and infrastructure usage requirements for the GP, which includes land allocation & usage, provisioning of infrastructure services, creating economically productive, efficient, and equitable rural growth centers resulting in a balanced and sustainable distribution of activities, so that the Panchayats/ Rural Areas can perform all their economic and social functions efficiently and effectively.

The Spatial Development Plan using the latest Geographical Information System (GIS) technology would be an internal component of the Master Plan to promote growth and guide and regulate present and future development of Rural Areas with a perspective of 20-25 years under the overall supervision of Panchayati Raj Institutions.

An integrated spatial and sectoral planning would be required in the rural areas for:

- ✓ Managing growth and change over time
- ✓ Providing for orderly and predictable development in the future
- ✓ Protecting and managing environmental resources
- ✓ Setting priorities for developing and maintaining infrastructure and public facilities

- ✓ Strengthening local identity and character of the village;
- ✓ Creating a framework for future policy decisions for all stakeholders
- ✓ Promoting inclusive, open, and democratic planning
- ✓ Providing guidance to land-owners, developers, and Government authorities

In India, the spatial units such as Gram Panchayat, Community Development Blocks, Revenue Districts and other special purpose regions are considered the building blocks of economic planning, apart from the States and Union Territories. A number of attempts have been made since the Fourth Five Year Plans (1969-74) to evolve planning guidelines at district and block level by the Planning Commission and the States have also participated in this exercise but have never given serious thought to a decentralized planning process. The basic objective of balanced regional development and social justice can hardly be achieved without spatial planning at such decentralized levels-districts and community development blocks or areas level planning.

## **1.2 Gram Panchayat Spatial Development Plan: Bongshar Gaon Panchayat**

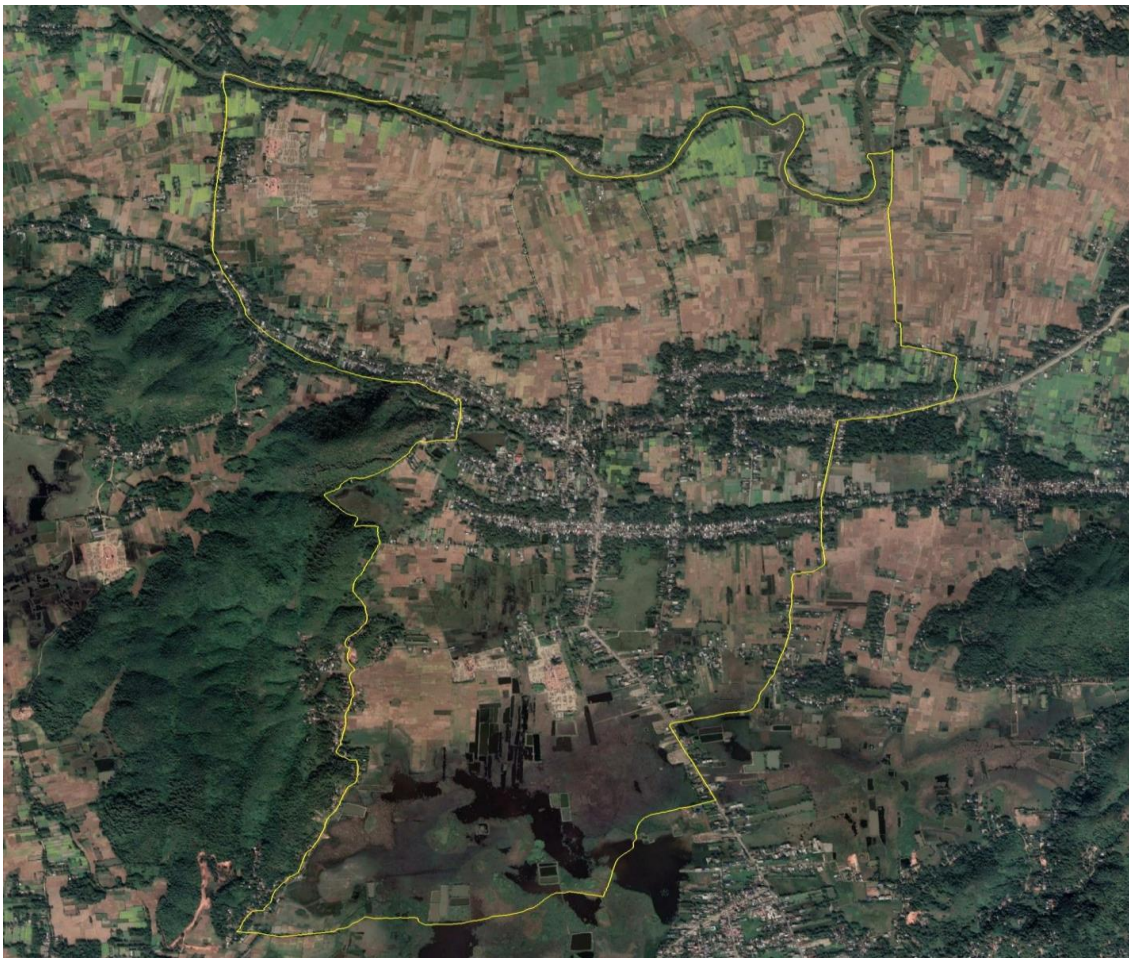


Fig.1.1 Areal View of Bongshar GP

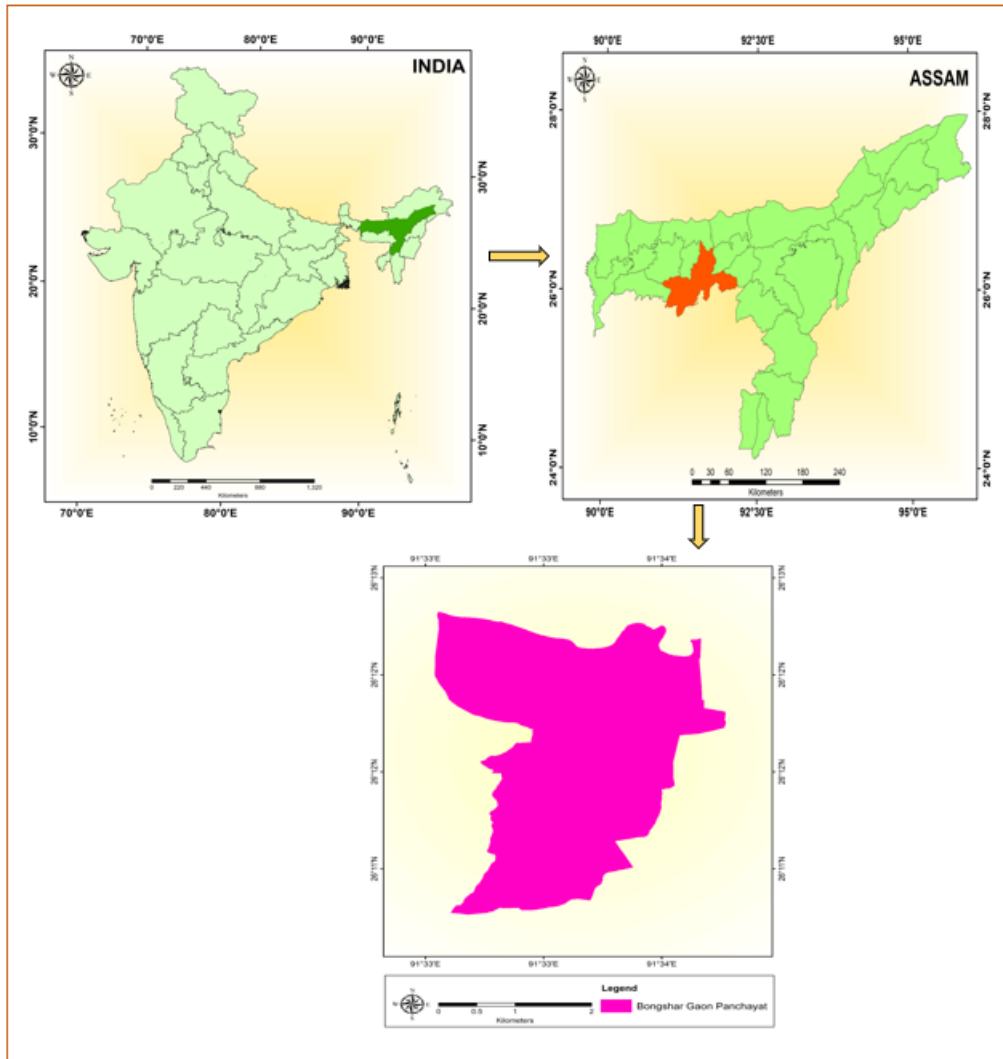


Fig. 1.2 Geographic Location of Bongshar GP

Bongshar village is located under Sualkuchi block in Kamrup district of Assam State, India. The total area is spread over 9.57 sq. km having latitude  $26^{\circ}11' N - 26^{\circ}13' N$  & longitude  $91^{\circ}32' E - 91^{\circ}35' E$ . The village is famous for its silk weaving and produces varieties of silk products like mekhela chador, saree, Gamosa, kurta, dhoti set, salwar, shirt, dupatta, etc. The overall population of Bongshar village is around 12570.

### 1.2.1. Background History:

Bongshar is located in Kamrup district under 51 no Jalukbari constituency. Bongshar has a very old history. Mughal King Jahangir captured the Kamrup, along with Bongshar from Raja Parikshit Narayan, and ordered Sheikh Ibrahim Kadori/Kadodi for revenue survey (pargana bibhag) in these areas. The main objective of the survey was to collect revenue taxes in a smooth and systematic manner, before which such system doesn't exist. Before captured by King Jahangir the taxes were in



form of labour services of the common people towards the royals and in return they used to get agricultural land to do cultivation. Sheikh Ibrahim Kadodi established his office near Bhringeswar Devalaya, which was situated 8km away from Hajo to do the revenue survey.

He pronounced the word Bhringeswar as Bangeswar in connection with flowing of Brahmaputra river nearby north part of Hajo. He made Bangeswar Pargana by changing the pronunciation of language from Bhringeswar to Bangeswar. Historical evidences showed that Bhringeswar word had changed/modified to Bangeswar>Bongsar>Bongshar [source: Harshbardhan, Bongsor, Bongsorar Buranji].

### 1.2.2. Socio-Demography:

According to 2021 Gaon Panchayat Survey, the overall population of Bongshar GP is around 12570 with Population Density 1313/sq. km. Total number of Household (HH) is 1886 with 8044 male and 4526 females having 1257 no of Child population(0-6yrs). The region comprises of only Hindu religion having ST, SC and OBC percentages of 1.11%, 12.4%, 6.4 % respectively. The overall literacy rate of the village is around 73% and the female sex ratio is of 1041 against state average of 958.

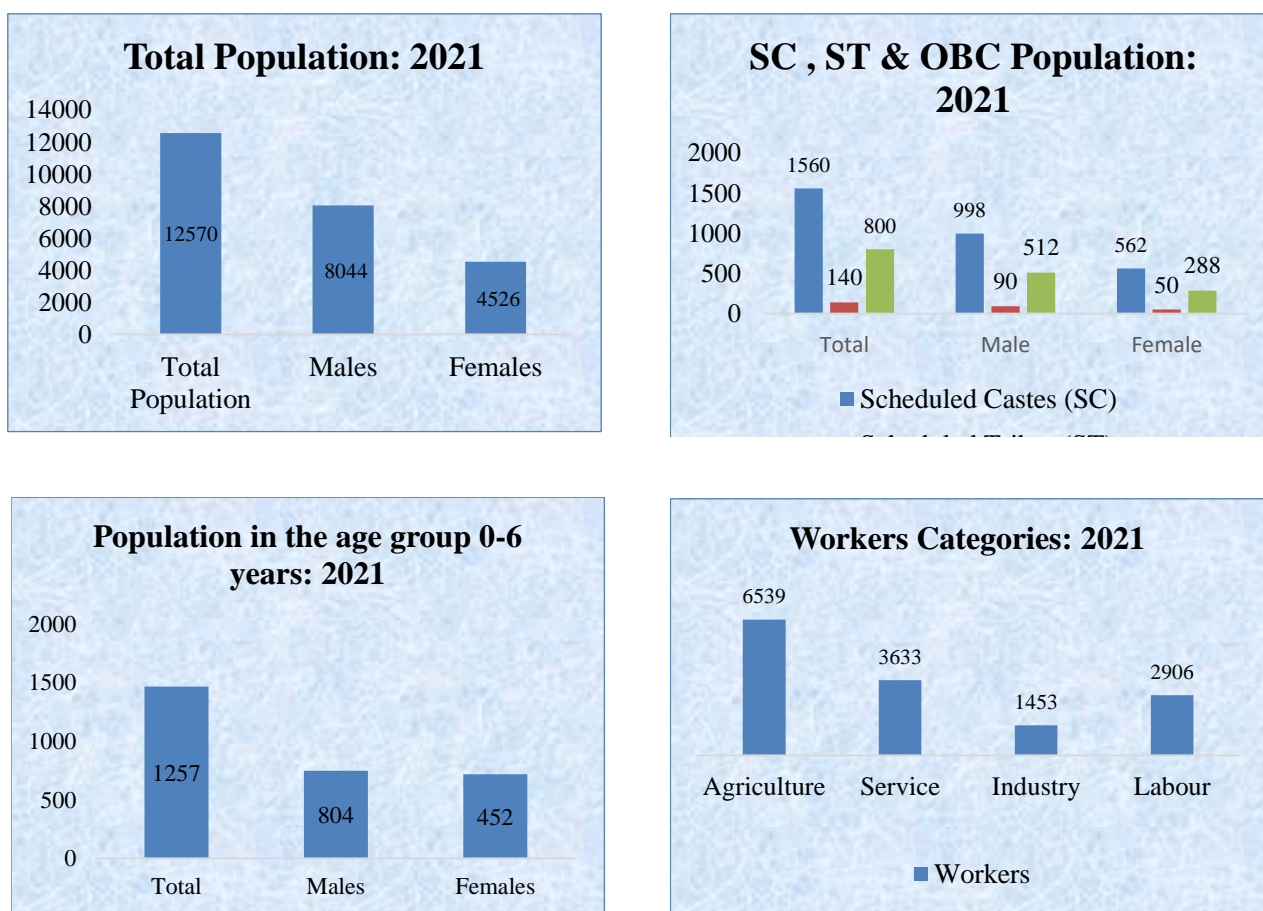


Fig. 1.3 Socio-demographic aspect of Bongshar GP

### 1.2.3. Culture:

The culture of Bongshar GP is traditionally a hybrid one, developed due to cultural assimilation of different ethno-cultural groups under various political-economic systems in different periods of its history. The major components of the culture are:

- I. **Nagara Nam:** The Nagara Nam art form has direct or indirect influence on the socioeconomic aspect. Its performance has deep culture and spiritual significance. It has become an essential part of folk culture with great contribution to the age-old religious faiths in Assamese society.
  
- II. **Ojapali:** Ojapali is one of the unique forms of arts of this area which involves three art forms - Song, Dance and Drama. It is performed by a group of 4 or 5 men of whom the chief performer is called Oja who is supported by 3 to 4 Palis, and hence the name Ojapali. The only instrument played by Ojapali is Khutitaal (palm sized Cymbal). The performers wear long sleeved white gowns, silver jewelry etc. and Nupur (bundle of tiny metallic percussions played by body vibrations).

These indigenous cultural festivals are diminishing day by day in the village. Some other local festivals organized in the village are:

- i. Hodou Bongshar Xarbojanin Xarodiyo Durga Puja
- ii. Bongshar Shri Shri Krishna Doul Utsav
- iii. Bringeswar Doul Utsav
- iv. Gopal Than Huwori Utsav



Fig 1.4 Ojapali



Fig 1.5 Nagara Nam



Fig 1.6 Shri Shri Bhringeswar Devalaya



Fig. 1.7 Shri Shri Laxmi Narayan Mandir

#### 1.2.4. Religion:

The region comprises of only Hindu religion. There are 5 “Namghars” (religious place) in the GP. Bongshar is famous for Bhringeswar Devalaya which is probably constructed by Siva Singha in 18th CE.

#### 1.2.5. Climate:

Bongshar experiences a cold and foggy winter, a moderately hot spring and a temperately hot but humid summer. In March and April, the weather begins to grow a little warmer. Average temperature ranges from 12 to 38 ° C during the year. In winter, temperature ranges from 15 to 25 ° C during day and 8 to 15 ° C during night. The summer temperature ranges from 25 to 38C ° during day and 15 to 25 ° C during night. Average annual rainfall varies from 1500 mm to 2600 mm in Kamrup district as well as in Bongshar.

#### 1.2.6. Rainfall Runoff Estimation:

Runoff modeling is relationships for the basin are considered using the SCS curve number method. In undertaking hydrological modeling using remote sensing data in GIS environment the SCS curve runoff model is largely suitable due to its reliance on land cover parameters which can be extracted from remote sensing (Senay et al., 2004).

Runoff curve number equation estimates total runoff from total rainfall and this relationship excludes time as a variable and rainfall intensity. Its stability is ensured by the fact that runoff depth (Q) is bounded between the maximum rainfall depth (P). This implies that as rainfall amount increase the actual retention (P-Q), approaches a constant value; the maximum potential retention (USDA, 2004). The runoff estimation related runoff (Q) to precipitation (P) and the curve number (CN) which is in turn related to storage (S). CN is based on the following parameters; hydrologic soil group, land use and treatment classes, hydrologic surface conditions. Equation 3 known as the runoff curve number gives the relationship between the parameters described below.

$$\frac{(P-Ia)^2}{(P-Ia)+S} \quad (3)$$

Where;

Q = runoff depth (mm)

P = rainfall (mm)

S = potential maximum retention after runoff starts (mm)

Ia = initial abstraction (mm)

Initial abstraction consists mainly of interception, infiltration during early parts of the storm, and surface depression storage. Its determination is not easy due to the variability of infiltration during the early part of the storm since it depends on conditions of the watershed at the start of a storm such as the land cover, surface conditions and rainfall intensity; thus, it is assumed to be a function of the maximum potential retention. (USDA, 2004)

$$Ia = 0.2S \quad (4)$$

Potential maximum retention (S) can be calculated by the Curve Number as below:

$$S=25400/CN-254 \quad (5)$$

The soil conservation service (SCS) model depends on the runoff Curve Number (CN).

Curve Number is estimated via the effect of soil and land cover on the rainfall runoff processes. The range of the Curve Number (CN) is between 1 (100 % rainfall infiltration) and 100, lower values of the Curve Number indicate lower runoff, while higher values of Curve Number refer to higher values of runoff.

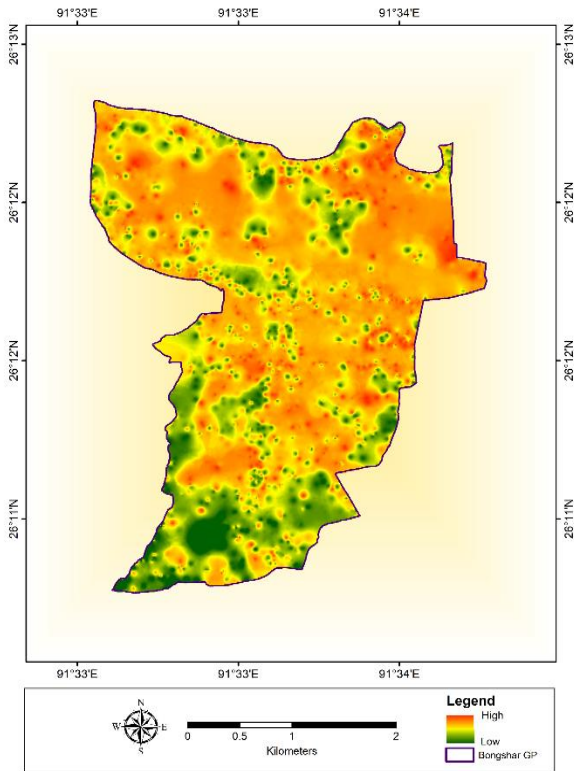


Fig 1.8 Rainfall Run-off map Bongshar

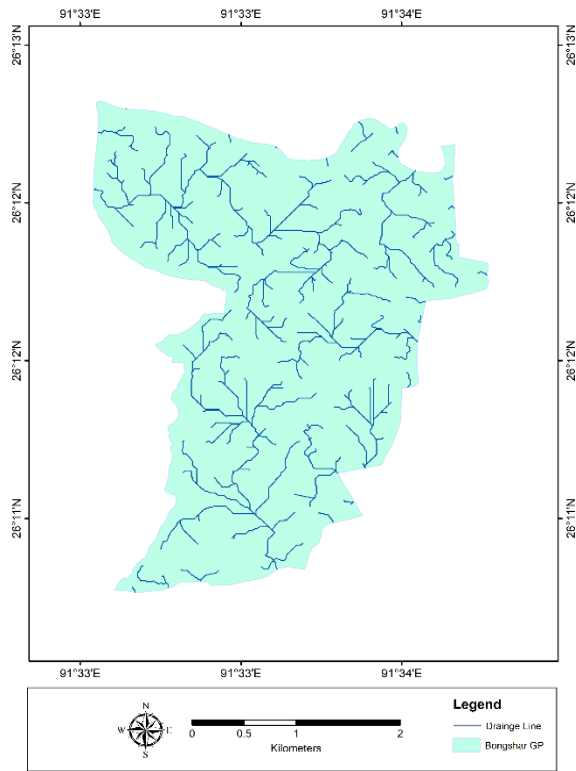


Fig 1.9 Drainage map Bongshar

Rainfall run-off map is prepared by using rainfall data from the year 2015 to 2020. Rainfall run-off is less in the southern portion of the region where infiltration occurrence is more and the region is mostly converted to wasteland or water-logged area. These areas can be used for pisciculture and irrigation purposes to the nearby agricultural region.

### 1.2.7. Geology and Geomorphology:

Geologically, Bongshar GP comprises of Quaternary fluvial sediments and following types of geomorphic landforms are there: Active Flood Plain, Moderately Dissected Structural Hills, Younger Alluvial Plain, Older Flood Plain and River. Most of the area in Bongshar GP consists of flood plain, which implies that the land is fertile and suitable for agricultural purposes. A small portion of GP comprises of dissected structural hills, having slightly higher elevation than the flood plain.

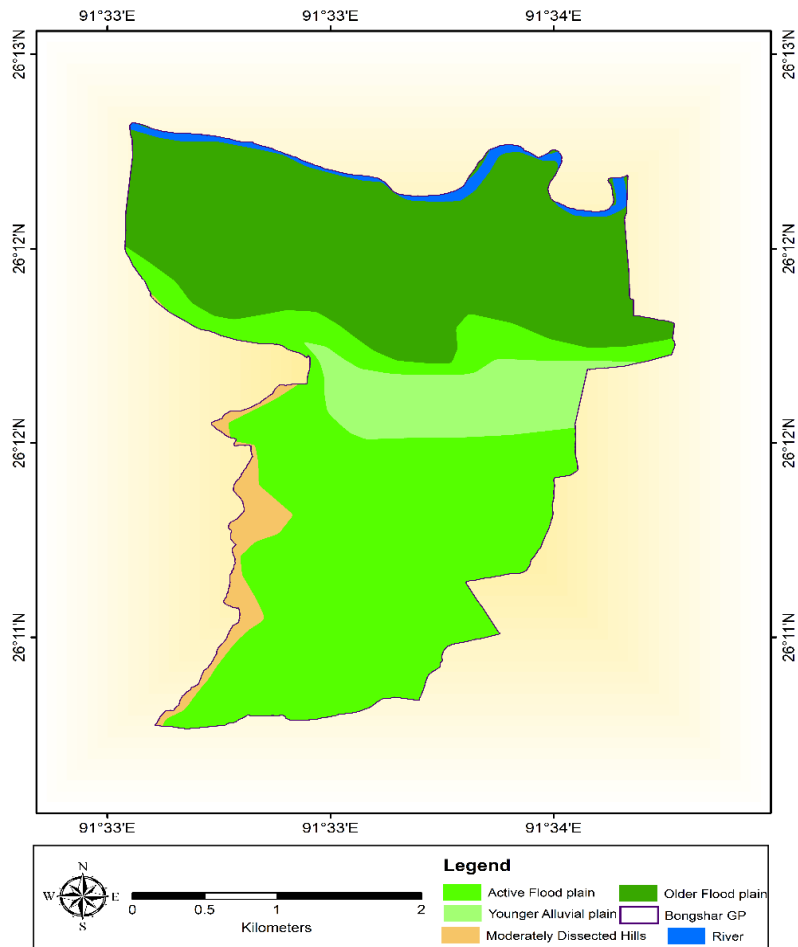


Fig 1.10 Geomorphology Map of Bongshar

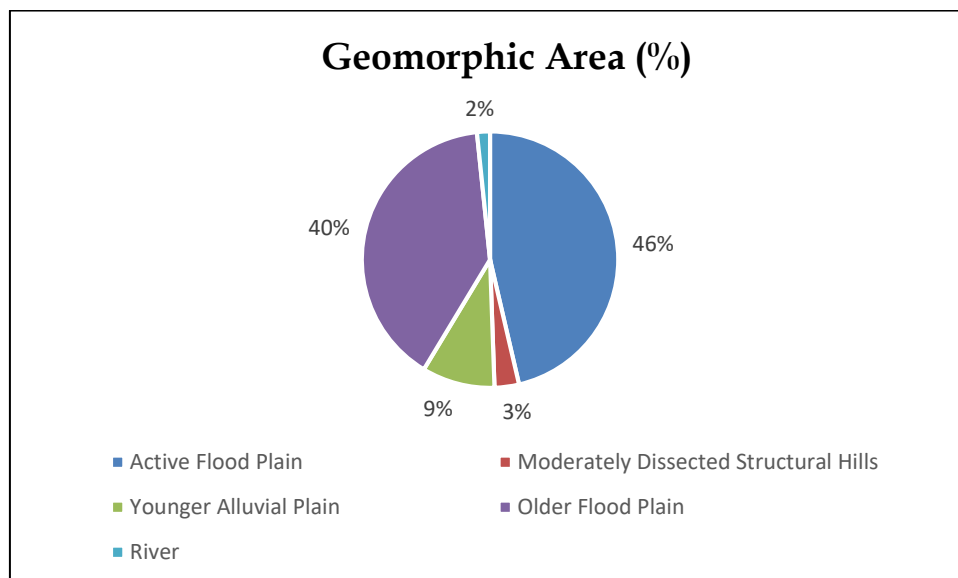


Fig 1.11 Percentage distribution of geomorphic area

### 1.2.8. Lithology:

Lithologically Bongshar is comprises of Banded Migmatite /Granitoid Qtzfelspathic Gneiss, Unsterilized sand, silt and clay and White to grayish sand, silt, pebble and clay.

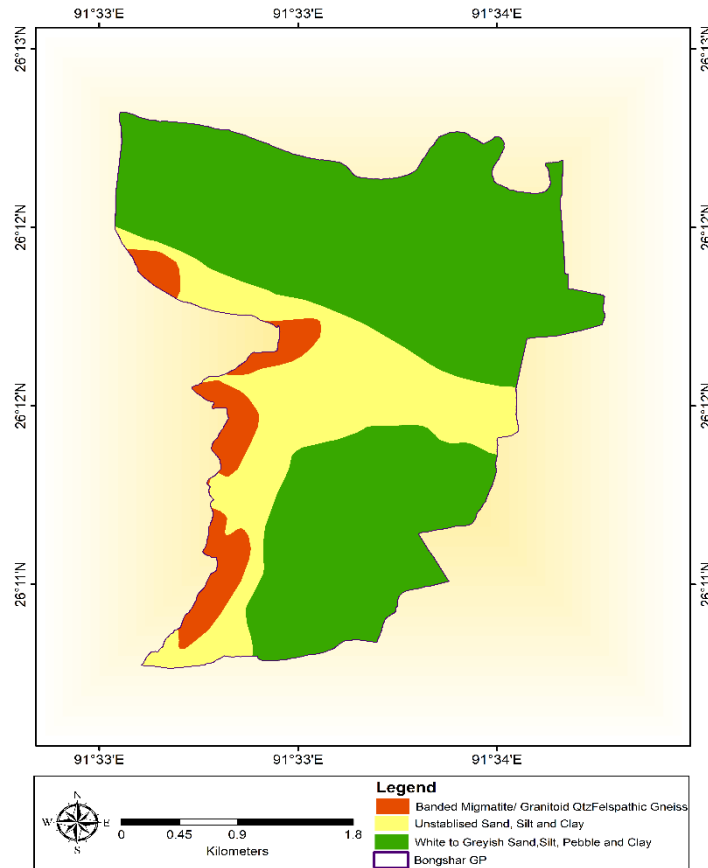


Fig. 1.12 Lithology Map of Bongshar

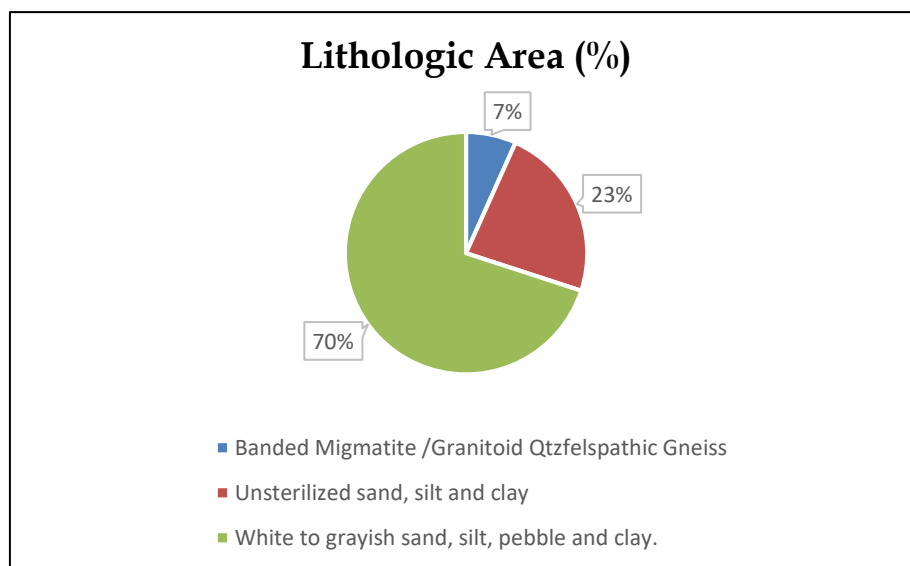


Fig. 1.13 Percentage distribution of lithologic area

### 1.2.9. Topography:

The area covering the Bongshar village is mostly plane which is good for construction, agriculture and industrial space.

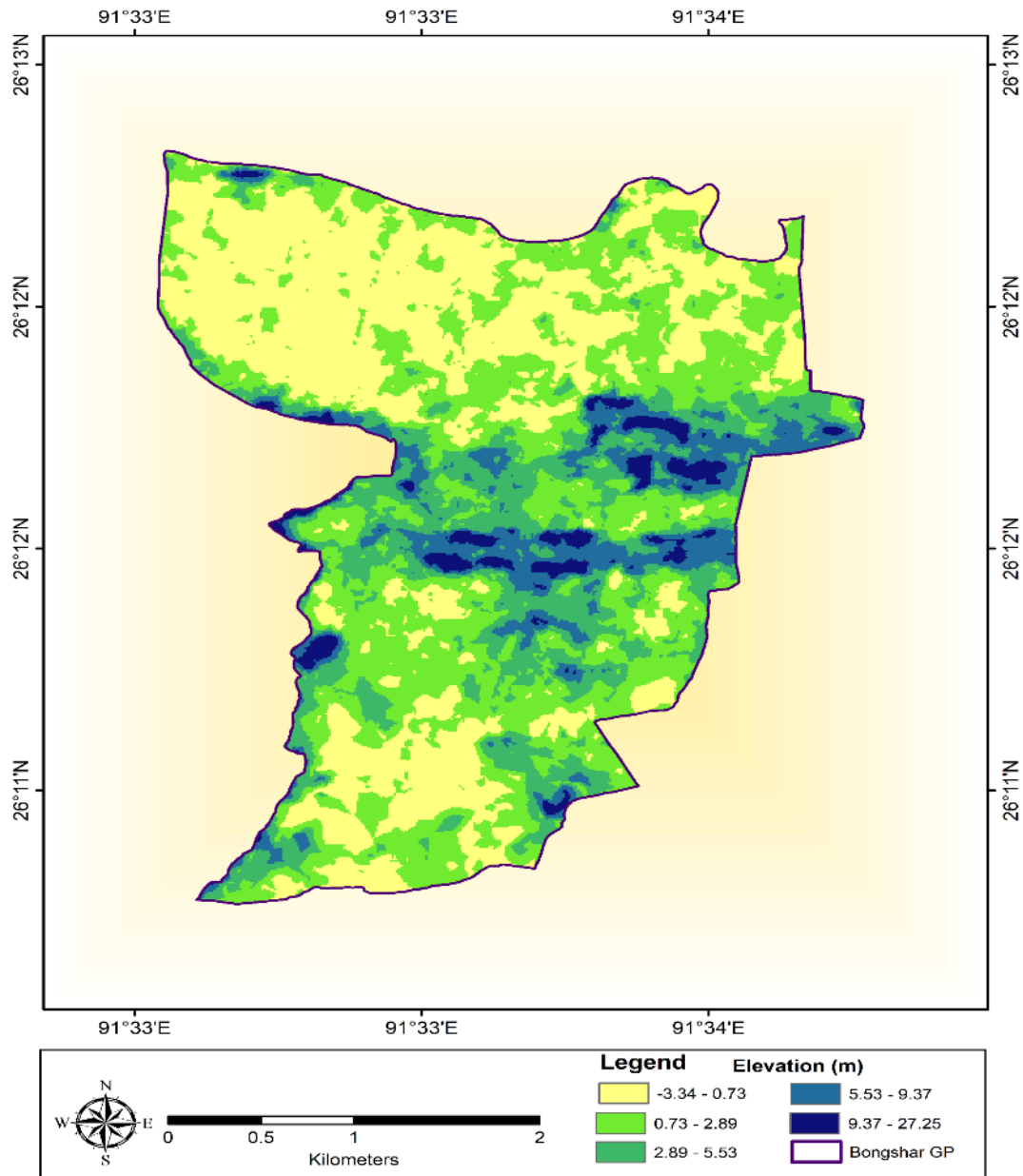


Fig 1.14 Topography map of Bongshar



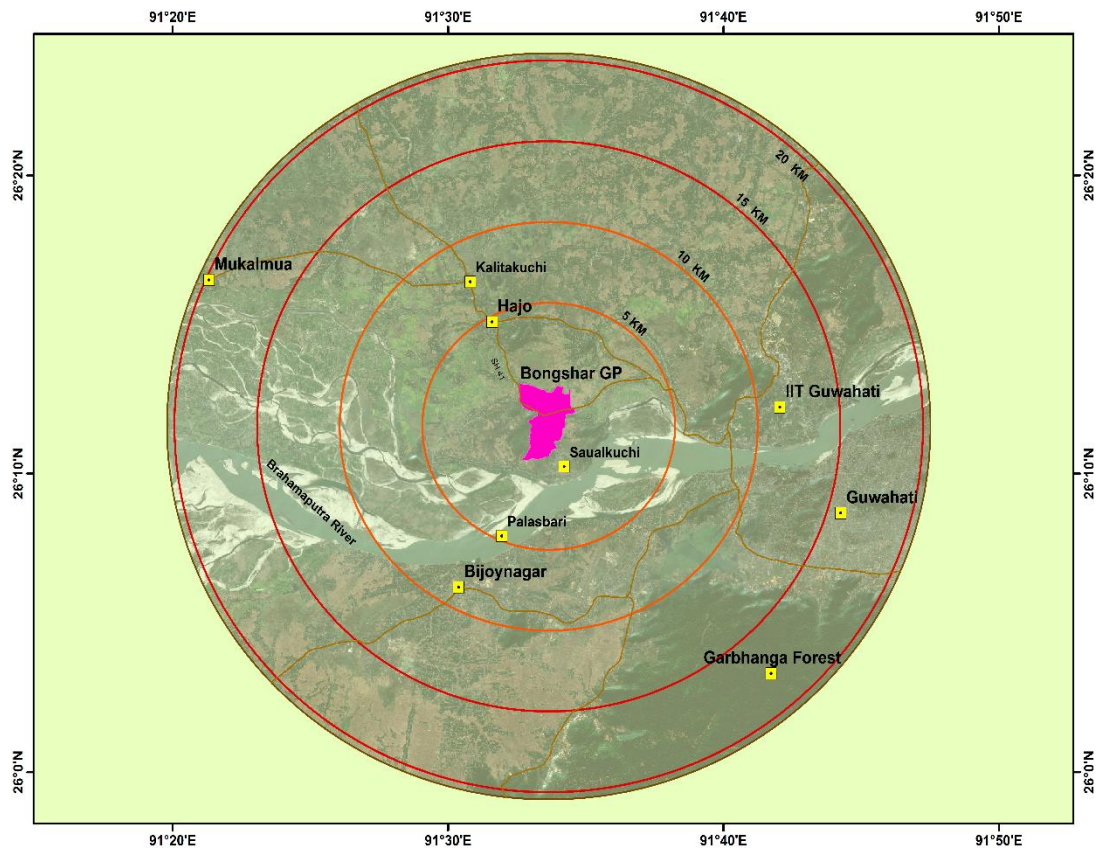


Fig. 1.15 Regional connectivity of Bongshar GP

### 1.2.10. Regional Connectivity:

Bongshar GP village has overall good connectivity with the regional settlement. The village is connected by National Highway - NH 27 and State Highway - SH 41 and SH2. The nearby locality like Sualkuchi, Palasbari and Hajo are within 5km reach of the village. Other places like Bijohnagar and Kalitakuchi are within 10km reach of the village. Institute like IIT Guwahati is at a distance of 23.7 km via NH427 and SH 41. The Brahmaputra River is to the south of Bongshar Village and the connectivity is via NH 27 by road. The Garbhanga Forest is at a distance of 55.3 km via NH27. The place Mukalmua is at a distance of 33.6 km via NH427 and Bongshar road.

### 1.2.11. Administrative Setup in the Gaon Panchayat

Assam has a very strong historical background of local self-government. The villages in Assam had a strong Panchayat in different names or forms since long past. Assam was one of the pioneer States in India to enact Panchayat Act and establish Panchayati Raj in the State when the Assam Rural Panchayat Act, 1948 was passed. This Act was amended and replaced by the Assam Panchayat Act, 1959, the Assam Panchayati Raj Act, 1972, the Assam Panchayati Raj Act, 1986 and finally the Assam Panchayat Act, 1994 which incorporated the provisions of the 73rd Amendment Act, 1992 of the

Constitution of India. The Assam Panchayat Act, 1994 received the assent of the Governor on the 22nd April 1994 and elections were held in October 1996, for establishing a three-tier Panchayati Raj system in the State at the village, intermediate and district level. Gaon Panchayats (GPs) at the village level are the key units, while the middle level comprises of Anchalik Panchayat (AP) at the block level, and Zilla Parishads (ZPs) at the apex level.

The Panchayat body shall consist of 10 members directly elected by the voters of the territorial constituencies and the President of the Gaon Panchayat who shall also be directly elected. A Vice-President shall be elected from and by the members in the first meeting to be called by the Deputy Commissioner or an Officer authorized by him. The Gaon Panchayat is required to meet at least once in two months. In addition, it is to work through 3 standing committees namely Development Committee, Social Justice Committee and Social Welfare Committee.

The Act provides for a Gaon Sabha (constitutional equivalent of Gram Sabha) for every Gaon Panchayat area consisting of persons registered in the electoral rolls of the area. As per the Act the population of the area of the Gaon Sabha shall be between 6000 and 10,000. So, the number of members (who are the adult persons and voters in the general election) will be quite large and residentially scattered over a relatively large area given the density of population of Assam.

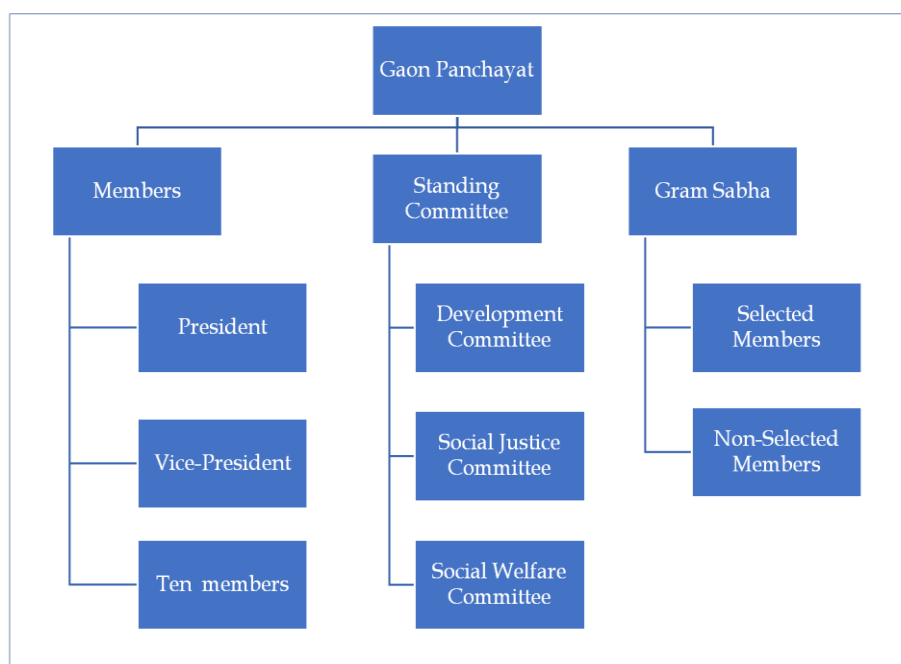


Fig 1.16 Administrative set-up in Bongshar GP

## 1.2.12 Methodology

The Methodology adopted for the Bongshar Gaon Panchayat Spatial Development Plan is presented in Fig 1.16 and Fig 1.17.

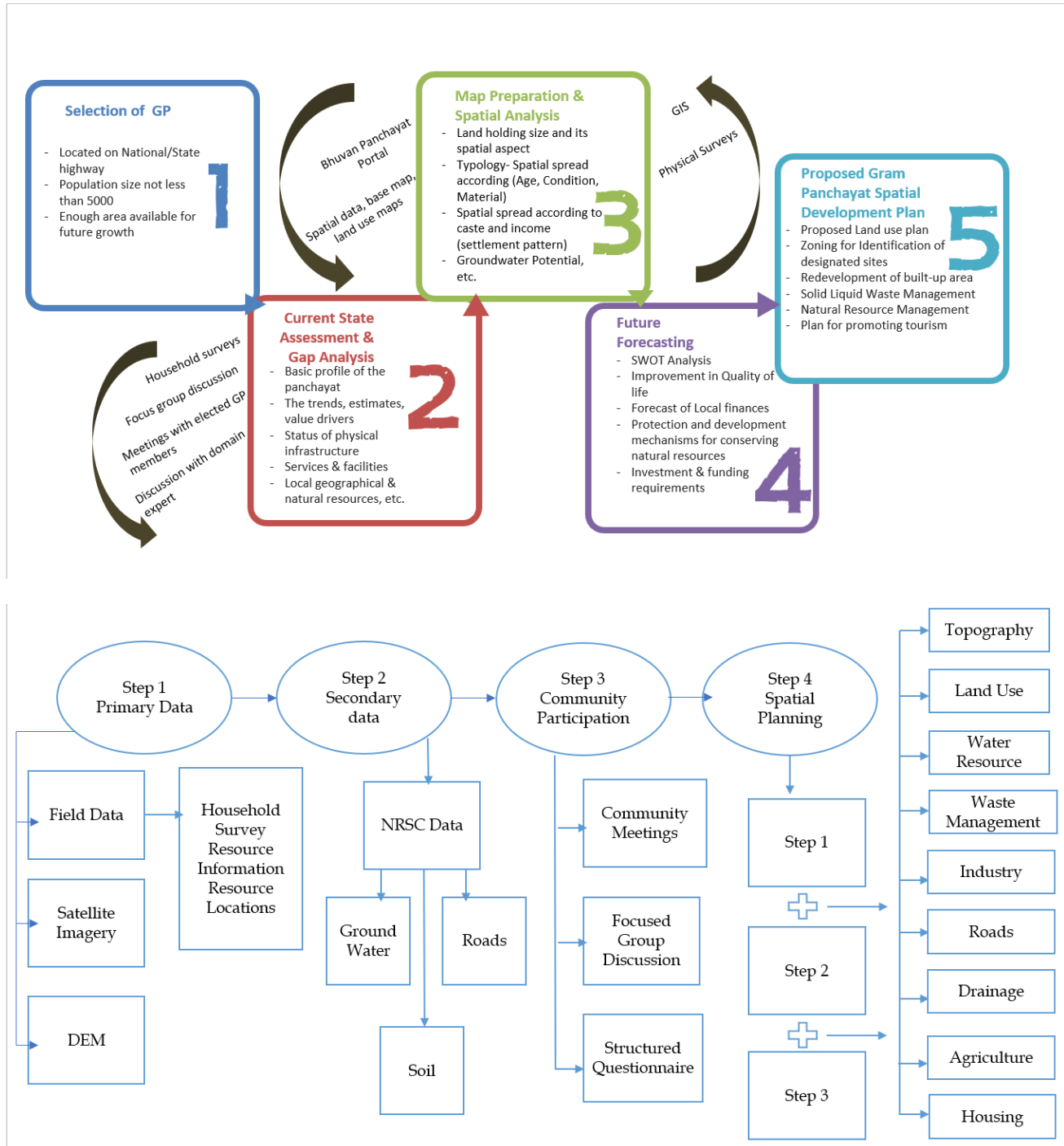


Fig 1.17 Methodology

## CHAPTER 2

### SPATIAL ANALYSIS AND PROPOSAL FOR GAON PANCHAYAT SPATIAL DEVELOPMENT PLAN

In the present work, a field survey was conducted to collect the baseline data of the village. These data are analyzed to assess the current situations, facilities available in the village. In the first stage, spatial analysis is made on the basic parameters like utilization of land use and land cover, land use & management of abadi area, agriculture, natural resource management, livelihood, etc. In the second stage, a spatial development plan is proposed by projecting the growth, potential and opportunities in the village in view of the next 20 years vision.

#### 2.1 Utilization of Land Use and Land Cover (LULC)

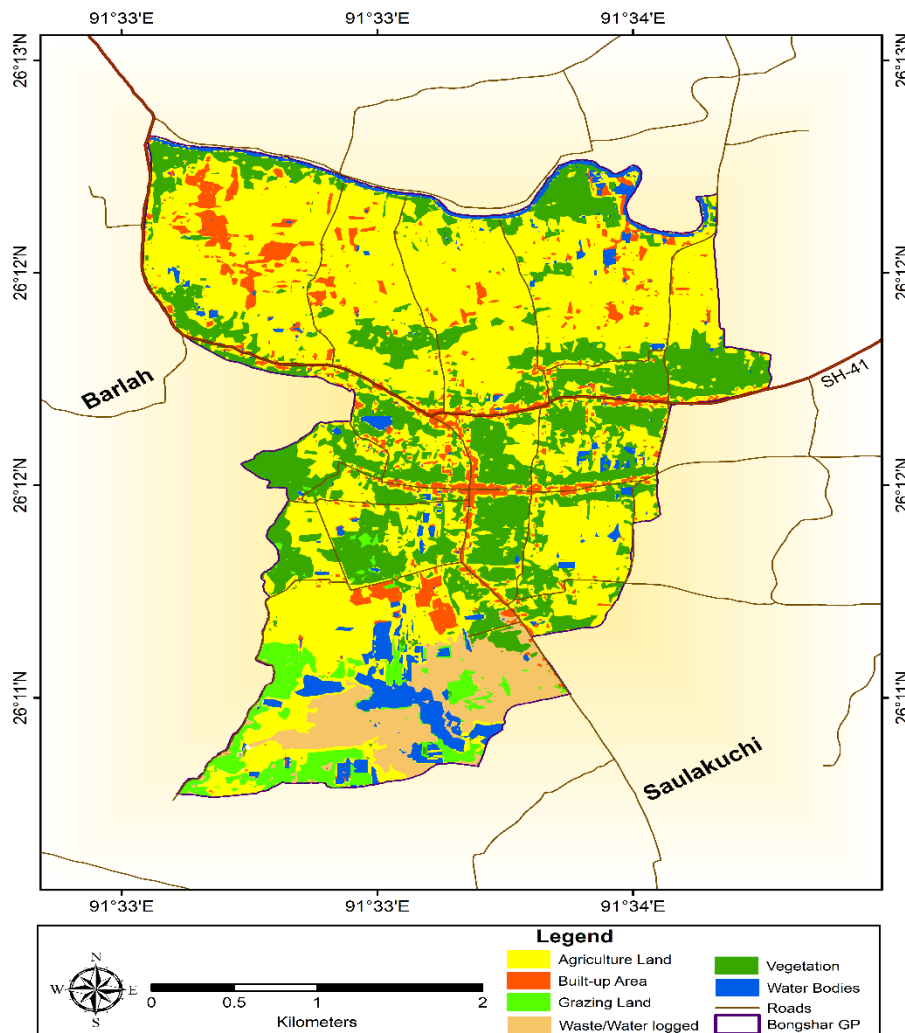


Fig 2.1 LULC Map of Bongshar GP

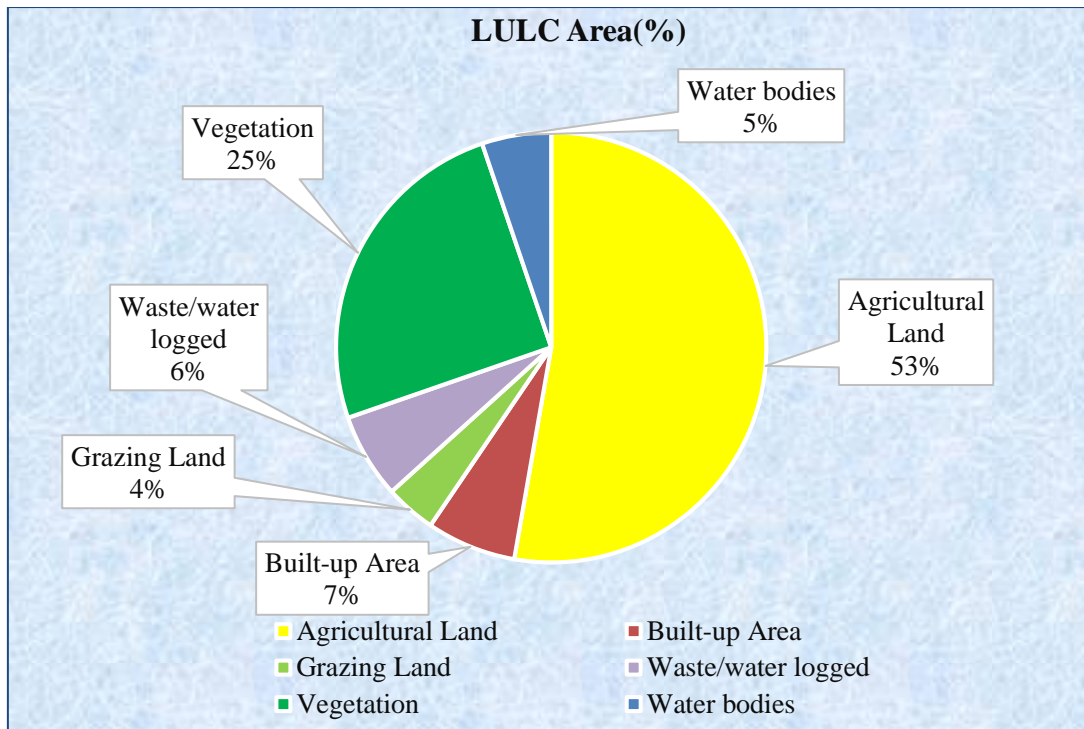


Fig 2.2 Land Use Distribution of Bongshar GP

As shown in Fig 2.2, around 78% of the total area of Bongshar Village is occupied by Agricultural and Vegetation land. A major portion to the south constitutes of waste or water-logged region. The area covering grazing land is comparatively low as compared to the built-up area, which constitutes of residential, public and semi-public activities.

## 2.2. Existing Land & Water Use Management

The existing land & water management plan of Bongshar Village can be seen in Fig 2.3. The state highway SH41 passes through the village that connects other village roads. Along these roads, urban/built-up area is growing. Around 6% of total village area is occupied by wasteland/water-logged area which is basically located to the southern part of the village and these areas are not properly utilized for sustainable development. Vegetation and Grazing land are widely spread throughout the village, which is not properly managed for sustainable development of human being. Zoning for Commercial area including bank and market, GP office, post office is properly done and is situated near to the main road.

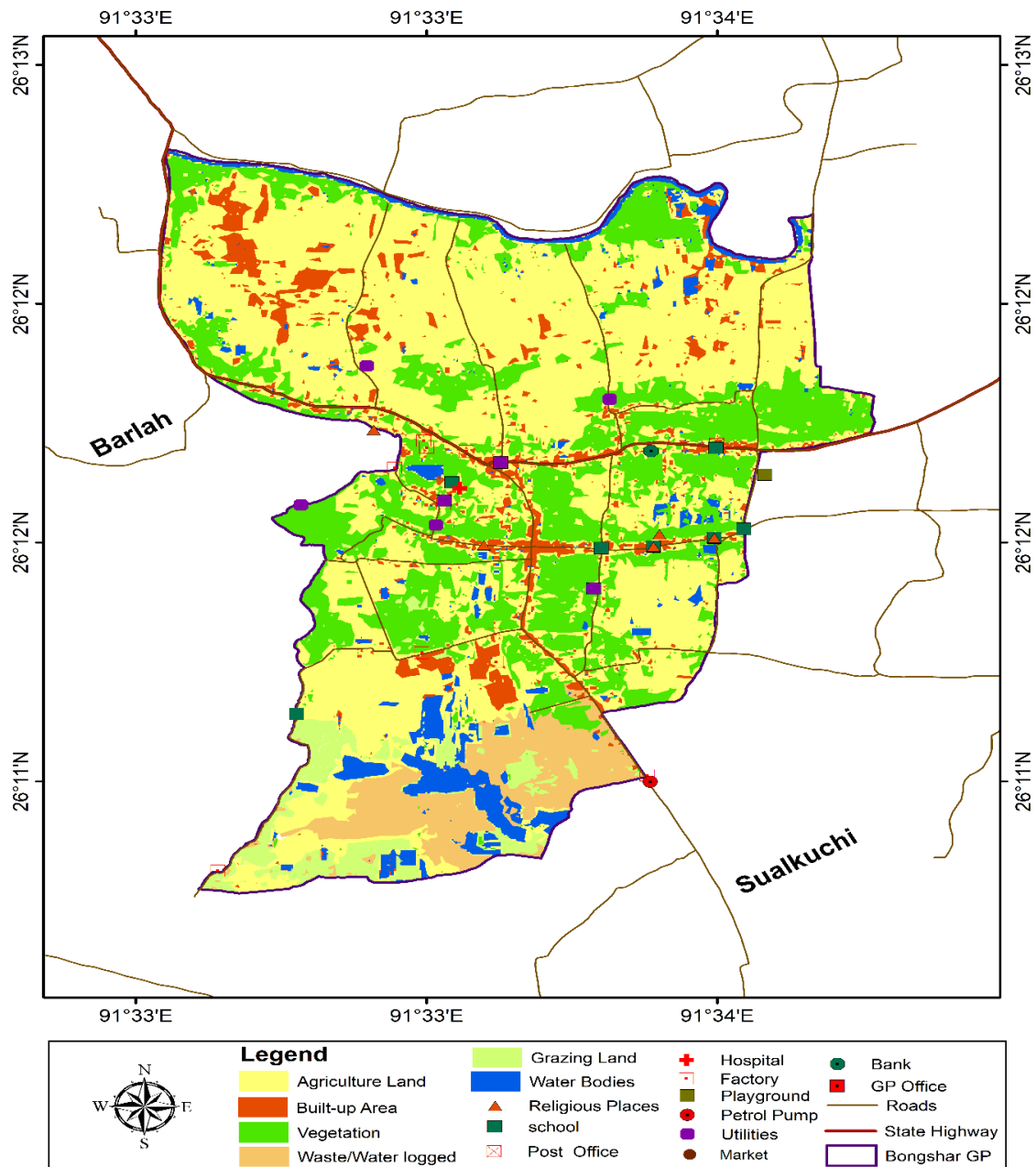


Fig 2.3 Existing Land & Water Management Plan (Bongshar GP)

### 2.3 Land Use & Management of Abadi Area

Abadi area consists of approximately 7% of total area of Bongshar GP. Around 90% of the abadi area is under residential land use and other remaining area is used for various public and semi-public activities like panchayat office, schools, banks, post office, religious places, playground, etc.

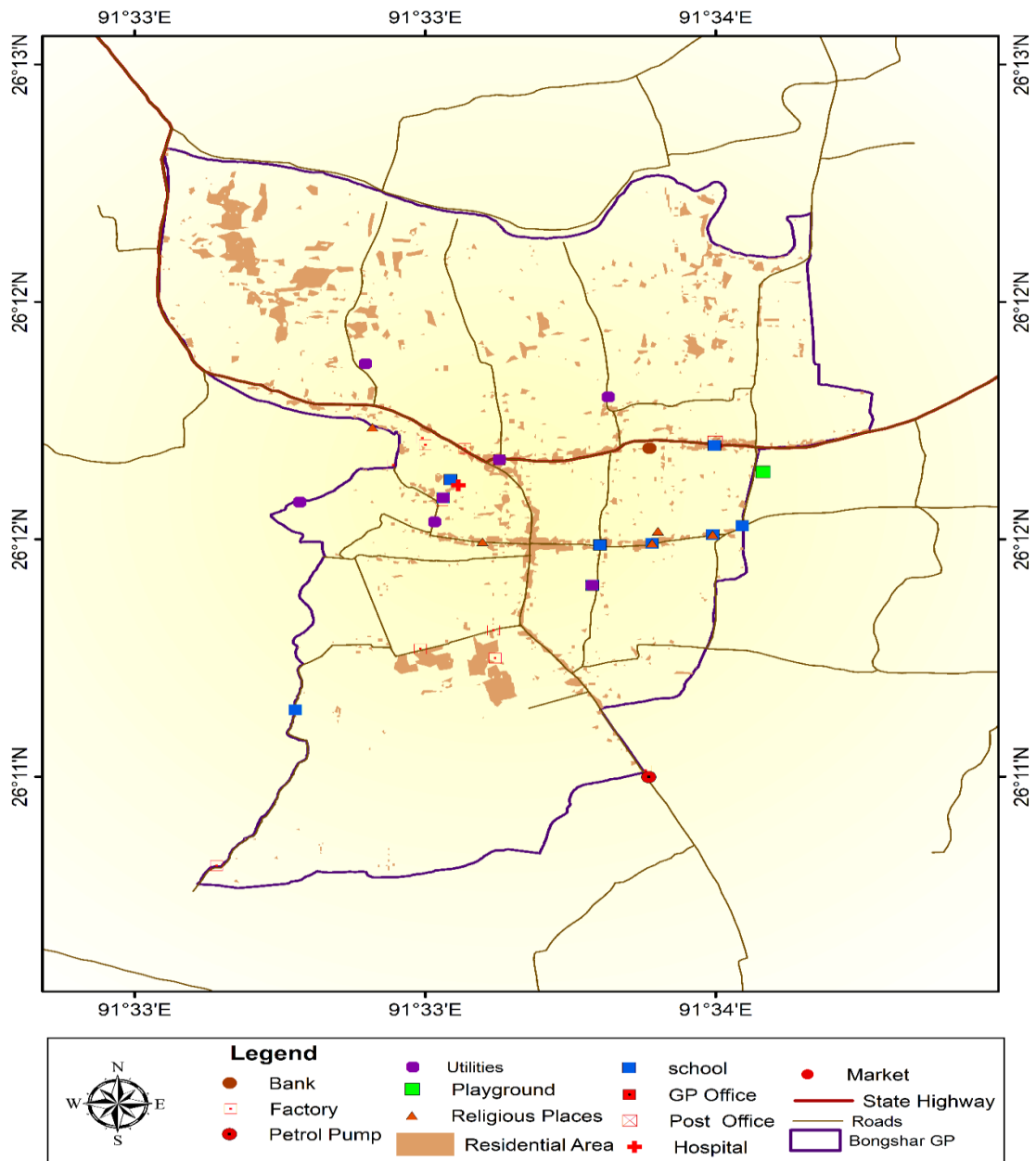


Fig 2.4 Land Use & Management of Abadi Area (Bongshar GP)

The abadi area is divided into three categories, and individual analysis is made on each category:

### 1. Physical Infrastructure

- i. Housing
- ii. Roads
- iii. Drainage
- iv. Industry

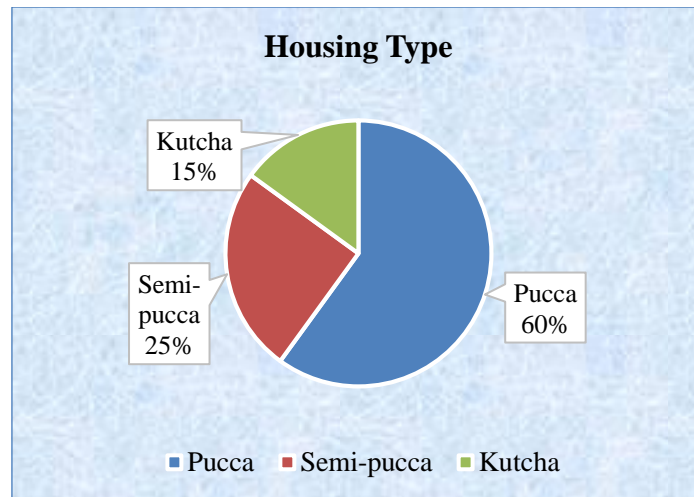


Fig 2.5 Percentage distribution of Housing Type

## 2. Social Infrastructure

- i. Health
- ii. Education

## 3. Other Social Infrastructure

Public & Semi-public infrastructure like bank, post office, GP office, club, playground, etc.

### 2.3.1 Physical Infrastructure

#### 2.3.1.1 Housing

##### *Housing Type*

- The houses in Bongshar village are mainly categorized into three types – Pucca, Semi-Pucca and Kutcha. Almost 60% houses are pucca, 25% houses are semi-pucca and 15% houses are kutcha.
- Generally, the pucca and semi-pucca houses are spread in random and the kutcha houses are spread to little remote end of the village.
- The construction materials for these houses are locally available and almost all houses are built by local constructor. Nearly 25-30 people are employed in the construction sector.
- The life of these pucca houses are >30 years, semi-pucca houses-20-30 years and kutcha houses 4-5 years.





a) Pucca

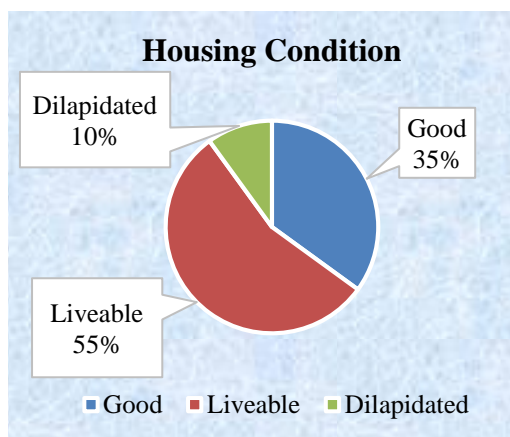
b) Kutcha

c) Semi-Pucca

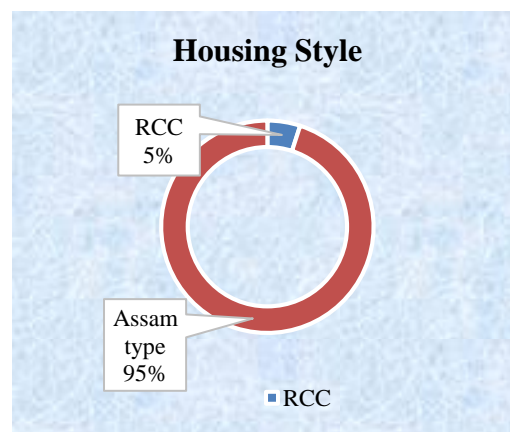
Fig 2.6 Housing Type

**Housing Condition**

- On the basis of condition, the houses in Bongshar village are classified into good condition, Livable condition and dilapidated condition.
- It was found from the field survey that around 35% houses are in good condition, 55% houses are in livable condition and 10% houses are in dilapidated condition. The good condition houses are mainly near to the main road and are equipped with boundary wall and garage for two wheelers/four wheelers. Majority of houses are in livable condition with proper toilets and septic tank. **Around 10% houses are in dilapidated condition mostly in the upper land area.**



a) Housing Condition



b) Housing Style

Fig 2.7 Percentage distribution of Housing Condition & Style



a) Good

b) Livable

c) Dilapidated

Fig 2.8 Housing Condition

### ***Housing Style & House Built under Govt. Scheme***

- The houses built in Bongshar village are generally of Assam Type which accounts for almost 95% of total houses built and only 5% houses are of RCC Type.
- In Assam Type houses, the roof is typically erected by high gables to overcome heavy rainfall in the region, where walls are usually timber framed, plastered with cement.
- Up till now, around 40% houses are built under Govt. Scheme like Pradhan Mantri Gramin Awaas Yojana.



a) Assam Type

b) RCC Type

c) PMAY-G Houses

Fig 2.9 Housing Type & House built under Govt. Scheme

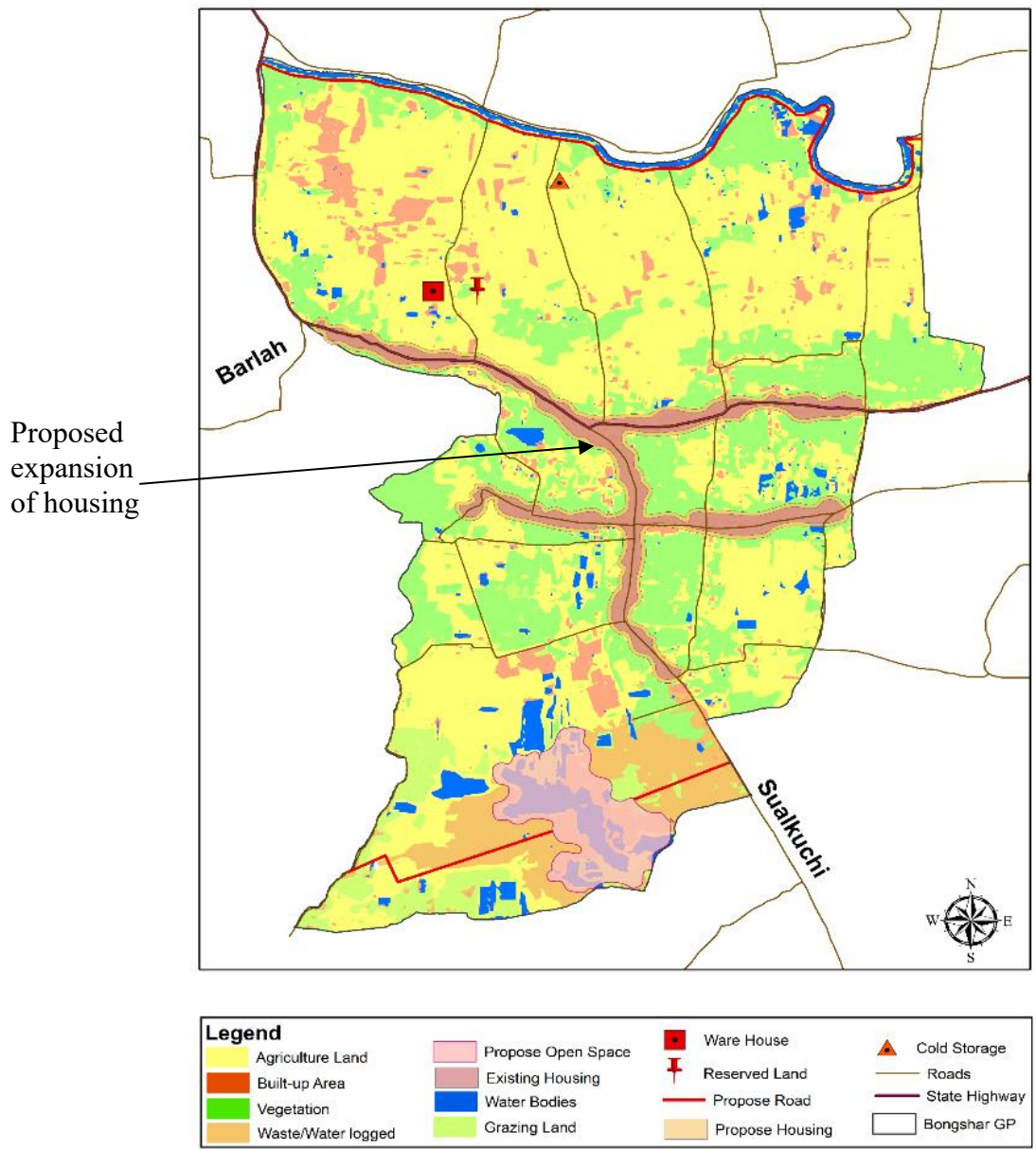


Fig 2.10 Proposed expansion of housing

### Proposed Housing Development

As shown in Fig 2.11, around estimated 2600 more houses to be built in the next 10 years, and for the next 20 years, another 3700 houses to be constructed i.e., around 6300 more household from the current state. Expansion of housing is proposed with primary objective to ensure sanctity of agricultural and green/vegetation/grazing lands, for a sustainable future.

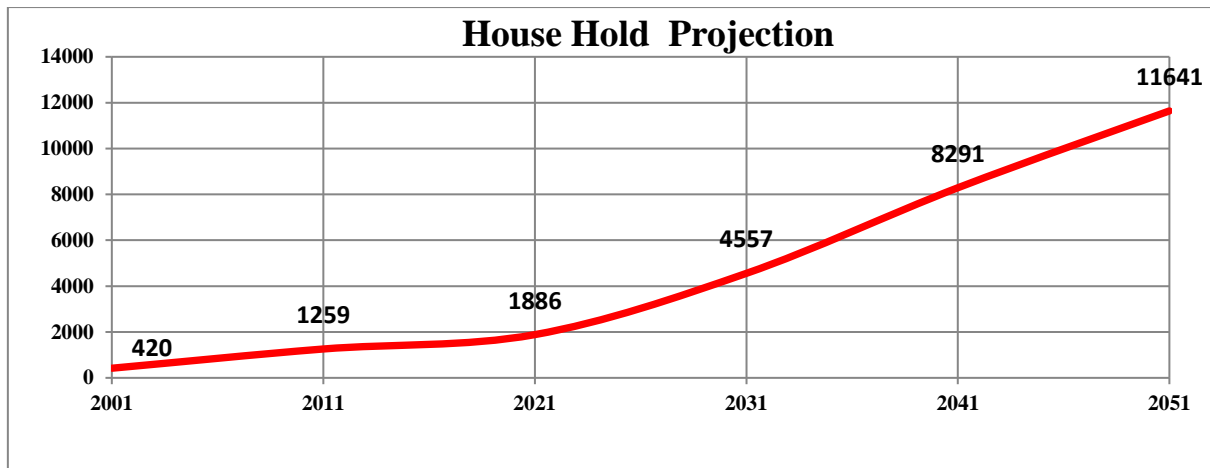


Fig 2.11 Household Projection

## *Proposed Housing & Amenities*

### 1. Present Housing Cluster

- Progressive allowance of G + 3 housing along Primary and Secondary roads & G + 2 for houses along tertiary streets, with adequate open space and gaps between housing as per revised NBC
- Recommending a mixed (Pucca + kutchra) approach
- Mandating/subsidizing installation of solar for water heating and electricity; rain-water harvesting and bio-toilets.

### 2. Future expansion for housing

- Proposed plot by plot, uniformly planned expansion for housing in future (upon exhaustion of 1)

### 3. Curtailment of future building

- Stringent policy measures to be implemented to ensure no expansion for housing in future amidst agricultural land.



Fig 2.12 Proposed Housing Amenities

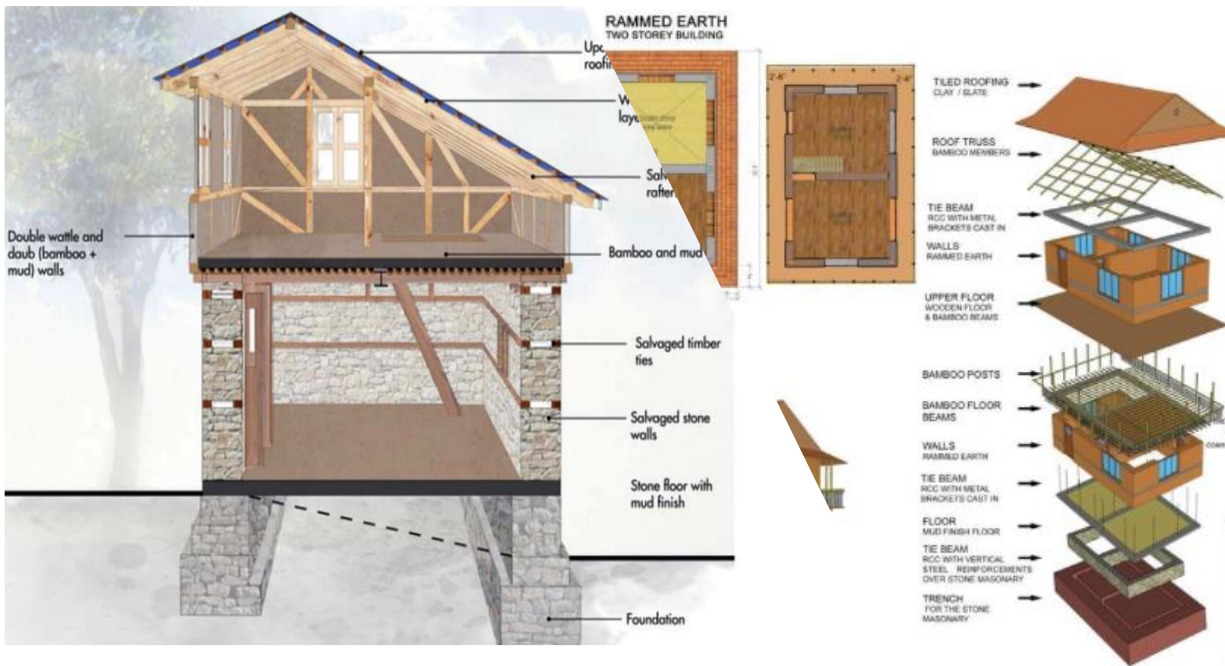


Fig 2.13 Proposed Housing Type - Maintaining Assam Vernacular Architectural Language

***Design & Construction of Assam-Type Houses***

According to GSHAP data, the state of Assam lies in a region with high to very high seismic hazard. As per the 2002 Bureau of Indian Standards (BIS) map, this state also falls in Zone V. Historically, parts of this state have experienced seismic activity greater than M6.0. Approximate locations of selected towns and basic political state boundaries are displayed in Fig 2.14.

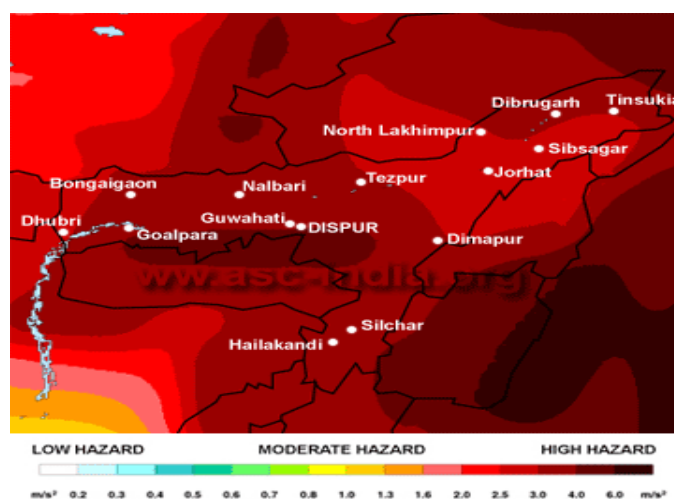


Fig: 2.14 GSHAP seismic hazard map for Assam, India

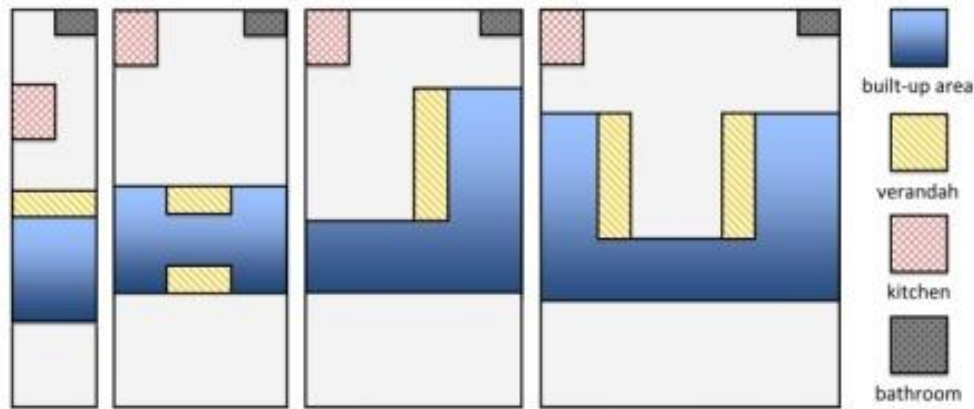


Fig 2.15: Plan variations of typical Assam-type houses

Considering earthquake zone V and land type both plain and elevated, Assam-type architecture and construction are proposed as this vernacular style is climatologically responsive and earthquake resistant. Assam-type homes are built on both flat and sloped terrain. The houses proposed for flat terrain - either rectangular, L- or C-shaped and for slopes - mostly rectangular in shape. These houses consist of a verandah, a living room, a kitchen, with bathrooms and toilets built away from the main house.

Following are the design and construction guidelines for Structural Systems and Foundation:

- The Assam type house comprise mostly of a single storey, but in the rare occasion of two storeys, the second storey uses light wood for construction.
- No formal foundation is used in typical Assam-type houses. The main wooden verticals of the house are pierced into the ground by about 600-900 mm. In some cases, involving construction of formal houses, the main wooden posts of the house are supported on masonry or plain concrete pillars constructed over the ground up to plinth or sill level. The connections between wooden posts and the pillars are achieved using steel bolts and U-clamps.

**Table 2.1: Foundation Details**

Type	Description
SHALLOW FOUNDATION	Wall or column embedded into soil, without footing
	Rubble stone, fieldstone isolated footing
	Rubble stone, fieldstone strip footing

	Reinforced Concrete strip footing
	Mat foundation
DEEP FOUNDATION	Reinforced Concrete or Steel bearing piles
	Reinforced Concrete or Steel skin friction piles
	Wood piles
	Cast-in-place concrete piers
	Caissons

**Table 2.2: Structural Details**

Type		MATERIAL/ TYPE OF LOADBEARING STRUCTURE	SUB-TYPE DESCRIPTION
HYBRID STRUCTURAL SYSTEM	WALLS	Stone Masonry	Rubble stone or Dressed stone in mud/lime mortar
		Adobe/Earthen Walls	Adobe blocks or Mud walls with horizontal wood members; or Rammed earth
		Confined Clay masonry	Clay brick/tile masonry with wooden posts and beams or concrete tie
		Wattle and Daub	Bamboo/reed mesh and posts
	FRAME	Load-bearing Timber	Post and beam wooden frame (with or without tie connections)
			Stud wall frame with board sheathing
		Seismic protection	Base isolation or seismic dampers

## Roof & Floor System

### Flooring

Different types of flooring can be seen in Assam-type houses. Wooden plank flooring is adopted in stilted houses and mud plaster flooring in rural areas. The elevated floor is made of wood runners of size 50×100 mm spaced at about 300 mm spacing spanning between wood beams of size 120×120 mm spaced at about 600 mm spacing. The floors are covered with 25×2500 mm wood planks of thickness about 25 mm. Other common types of flooring include cement flooring over an under layer of sand or brick soling, etc.

### Roofing

Pitched CGI (*Corrugated Galvanized Iron*) sheet roofing over timber trusses is the most common form of roofing used in these houses. This roofing is best suited in this area because the region receives high amount of rainfall that may possibly has severe effect on durability of building. Ikra reed can also be used for roofing in rural areas.

Table 2.3 Roof & Floor System

Type		MATERIAL/ TYPE OF LOADBEARING STRUCTURE	SUB-TYPE DESCRIPTION
ROOF AND FLOOR SYSTEM	ROOF	Masonry	Vaulted
			Concrete joists with masonry panels
		Wood/Timber	Thatched roof supported on wooden purlins or Shingle roofs
			Wooden beams supporting clay tiles, natural stone slates, manufactured wood panels
	FLOOR	Concrete	Flat or Waffle slabs
		Wood/Timber	Wood planks with ballast and concrete or plaster finish
			Wood planks supporting clay tiles, slate, plywood or manufactured wood panels on joists



## Roof Water Harvesting

Roof water from the houses and other paved areas to be collected and stored in sumps for reuse and also for recharging the bore wells after filtering (using pebble, charcoal, sand beds). It would be advantageous to plan this activity while constructing any new houses to collect as much roof water as possible and further for diverting this water to the sumps nearby and to the bore wells, after necessary filtering. Roof water could be harvested by connecting the pipes and bringing the rainwater to a common pipe and then to sumps (size depends on roof area and requirement) after passing through filter beds. This water can be used for flushing, gardening, washing etc. For the new houses, harvesting of roof water, through sumps and recharging bore wells could be planned.

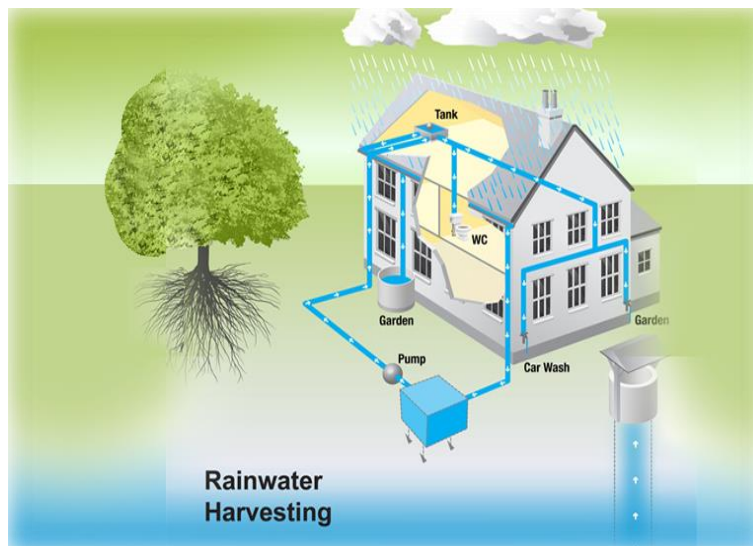


Fig 2.16 Rainwater Harvesting

### 2.3.1.2 Roads & Drainage

#### Road Network:

- The overall connectivity of village road is quite good as shown in Fig 2.17.
- The formation width of the village roads is 6m with carriageway 3.75m, and 1.25m wide side shoulders.
- Almost 95% of village roads are pucca and only 5% are kutchra roads
- The roads are made under Govt. Schemes like Pradhan Mantri Gram Sadak Yojana and State PNRD Department.
- **The roads do not have street lights in the village area.**

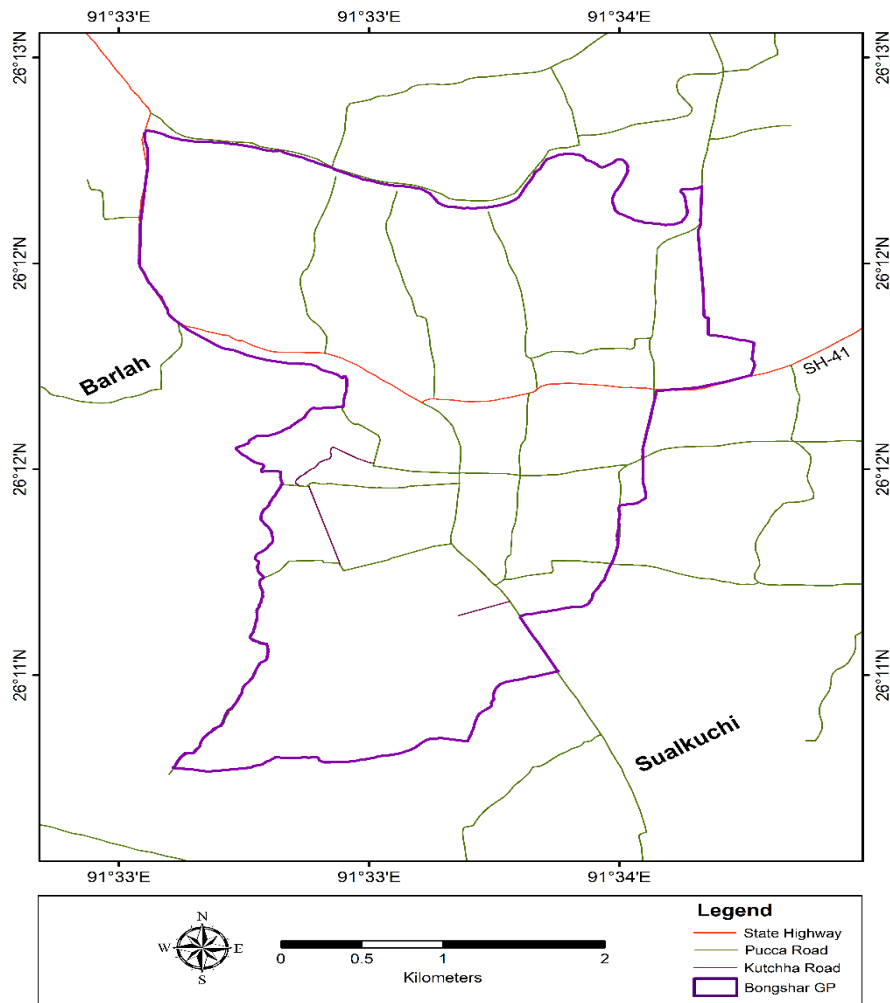


Fig 2.17 Spatial map of Bongshar Village Roads

Table 2.4 Road Transportation

Road Transportation (Pucca Roads)	Length Covered (Km)	Percentage Covered
Village Road	12.89	75.34
State Highway	4.22	24.68

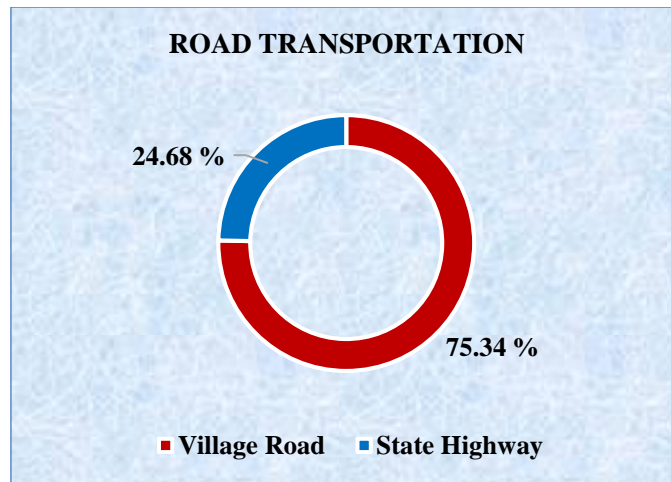


Fig 2.18 Percentage Distribution of Village Road & State Highway

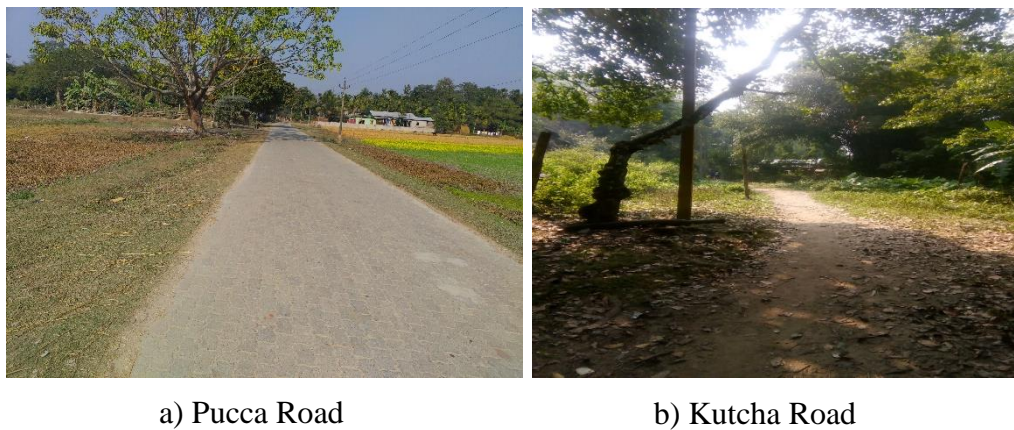


Fig 2.19. Village Roads

**Drainage:**

- Drainage line construction is underway and almost 40% drainage work is completed in the village.
- Some local people are also employed through MGNREGA for construction purposes.



Fig 2.20 Drainage line under construction

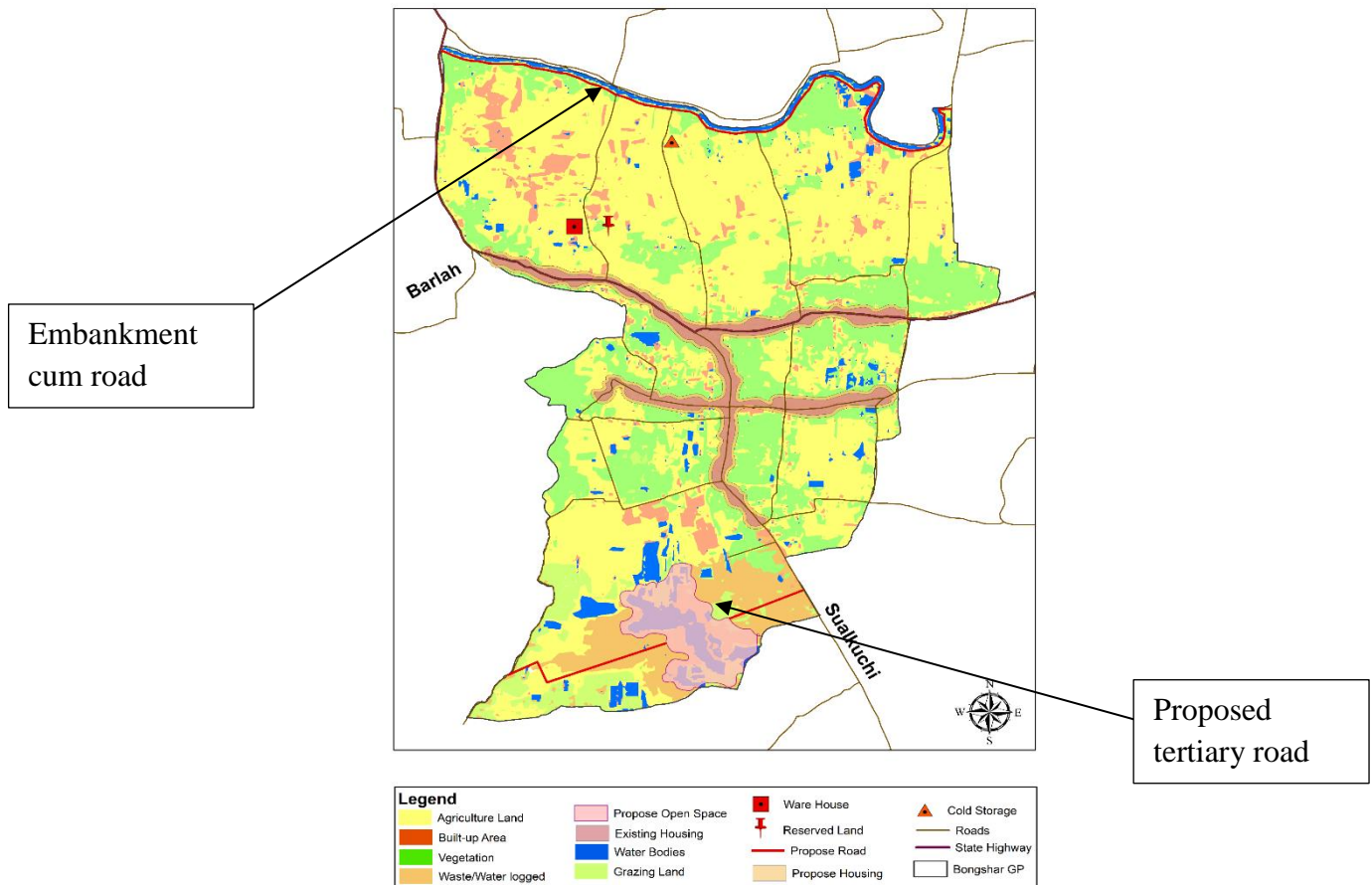


Fig 2.21 Proposed Road Network Development

## Proposed Road Network Development

The Overall connectivity of Bongshar village is quite good. An embankment cum road as shown in Fig 2.22, of length 4.20 km is being proposed to be constructed along the Sesa River, which forms northern boundary of the village.

- ✓ To prevent flood inundation
- ✓ Irrigation purposes
- ✓ Better connectivity

Around 5% roads are kutchha, which needs to be built pucca in the next 5 years. Tertiary Road connecting with proposed reclamation of wasteland is proposed for better connectivity with the region. The vision is to preserve the agricultural land and vegetation.



Fig 2.22: Embankment cum road

## Proposed Road Development

### Road Finish & Material

Use of **pervious concrete or pavers** for proposed pucca roads and present kutchra roads is advised, as it allows rain water absorption and helps maintain ground water.

### Pavements

Need for **permeable pavements** (min 3ft wide), is advised with a 6inch rise wrt. street level along at least one side of the Tertiary roads.

### Streetlights

Solar streetlights, at distance of 2.5 - 3 m to be installed along all Secondary and at distance of 4-5m for all Tertiary streets recommended, with particular provision at street corners

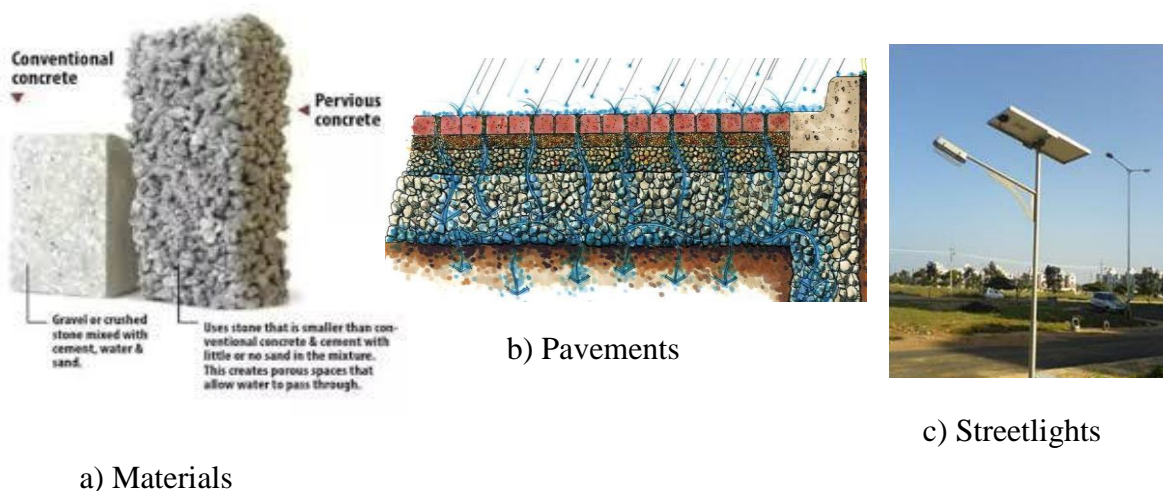


Fig 2.23: Proposed Road Development

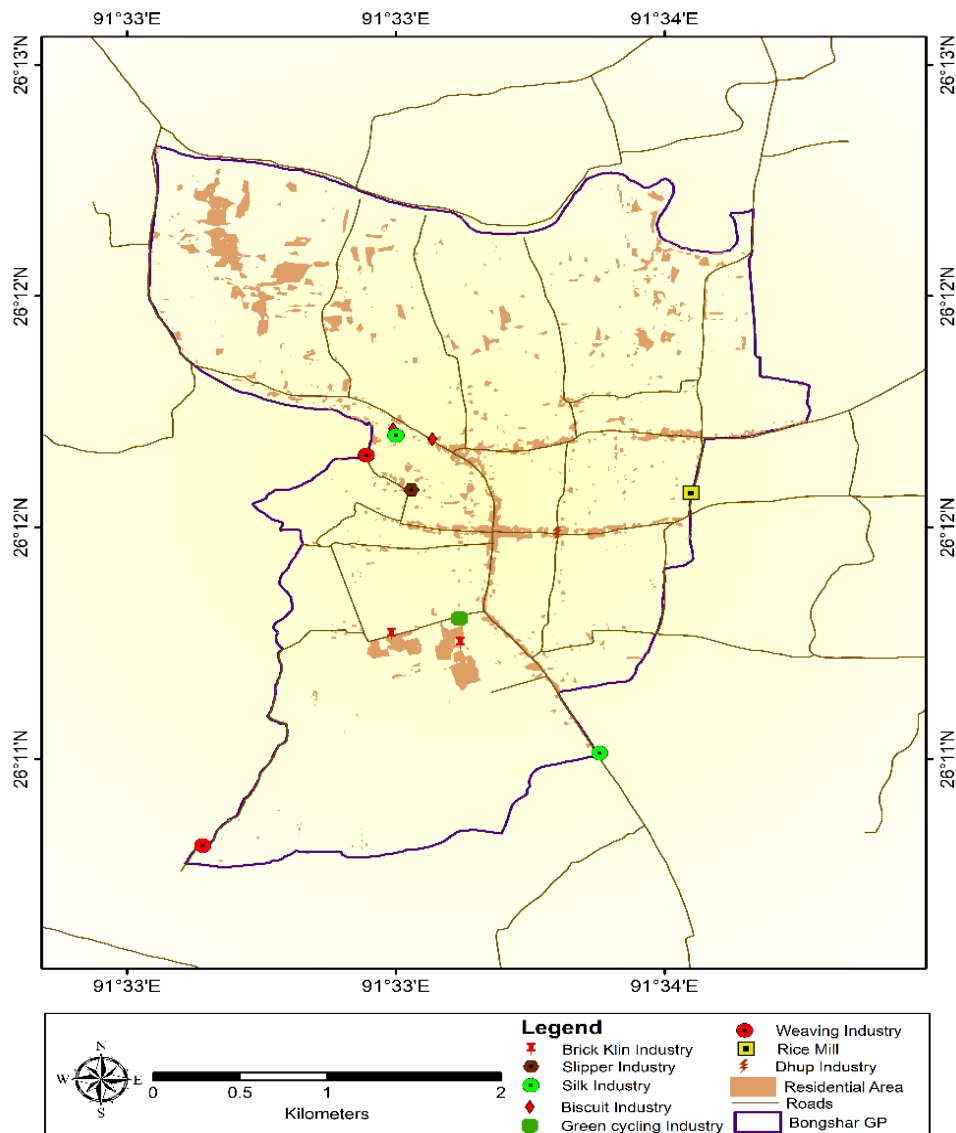

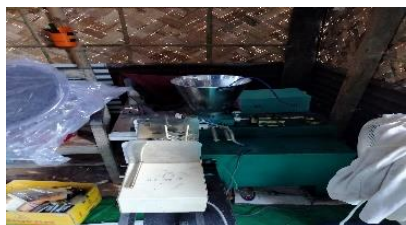






Fig 2.24: Spatial map showing location of industries

### 2.3.1.3 Industry

The spatial location of different industries is displayed in Fig 2.24. There are various industries like Brick Kiln factory, slipper factory, biscuit factory, green cycling factory, silk factory, agarbatti factory, rice & mustard mill. A brief description of all the existing industries are presented in Table 2.5.

**Table 2.5: Industries Details**

<b>Small Scale Industries</b>		
1	<b>Silk Factory</b> 	<ul style="list-style-type: none"> <li>• Area covered is around 5700 sq. ft</li> <li>• 10-12 people employed</li> <li>• Market linkage- Sualkuchi</li> <li>• Semi-machanized machine used</li> </ul>
2	<b>Agarbatti Factory</b> 	<ul style="list-style-type: none"> <li>• Area covered is around 2880 sq. ft</li> <li>• 12-15 people employed</li> <li>• Market linkage- Guwahati City</li> </ul>
3	<b>Slipper Factory</b> 	<ul style="list-style-type: none"> <li>• Area covered is around 1400 sq. ft</li> <li>• Girl entrepreneur along with her family members</li> <li>• Raw materials from Guwahati city</li> <li>• Market linkage nearby market</li> </ul>
<b>Medium Scale Industries</b>		
4	<b>Bakery</b> 	<ul style="list-style-type: none"> <li>• Area covered is around 1400 sq. ft</li> <li>• 14-15 people employed</li> <li>• Market linkage- nearby market</li> <li>• Bread, biscuits, cookies, etc.</li> </ul>

5	<p style="text-align: center;"><b>Weaving</b></p> 	<ul style="list-style-type: none"> <li>• Total weaving machine set (haal) 1500</li> <li>• Families employed around 100</li> <li>• Gamosa, Saree, Dhoti set, Dupatta, Mekhela Sador, etc.</li> </ul>
<b>Large Scale Industries</b>		
6	<p style="text-align: center;"><b>Brick Kiln</b></p> 	<ul style="list-style-type: none"> <li>• Total area covered 25 ha</li> <li>• Total people employed 140</li> <li>• Workers female to male ratio 50:50</li> <li>• Production capacity 19 lakhs/season i.e., from November to April</li> </ul>

## Proposed Industries

### *Bongshar as Silk Hub*

The GP Bongshar, comes under Sualkuchi block that produces the best silk in the state. The Muga silk and Pat silk along with Eri silk from this region is famous for its quality not only in the state but also in most of the parts of India. Different types of items produced in the village are presented in table 2.6.



Fig 2.25: Silk Weaving & Products



**Table 2.6: Items produced from different fabrics**

SL No	Fabrics	Items produced
1	Muga Silk	Mekhela, chador, Plain fabric in than, stoles, jacket, etc.
2	Mulberry Silk	Mekhela chador, Riha, Than fabric, Gamocha, Dhoti, Challeng chador, etc
3	Tasar Silk	Mekhela, chador, Than, waistcoat, jacket, etc.
4	Cotton	Gamocha etc
5	Eri, Khadi	None

### ***Challenges***

- ✓ Handloom industry is not thoroughly organized
- ✓ Majority of the weavers rely on middlemen to sell their products
- ✓ Large number of looms are lying unutilized just because of a shortage of weavers
- ✓ Unusual sudden price rise in yarns
- ✓ This sector has not attained proper awareness as far as weaving related challenges are concerned.

**The following measures can be taken keeping in view the aspects of product diversification, better marketability and higher profitability:**

- The establishment of ‘yarn banks’ of muga and mulberry silks. These silk yarns should be made available to the weavers at reasonable market prices
- Various training programs and other support should be provided to the weavers to enhance their weaving skills
- Certain welfare schemes with health and maternity benefits to weavers should be provided for motivating them to work
- Participation in various expos and haats should be made possible
- The government of Assam should look into the matter of idle, inactive looms and sick units.

- Common Facility Centre or CFCS for weaving preparatory machines such as winding, double-twisting, and mechanized warping may be established to be operated on a nominal charge basis.
- Jacquards of higher capacities with pneumatic lifting mechanisms may be provided to existing innovative designers
- CFCS for embroidery machines can be established so that Muga/Mulberry/Tasar plain silk woven on power looms can be embroidered for value addition and better marketability.
- Design studios with innovative professional designers may be provided for diversification of designs
- The weavers should be provided training in export-import policies in order to prepare them as exporters and importers of silk products. This practice will help them get rid of the grip of middlemen.
- There is a need for a brand name for the Silk products.

**The following work has been done by RuTAG-NE, IIT Guwahati in contribution to the Silk Weaving Industry:**

### **1. Development of Endi (Eri) Silk processing Technology/ Eri Cocoon Opener**

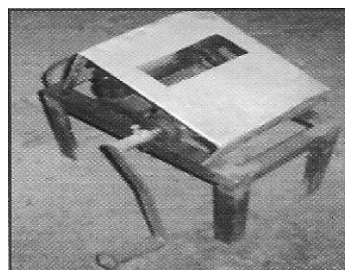
#### **Objectives**

- To standardize Eri cocoon opening mechanism
- Reduction on cost of production
- Enhancement of artisans/ Eri Silk spinners' earnings/wages

Artisans engaged in Eri Silk spinning feel that their daily earnings from such activities is much less than other economic avenues as the appliances used for Eri opening and spinning are age old and less productive. Therefore, these artisans are migrating from the Eri Silk sector to other remunerative activities.



Eri Cocoon Opener



Lap Cutting Machine

Fig 2.26: Silk processing technology

### **Achievements:**

An Eri Cocoon opener was developed through several stages by RuTAG-NE. The machine was field tested. The chief Executive of TAGS, Late Padmashri R. N. Upadhyay observed that Lap quality and quantity of Eri silk with the machine has greatly improved (approximately 7.5 times).

### **Contribution towards strengthening RuTAG**

The resultant impact is that the artisans involved in the trade now earn about Rs. 200/- to 220/- per day, and many artisans have returned to the trade.

## **2. Fabrication of Upgraded Muga Reeling Machine**

### **Objectives**

- To standardize Eri cocoon opening mechanism
- Reduction on cost of production
- Enhancement of artisans/ Eri Silk spinners' earnings/wages.

Up gradation of existing four bobbins reeling machine to six bobbins Muga reeling machine to increase the income level of rural artisans.

### **Achievements:**

Upgradation of the machine and have succeeded to increase *Muga yarn* reeling productivity by providing two additional bobbins in the existing machine. Added advantage to the modified technology are as follows:

- It increases the production of Muga Yarn Reeling
- Can be operated both manually and electric power

The technology has been handed over to Adarsha Sonali Atma Sahayak Got, Nagaon, Assam, for further dissemination.



Fig 2.27 Upgraded Muga Reeling machine



Fig 2.28 Motorized Re reeling machine for Muga

### 3. Upgradation of Motorized Re-reeling Machine for Muga

#### Objectives

To develop a cost effective and user friendly *Muga yarn re- reeling* machine in order to increase the income level of the artisans.

#### Achievements:

The traditional method of re-reeling of muga yarn by hand is laborious and time consuming. A motorized re-reeling machine has been developed which could remove the hazard of hand reeling. The machine can be operated both manually and with electric power. Speed control is also possible for getting different twist of the thread. It enhances the capacity of re- reeling of muga yarn by providing six numbers of bobbins with a motor of 0.5 hp.

The technology has been handed over to Adarsha Sonali Atma Sahayak Got, Nagaon, Assam, for further dissemination.

### 2.3.2. Social Infrastructure

#### Health

There is one public health centre in Bongshar GP. The details of the health centre are as follows:

No of Doctors: **1**

Total Staff Members: 5, including Nurse and Compounder

Doctor to Patient ratio: **8750:1**

Commonly found diseases: fever, gastritis, ARI, diabetes, BP, etc.

Main cause of diseases: due to food habits & lifestyle



Fig 2.29 Health Centre (Bongshar GP)

### Existing Facilities

- ✓ OPD
- ✓ Laboratory for in house analysis
- ✓ 10 beds for in house patients
- ✓ Labour room
- ✓ Minor Operation Theatre and stabilization room

The lab facilities are not adequate considering the doctor-patient ratio. For disabled or senior citizens, one stretcher, cycling tools are found in the existing hospital. There is a demand that this hospital needs to be upgraded to a Super Specialty Hospital in near future. However, immediate needs are construction of boundary walls, 24X7 basis doctors, to increase strength of doctors and staff members, to increase number of beds, ambulance services and security arrangements.

### Education

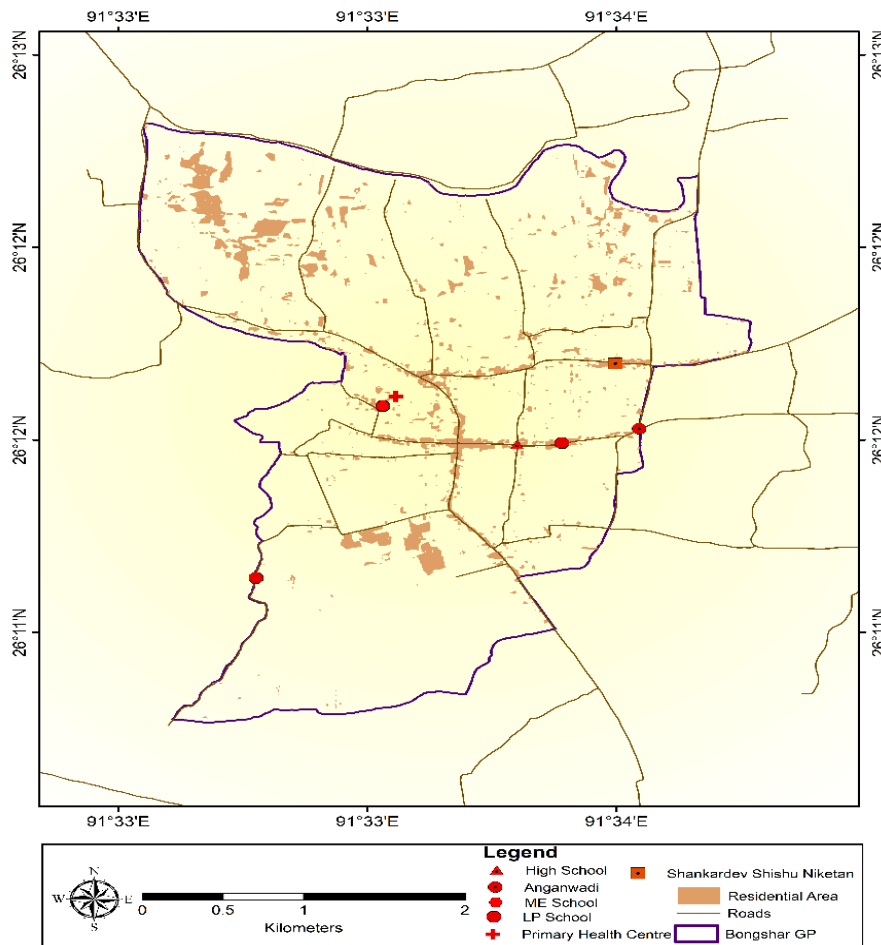
- The village has good number of schools but the infrastructure in some schools are very poor and some of them lack basic facilities.
- The dropout ratio of students is 1%.



Fig 2.30: Educational Institutes in Bongshar

**Table: 2.7 Educational Institute**

Infrastructure Facility	Present Status
Lower Primary School	08
ME School	03
High School	02+1(private)
Higher Secondary	01
College	-
Art School	01
Aanganwadi	01



**Fig 2.31: Spatial Map showing Health & Educational Institutes**

### 2.3.3. Other Social Infrastructure

There are various other social infrastructures present in the village like post office, bank, committee hall, playground, etc. as shown in table 2.8.

**Table 2.8: Other Social Infrastructure**

Infrastructure Facility	Present Status
Post office	1
Auditorium	1
Bank	1
Playground	1
ATM	1
Libraries	8
Religious Places	35
GP office	1
Committee Hall	3
Govt. Department	3
Artificial Cow reproduction Centre	1
Museum	1



a) Bank



b) Temple



c) Club

**Fig 2.32: Other Social Infrastructures in Bongshar GP**

## 2.4 Agriculture

The total agricultural land is spread over 5.05 sq. km comprising of single, double and multiple cropping intensity. Majority of area around 78% is used for double cropping, 18% for single crop and around 4% is used for multiple cropping. The major cultivation in the region comprises of rice, mustard, sugarcane and some vegetables.

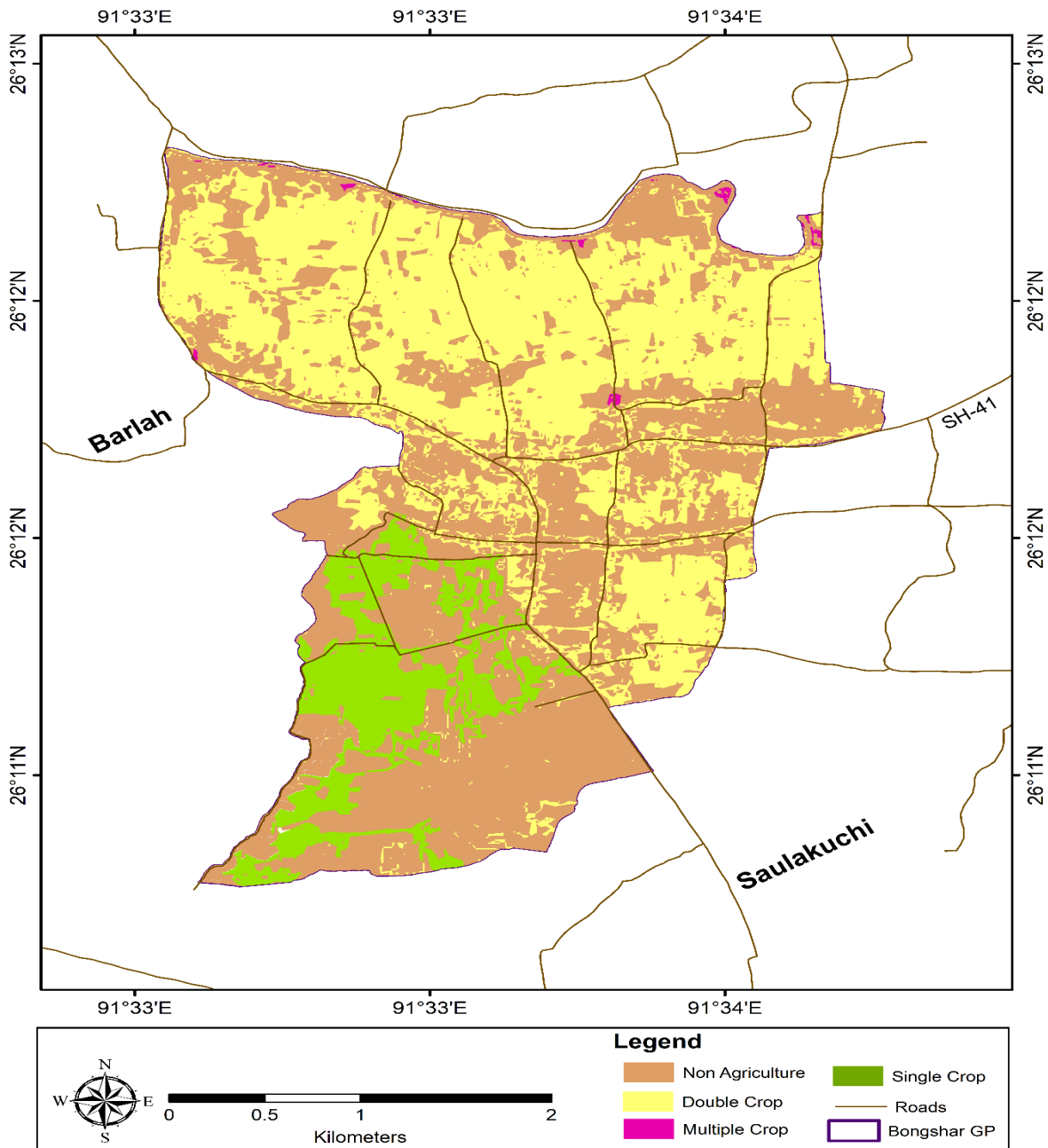


Fig 2.33 Agriculture Cropping Intensity



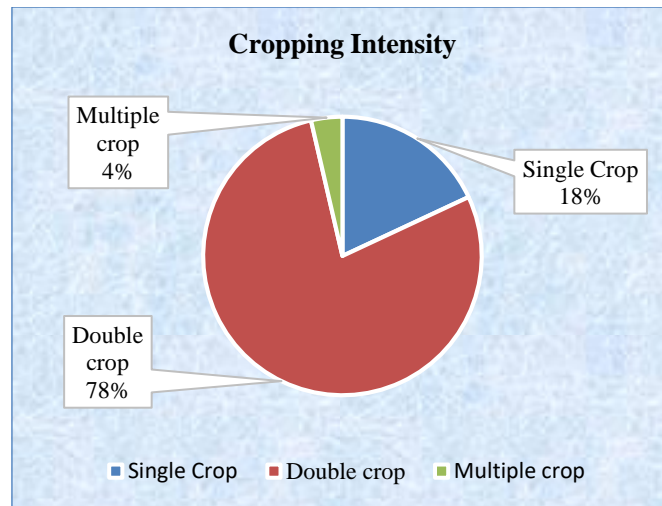


Fig 2.34 Percentage distribution of cropping intensity

### Rice Cultivation:

- The common varieties of rice produced by the farmers are Joha, Aijung, Ranjit, Bahadur, Sonalika, etc. Majority of farmers are small farmers having small land holding capacity and generally perform self-sustenance type of agriculture. Farmers having larger land holding sell their produce to traders from city and other nearby places.
- There is no proper irrigation system for the farmers, and one govt. sponsored irrigation system is non-functional at the moment.
- Around 90% of farmers use chemical fertilizers for rice cultivation and some of the farmers have acquired training from SIRD, Assam.
- The seeds are mainly produced by the farmers themselves and sometimes they procure from the State Government. The machinery like tractor and power tiller are used for land preparation and other unit operations are mainly performed using traditional method.



Fig 2.35 Rice Cultivation



Fig 2.36 Mustard Cultivation

**Mustard Cultivation:**

Mustard is cultivated in both single as well as double cropping intensity. The cultivation is done in household level as well as in farmland. There is a local mustard oil extraction mill in the village, where the farmers processed their raw materials and sell their produce to the nearby market as well as for self-consumption.

**Sugarcane Cultivation:**

Sugarcane is cultivated in rice field, along with banana or vegetable field. Majority of sugarcane produce is sold to the outside village traders and some of the farmers extract sugarcane juice with the traditional method using Ox animals. They used to make local Jaggery product from the juice and the sugarcane molasses are used for feeding the Ox.



Harvested Sugarcane

Traditional method of sugarcane extraction

Fig 2.37 Sugarcane Cultivation



Fig 2.38 Jute Cultivation

### Jute Cultivation

Jute was one of the major cash crops cultivated in these areas 15-20 years back which accounted around 20% of total agricultural land in the Gaon Panchayat. Currently jute cultivation is almost nil in these areas and **some of the major constraints** that led shifting from jute to other cultivation are:

- Availability of other low-cost alternatives like plastic
- Due to limited holding and small amount of production, it is difficult to attain production cost efficiency at the grower's level
- The marginal and small grower's regularly face several other constrains while marketing their products, which has widespread negative influence upon their farming decision in the subsequent crop years
- Unstable or low price of raw Jute, unavailability of quality Jute seed, lack or limited irrigation water at sowing period, diseases, labour shortage during peak season, weed problem, lack of retting water/retting pond
- The increasing cost of cultivation and the fluctuating market price often affect the farmers

The cultivation process of Jute is less harmful to the environment and it enhances nutrient availability of the soil. Biodegradable Jute fiber protects the environment and maintains the ecological balance. Due to this ever-increasing awareness, ecofriendly products and services made from natural fiber are highly acclaimed in the market nowadays.

Environmental sustainability is ensured through the use and adoption of environment friendly, renewable, biodegradable resources. In the process of achieving environmental sustainability, it is utmost important to ensure uninterrupted fiber supply. This is possible only when the fiber cultivation is viable in terms of its economic return. This demand adequate concerns on the issues and constrains of the farmers from a holistic perspective.

To apprehend the opportunities arising out of environmental awareness, strengthening the existing production base, removing fluctuating decline in production as well as acreage, value addition through quality production and promoting diversification at the grower's level is suggestive. Identification and removal of the major constraints, capacity building, creation of awareness on modern method of cultivation can contribute to a large extent in this context.

### **Vegetables:**

Vegetables are cultivated both in household level as well as farmland. The common vegetables grown are potato, tomato, brinjal, cabbage, cauliflower, gourds, spinach, ginger, garlic, onions, chili, etc. Out of all the vegetable crops, potato, tomato, brinjal, cabbage is cultivated in large farmland and are used for business purpose.

### **Horticulture:**

Among horticultural crops, Banana, Mango, Jackfruit and coconut are grown in large farmland. Banana is generally cultivated integrated with farm ponds, and, Mango and Jackfruit are cultivated together covering area around 40 hectares altogether. The Mango and Jackfruit are sold through an NGO to the market.

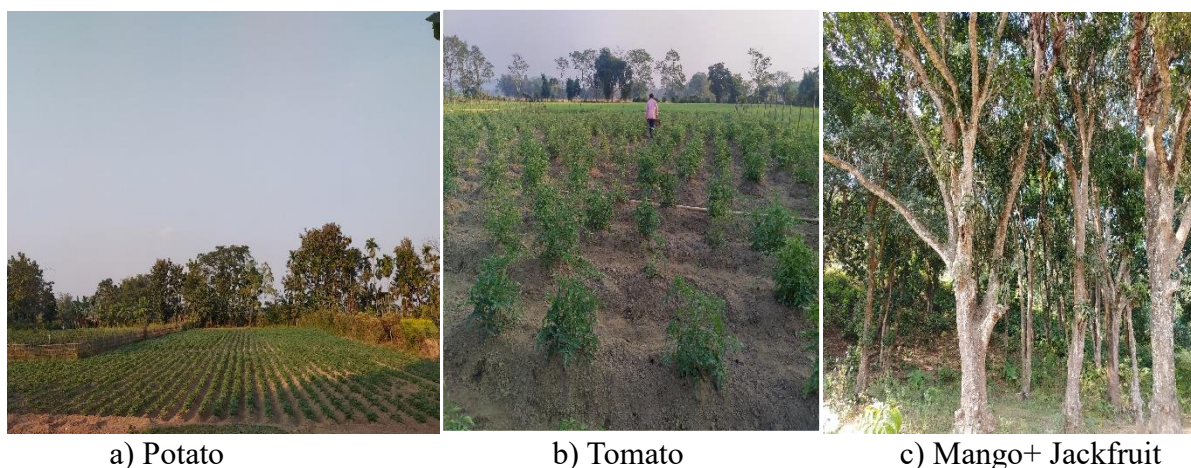







Fig 2.39 Vegetable cultivation & Horticulture plantation

## Economically Important Plants

Bongshar is blessed with some economically important plants that can add to some additional income to the villagers. Some of the economically important plants present in the village are presented in table 2.9.

**Table: 2.9 Economically Important Plants**

Sl No	Plant Name	Uses
1	Sisoo 	Furniture, agricultural and musical instruments, carvings, boats, flooring, etc.
2	Teak 	Furniture, carving, turnings, exterior construction, boats, etc.
3	Bamboo 	Furniture, accessories, houses, fencing, bamboo vinegar, etc.

4	<p style="text-align: center;">Neem</p> 	Medicinal purpose, cosmetics, etc.
5	<p style="text-align: center;">Agar</p> 	Agar Oil, Agarbatti, perfume, etc.

## Organic Farming

### *Need for Organic farming*

The need for organic farming arises from the unsustainability of agriculture production and the damage caused to ecology through the conventional farming practices. Organically cultivated soils are relatively better attuned to withstand water stress and nutrient loss. The monoculture of high yielding seeds required external inputs of chemical fertilizers. The fertilizers also destroy soil organisms. The long-term effect was reduction of crop yields. The damaged soil was easily eroded by wind and water. The eroding soil needed use of continuously increasing quantities of fertilizers, much of which was washed/leached into surface and underground water sources.



Fig 2.40 Organic Farming

### ***Benefits of Organic Farming***

#### **i. Improvement in soil quality**

It is reported that soil under organic farming conditions had lower bulk density, higher water holding capacity, higher microbial biomass carbon and nitrogen and higher soil respiration activities compared to the conventional farms, hence sufficiently higher amounts of nutrients are made available to the crops.

#### **ii. Increased crop productivity & income**

Poor farmers can improve their farm productivity and fertility while avoiding dependence on expensive external inputs. Organic farming can increase productivity and income, thus helping to improve food security.

#### **iii. Low Incidence of Pests**

Bio-control methods like the neem-based pesticides to *Ti-ichoderma* are available in the country. Indigenous technological products such as Panchagavya (five products of cow origin) found to control effectively wilt disease in tomato.

#### **iv. Employment Opportunities**

According to many studies, organic farming requires more labour input than the conventional farming system. Hence, labour unemployment and under employment will find organic farming an attraction. Moreover, the problem of periodical unemployment will also get mitigated because of the diversification of the crops with their different planting and harvesting schedules resulting in the requirement of a relatively high labour input.

## v. **Indirect Benefits**

While the consumers get healthy foods with better palatability and taste and nutritive values, the farmers are indirectly benefited from healthy soils and farm production environment. Eco-tourism is increasingly becoming popular and organic farms have turned into such favourite spots. Protection of the ecosystem, flora, fauna and increased biodiversity and the resulting benefits to all human and living things are great advantages of organic farming which are yet to be properly accounted for.

## **Proposed Objectives**

**(i)** Sustainable Agriculture **(ii)** Increasing Agriculture Production **(iii)** Food Self-Sufficiency **(iv)** Environmental Protection **(v)** Conservation of Natural Resources **(vi)** Rural Development.

## **Food Processing**

The agro-climatic conditions of the region favor growing of a variety of fruits, vegetables/ spices like coconut, banana, mango, jackfruit, pineapple, orange, ginger, turmeric, chillies, pepper, etc. The sector has the potential to grow at a rapid pace in Assam with the increasing demand for processed food. With better quality planting material, organic farming, adequate research support and infrastructure, the region could easily cause a major boom in horticulture and food processing sector.

With primary focus on processing of surplus of fruits, vegetables and grains produced in the region, the following crops may be targeted for processing:

- Pineapple
- Citrus – orange, lemon
- Jackfruit
- Turmeric
- Potato
- Tomato
- Banana
- Papaya
- Ginger
- Rabi & Kharif Vegetables



**Table: 2.10 Food processing items**

Type of Units	Major Raw Materials Required
Pulping & Concentrate	Mango, pineapple, litchi, ginger, banana, tomato
Juicing	Mango, pineapple, litchi, orange, banana, guava
Jam & Jelly	Mango, pineapple, orange, guava
Chips	Banana, jackfruit, potato
Rice mill	Paddy
Vegetables (IQF)	Kharif & Rabi Vegetables
Confectionary	Pulp, concentrate, extracts of fruits
Dairy unit	Milk
Extraction unit	Ginger, turmeric, ayurvedic inputs
Spices processing unit	Cardamom, turmeric, coriander, black pepper, ginger
Dehydration unit (dry/powder)	Mango, pineapple, orange, tomato
Vegetable oil	Kharif, Rabi vegetables
Oleoresins	Ginger, turmeric

**Constraints in the growth of the sector:**

Many of the problems faced by the food processing units arise primarily on account of the perishable nature of raw material, seasonal nature of their operation and low scale of operation. Some of the specific problems are:

- ✓ Lack of efficient supply chain infrastructure and inadequate expansion of processing and storage capacity commensurate with agriculture production have been identified as the main

reasons for higher wastages, higher cost of production, lower value addition in food processing sector.

- ✓ Inadequate production and availability of processable variety of raw material is a major area of concern which arises due to inadequate emphasis on developing appropriate varieties and extension activities.
- ✓ Inadequate linkage of processors, exporters and bulk purchasers with farmers resulting in mismatch between the requirements of industry and supply of agri-produce by the farmers. The problem is often compounded by legal provisions relating to restrictions on commodity storage and movement.
- ✓ Food processing units, largely operating in MSME segment, face problem in their access to bank credit due to seasonal and perishable nature of the commodities handled by these units. High cost and inadequate credit do not attract prospective entrepreneurs choosing food processing sector for investment.
- ✓ Marketing of processed food is a major problem faced by food processors particularly the micro and small processors. Given the scale of operation, individual units are unable to invest in marketing and branding impacting performance of the sector.
- ✓ Sector specific Entrepreneurship Development training and Incubation Services are weak areas inhibiting growth of the sector.
- ✓ Traditional & ethnic food products have a huge potential both in domestic and overseas market. There is a need for R&D for product, process, and technology development to support this niche segment.

### **Proposed Objectives**

- ✓ Increase level of processing and preservation, particularly at farmer level, of perishables, to reduce wastages and increase value addition leading to higher income of farmers.
- ✓ Support the predominantly unorganized food processing segment to create employment opportunities in rural areas.
- ✓ Promote skill and human resource development to meet the increasing needs of the sector.
- ✓ Support processors in facilitating procurement, storage, movement of raw materials and promoting voluntary compliance of regulatory requirements.
- ✓ Generate more opportunities in agribusiness and food processing industry with a special focus on women.

### **Strategies to address the problem of food processing sector:**

- ✓ Promotion of cluster approach as the key strategy for intervention in the food processing sector with emphasis on strengthening and creation of integrated supply chain infrastructure to minimize wastages.
- ✓ Incentivize expansion of capacity and upgradation of technology for processing and preservation particularly for perishables.
- ✓ Promoting employment by incentivizing FPOs to engage in Agri-business and food processing and empowering farmers graduating to agri-entrepreneurs.
- ✓ Accelerate investment in food processing sector through collaboration between GOI, State Governments and other stake holders.
- ✓ Creating awareness on food quality & safety, training manpower for ensuring regulatory compliance, promoting voluntary compliance to regulatory standards through regime of self-certification and self-regulation.
- ✓ Strengthening of Institution operating in food processing segment for advancement of learning, dissemination of knowledge, entrepreneurship and skill training to meet the growing demand of the sector
- ✓ Support for R&D activities in products & processes, facilitate dissemination of latest innovation & technology for adoption, promoting best practices in food production, processing, packaging, storage and transportation.

## **2.5 Poultry & Animal Husbandry**

### **Piggery Farm:**

- ✓ There are around 50 piggery farms in the village.
- ✓ Around 65 families are employed in piggery farm.
- ✓ Large number of pigs are exported to Shillong and some of them are sold in the nearby market.
- ✓ Using traditional method in piggery farm.
- ✓ Not beneficiary of any Govt. Scheme and some of them are pursuing personal loan.

### **Proposed Objectives**

- ✓ To assist the economically weaker section including women by improving their livelihood condition by forming PRG and FPO as a source of additional income.



a) Piggery farm

b) Broiler farm

Fig 2.41 Piggery & Poultry Farm

- ✓ Expanding pig rearing among rural women with semi-intensive system.
- ✓ Scaling up production by minimizing preventable diseases, parasitic infestation etc.


#### Poultry Farm:




- ✓ There are around 20 broiler farms in the village.
- ✓ Around 10 families are employed in piggery farm.
- ✓ Sell broiler meat in nearby markets

### 2.6. Upper Land Area in the Village

The life in the upper land area in the Bongshar village is presented separately as shown in table 2.11. This elevated area is situated in the remote end of the village and has a huge potential for horticulture plantation.

**Table 2.11: Study of upper land area in the village**

<p style="text-align: center;"><b>Housing</b></p> 	<ul style="list-style-type: none"> <li>▪ Majority of houses are kutcha &amp; some semi-pucca</li> <li>▪ Generally, houses are made of bamboo &amp; mud</li> </ul>
---	---

<p style="text-align: center;"><b>Roads</b></p> 	<ul style="list-style-type: none"> <li>▪ 90% roads are pucca</li> <li>▪ Overall good connectivity with other parts of the village</li> </ul>
<p style="text-align: center;"><b>Water</b></p> 	<ul style="list-style-type: none"> <li>▪ People use water from well, hill</li> <li>▪ Some used sand and gravel filter for filtration</li> </ul>
<p style="text-align: center;"><b>Livelihood</b></p> 	<ul style="list-style-type: none"> <li>▪ Bamboo plant</li> <li>▪ Sisoo tree (permitted use as wood fuel)</li> <li>▪ Weaving</li> <li>▪ Cotton fibre</li> <li>▪ Rice cultivation</li> </ul>

## 2.7. Natural Resource

### Soil

The soil of Bongshar village is alluvial soil, which supports growth of wide variety of crops such as rice, sugarcane, cotton, jute, potato and other vegetables but they are deficient in nitrogen, phosphorus and humus.

**Table 2.12 Soil Characteristics of Bongshar**

Soil Type	Soil Depth	Surface Texture	Percentage
Alluvial soil	Deep (>100cm)	Loamy	100%

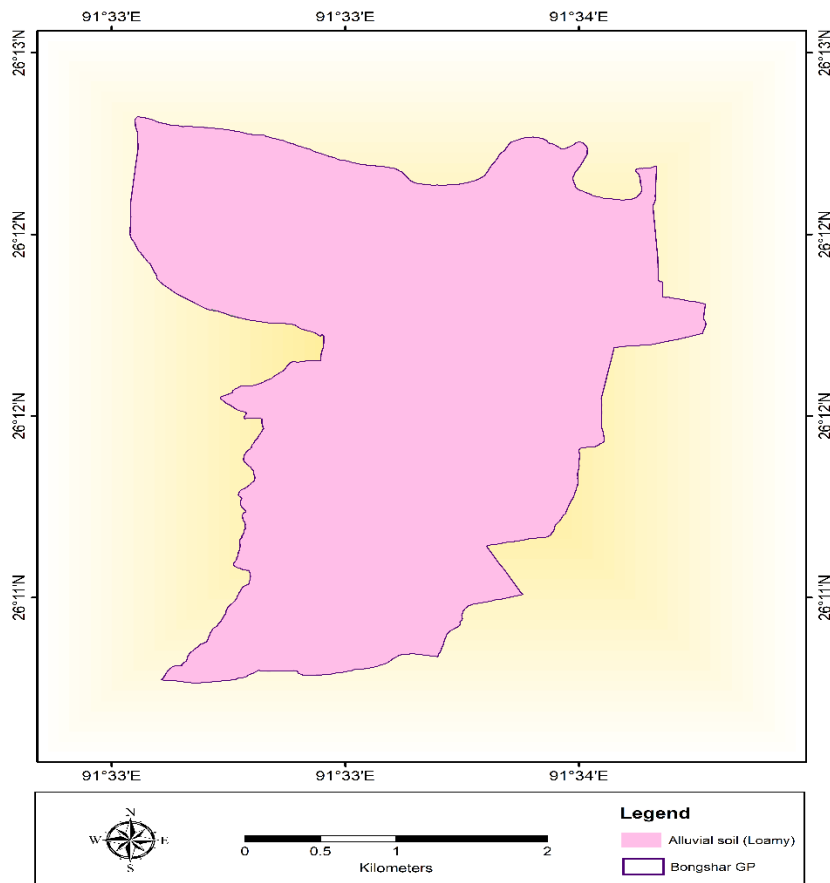


Fig. 2.41 Soil map of Bongshar

## Water

### *Water Quality:*

- Around 60% Household gets benefitted from tap water
- Almost 90% household have tube wells and 2% people have well.
- There is one water filtration and piped water distribution unit in the village from PHED.
- Some people use sand and gravel filter to reduce the iron content of the water.



Fig 2.42 Water from tap & tube well

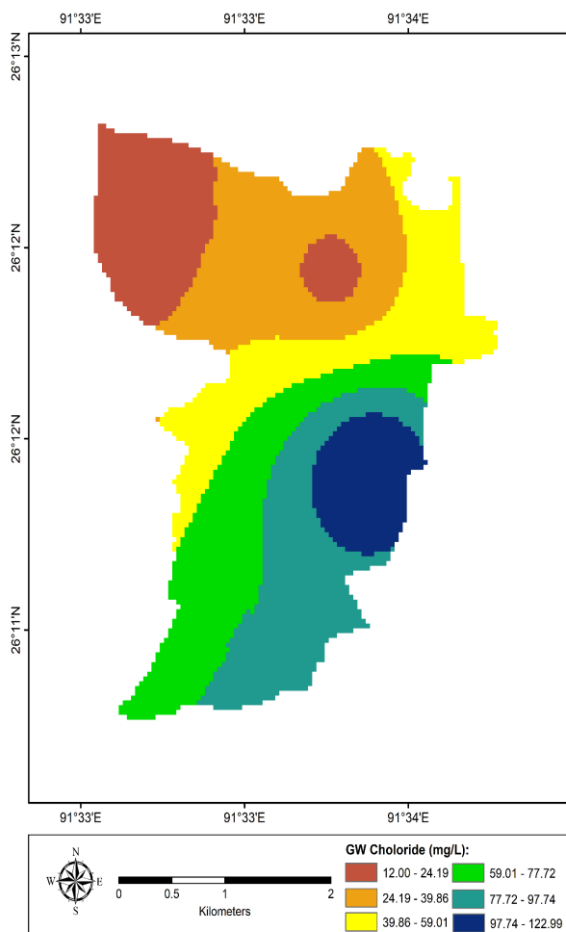
## Ground Water Quality:

### Chloride Content

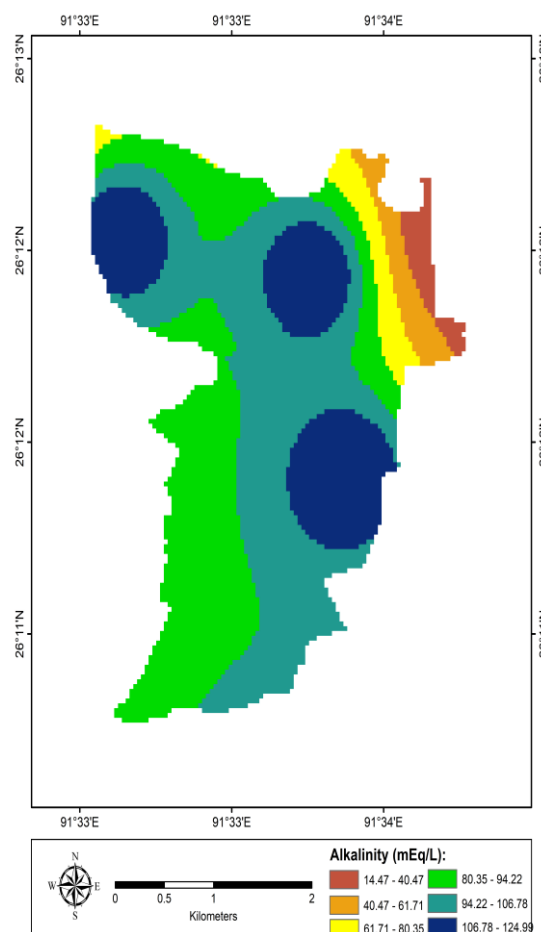
It has been observed that the concentration of Chloride in GW varies from 12 mg/L to 122.99 mg/L with mean of 61.93 mg/L. As per Indian Drinking Water Standard IS 10500: 2012, the permissible limit is 250 mg/L and the maximum limit is 1000 mg/L.

### Alkalinity

It has been observed that the concentration of Alkalinity in GW varies from 14.47 mEq/L to 124.99 mEq/L with mean of 74.71 mEq/L. As per Indian Drinking Water Standard IS 10500: 2012, the permissible limit is 200 mg/L and the maximum limit is 600 mg/L.



a) Chloride Content



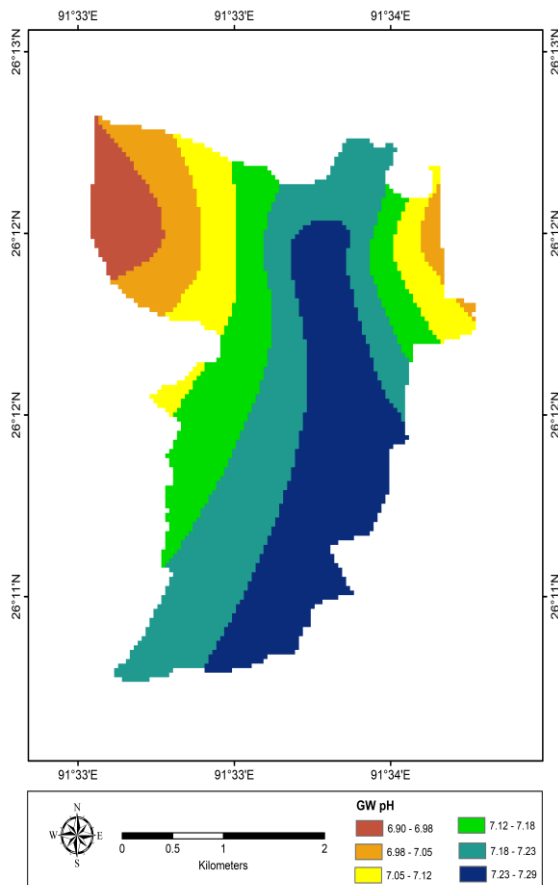
b) Alkalinity Content

## pH content

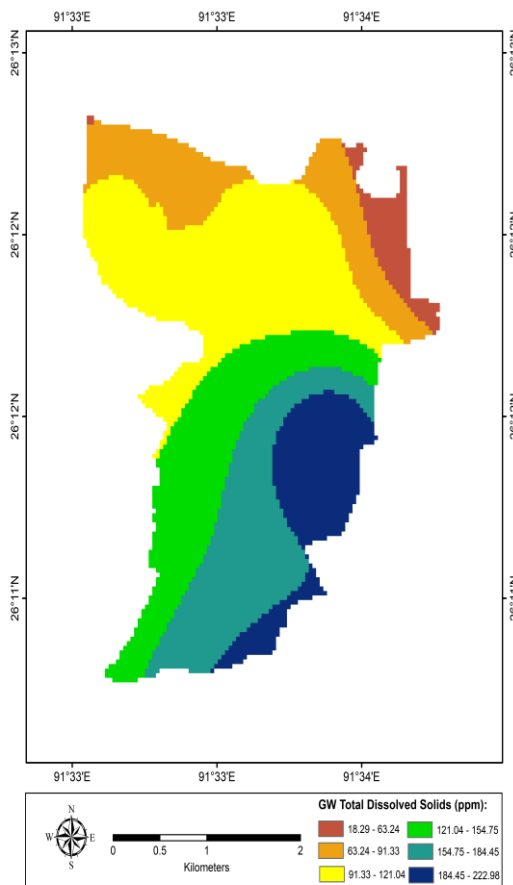
It has been observed that the concentration of pH in GW varies from 6.90 to 7.29 with mean of 7.10. As per Indian Drinking Water Standard IS 10500: 2012, the permissible limit is 6.5 to 8.5 and there is no relaxation in maximum limit.

## Total Dissolved Solids

It has been observed that the concentration of TDS in GW varies from 18.29 ppm to 222.98 with mean of 122.29 ppm. As per Indian Drinking Water Standard IS 10500: 2012, the permissible limit is 500 and the maximum limit is 2000 ppm.



c) pH Content



d) TDS Content

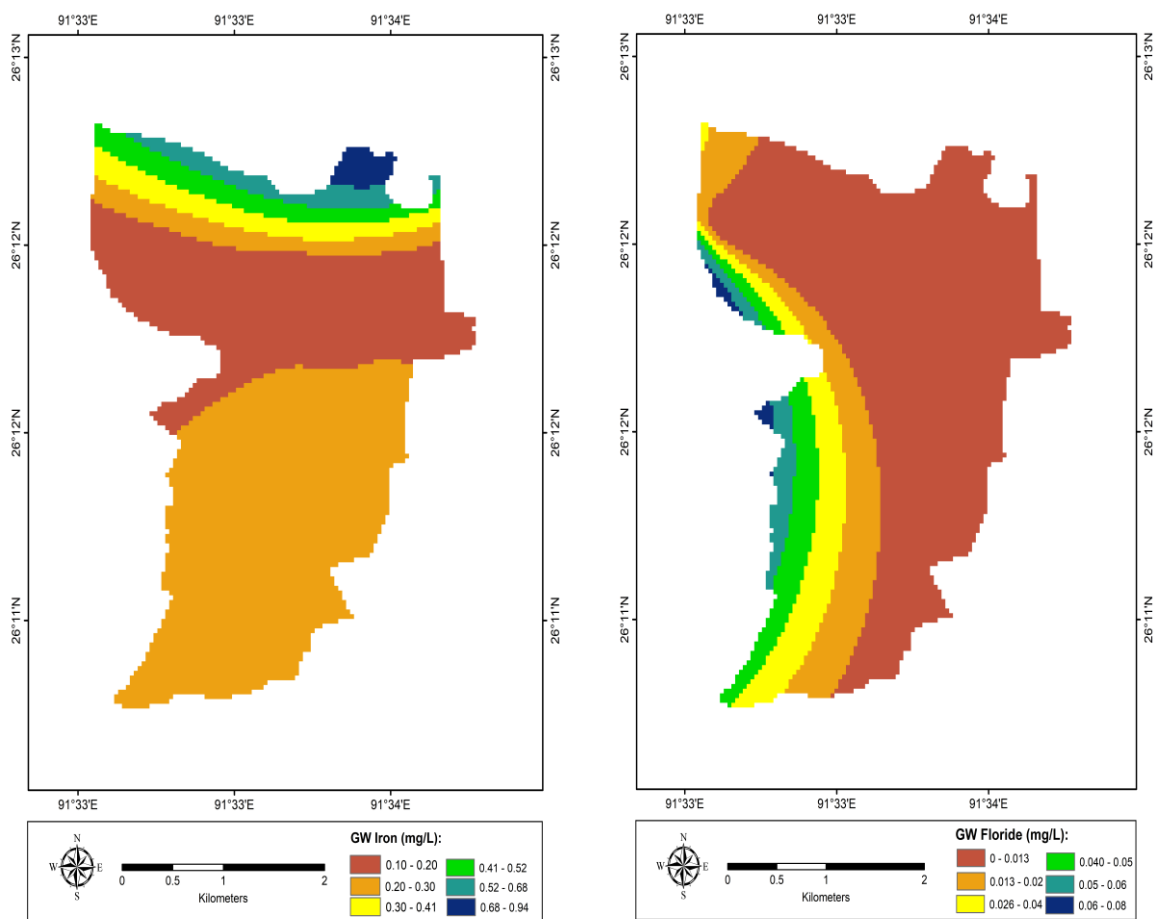


## Iron Content

It has been observed that the concentration of iron in GW varies from 0.10 to 0.94 mg/L with mean of 0.45 mg/L. As per Indian Drinking Water Standard IS 10500: 2012, the permissible limit is 0.30 mg/L and there is no relaxation in maximum limit. Hence, necessary measures need to be taken to deal with the concentration of Iron.

## Fluoride Content

It has been observed that the concentration of Fluoride in GW varies from 0 mg/L to 0.08 mg/L with mean of 0.04 mg/L. As per Indian Drinking Water Standard IS 10500: 2012, the permissible limit is 1 mg/L and the maximum limit is 1.5 mg/L.



e) Iron Content

f) Fluoride Content

Fig 2.43 Ground water quality

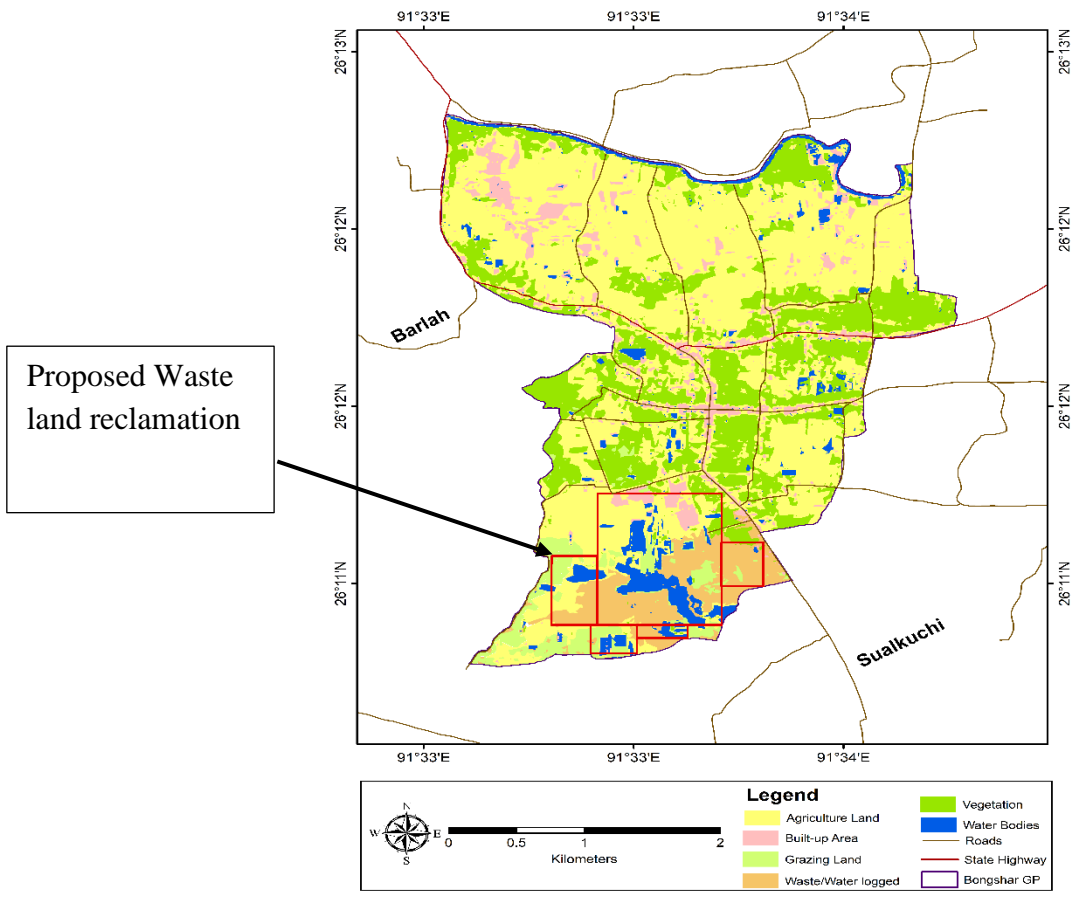


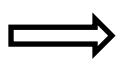
Fig 2.44 Proposed wasteland reclamation

## 2.8 Proposed Reclamation of Wasteland/Wetland

There is a huge prospect for pisciculture in the Bongshar GP considering the vast diversity of locally available breed, abundance of space, livelihood opportunities and alternate use for irrigation purposes for agriculture field. Retention ponds can be designed to store rainfall, run-off from roads and adjacent land, which may offer many opportunities for the local beneficiaries. The ponds can be used for pisciculture, eco-tourism, irrigation purposes that would provide excellent livelihood opportunities for the people.



Waste land in Bongshar



Retention Pond



Fig 2.45: Proposed Reclamation of Wetlands for Housing, Recreational & Enterprise

**Systematic reclamation of wet/wastelands, for;**

- Industry and enterprises, such as, Pisciculture, MSME, etc.
- Housing on wetland, particular precaution, such as, **bunds with retaining wall and stilted construction is prescribed** to support longevity of the buildings
- Large open – recreational spaces for sports or leisure
- Development of **Eco-tourism**
- Reclamation of present brick kiln factory for recreation/open space

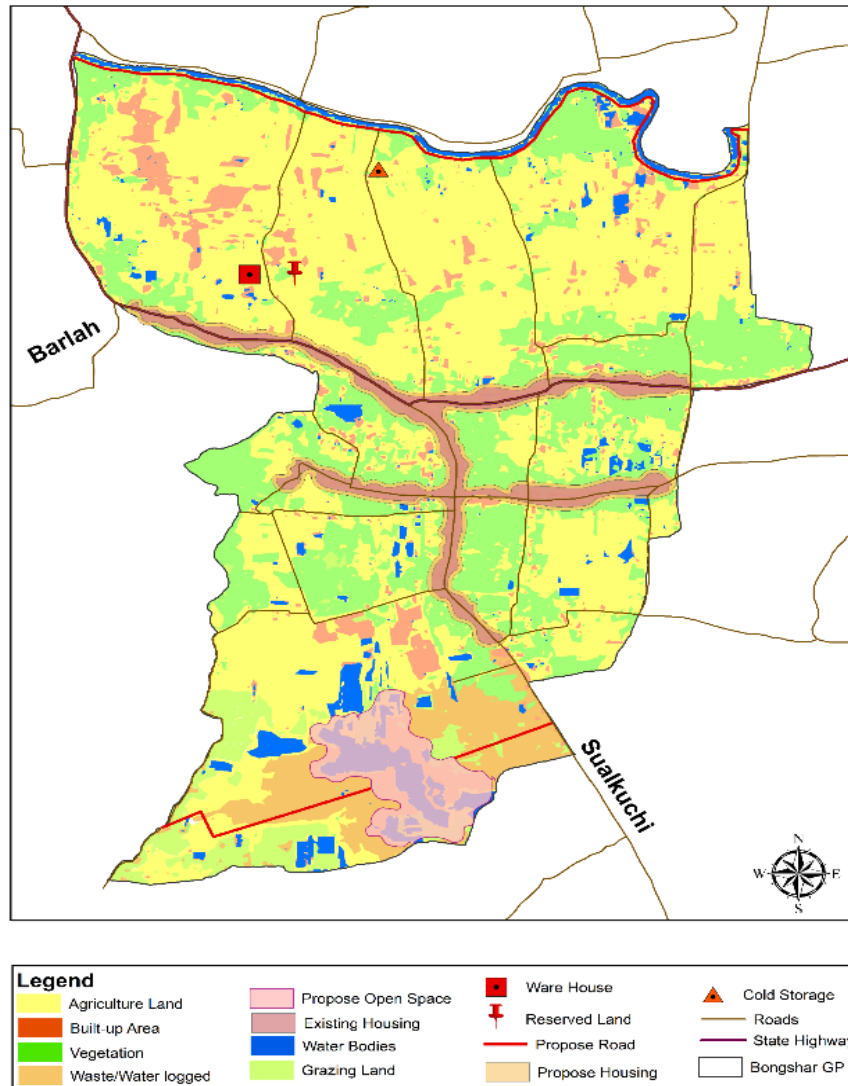


Fig 2.46 Proposed utilities in Bongshar GP

- The vast area of reserve land present in the north-western part of the village is proposed to be utilized for agro-based industry or veterinary service centre.
- Cold storage facility is needed in the village for vegetables and other perishable items.
- A centralized warehouse facility is being proposed for grains.
- Bhingeswar Devalaya can be developed to attract religious tourist, small artificial waterbody can be created, where tortoise, rare fish species, etc. can be introduced for tourist entertainment.
- Upgradation of existing playground with open stage for functions/events.
- Restaurants/ Hotel can be set up in the open space near the Sualkuchi/Bonshar Road (near Musuem).
- Piped water connection to all the village household from PHED.

## 2.9 Solid Waste Management Plan

Huge amount of waste is produced from industries, household, agriculture, animal husbandry, etc. Considering the waste produced, **the dustbins and landfill location has been identified and proposed as shown in the Fig 2.47.**

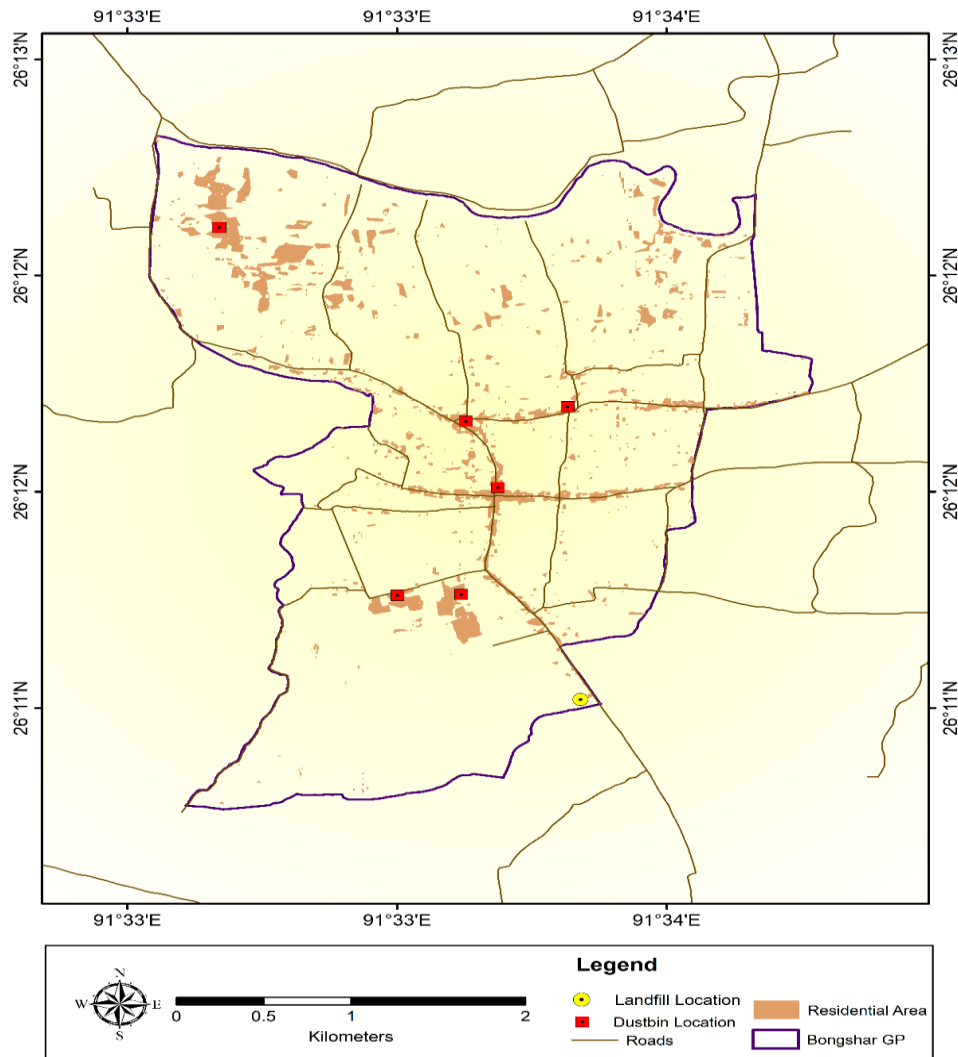


Fig 2.47 Dustbin & landfill location in Bongshar GP



Fig 2.48 Dumping site in Bongshar

## **Agricultural Waste Management**

Since, rice is the staple crop in the region, majority of agricultural waste produced in the region is from rice field. Sugarcane waste is well managed in the village considering its low volume by using it as an animal fodder and cooking fuel.

With developments in the technologies for its collection and utilization, rice straw to be used for better purposes such as for mushroom and energy production and for cattle feed.

### **Non- energy use of rice straw**

#### ***1. Using rice straw for mushroom production***

Mushroom cultivation is a profitable agri-business endeavor that produces food from rice and wheat straw while facilitating the proper disposal of this by-product in an environmentally friendly manner. The paddy straw mushroom, is considered to be one of the easiest mushrooms to cultivate because of its short incubation period of 14 days. On the other hand, cultivation of the oyster mushroom offers an on-farm technology for the bioconversion of poor-quality straw into nutritious food products. Mushroom cultivation can be a good source of income for the villagers as it has good demand and potential market in the region.



Paddy straw mushroom



Oyster mushroom

Fig 2.49 Mushroom production

#### ***2. Using rice straw for livestock feed***

Using rice straw for cattle feed is common in India. The rice crop should be cut as close to the ground as possible if the straw is to be fed to livestock as of the parts of rice straw, the stems are more digestible as they have lower silica compared to the leaves. Nutrient amendment is often done by treating the rice straw with urea, which is safer and more practical to use than anhydrous or aqueous ammonia.



Fig 2.50 Livestock feed



Fig 2.51 Biochar production

### ***3. Biochar production and utilization***

Using rice straw to produce biochar has huge potential. Biochar, a carbon-rich product, is used as soil amendment to improve soil productivity, carbon storage, and filtration of percolating soil water. Despite its huge potential, however, the processing of biochar requires energy for carbonization and for transportation of rice straw and biochar products. Until now, there is still a need for studies that demonstrate the feasibility of biochar production from rice straw in terms of energy balance and economic benefits.

#### **Using rice straw for anaerobic digestion (biogas production)**

Anaerobic digestion (AD) is a potential small-scale energy conversion technology for rice straw which is used to generate biogas fuel for cooking, heating air for drying, or for generating electricity.

The ratio of the layers of rice straw to cattle dung is 4:1, based on the weight with the specified moisture content (MC). Feedstock with 1.6 tons of chopped straw (15–18% MC) and 0.4 ton of cow dung (30–40% MC) is fed into a batch digester with a retention time of 100–120 days. Biogas is generated on the 7th day after feeding, with average yield of 4–5 m<sup>3</sup> biogas per day in about 100 days. Methane content is about 65%. In addition to the outputs, about 0.4 ton of digestate is obtained and used as organic fertilizer.

Considering the amount of waste produced from the rice field in the form of rice straw and abundance of cattle dung in the village, small scale anaerobic digester is feasible in the village.



Fig 2.52: Batch-AD system using rice straw and cow dung

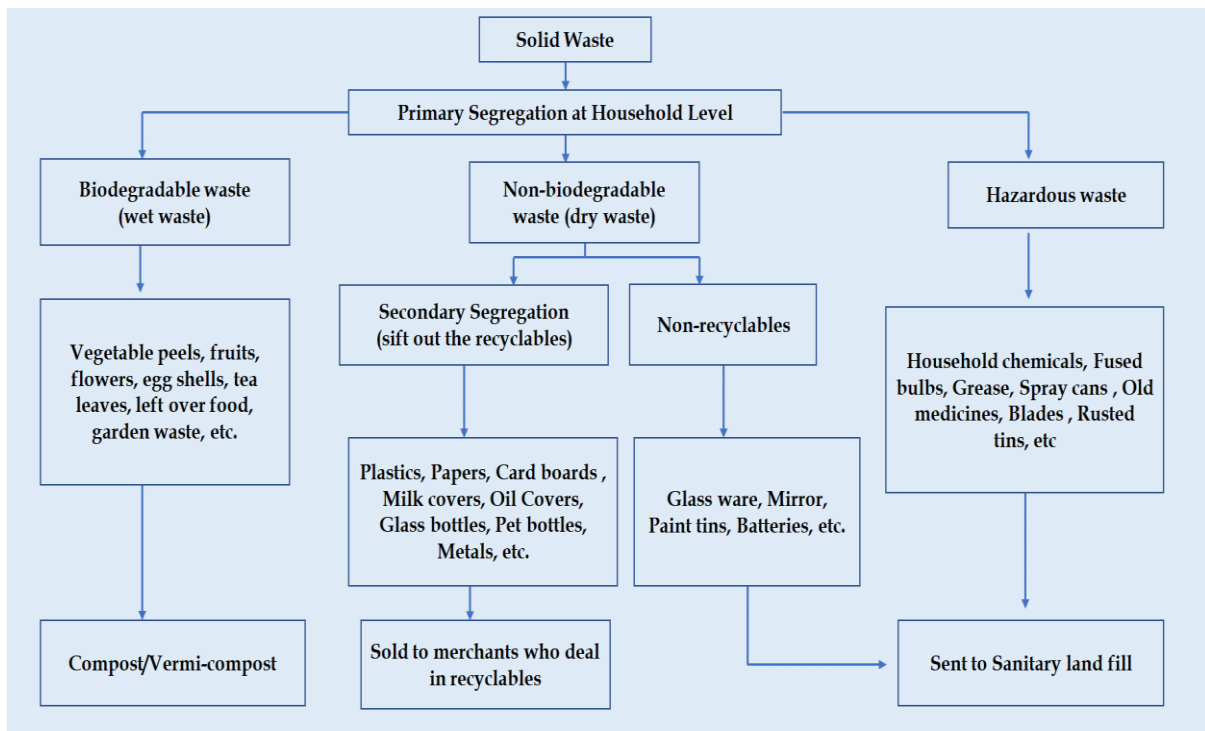


Fig 2.53 Solid Waste Management Plan



## 2.10 Growth Projection

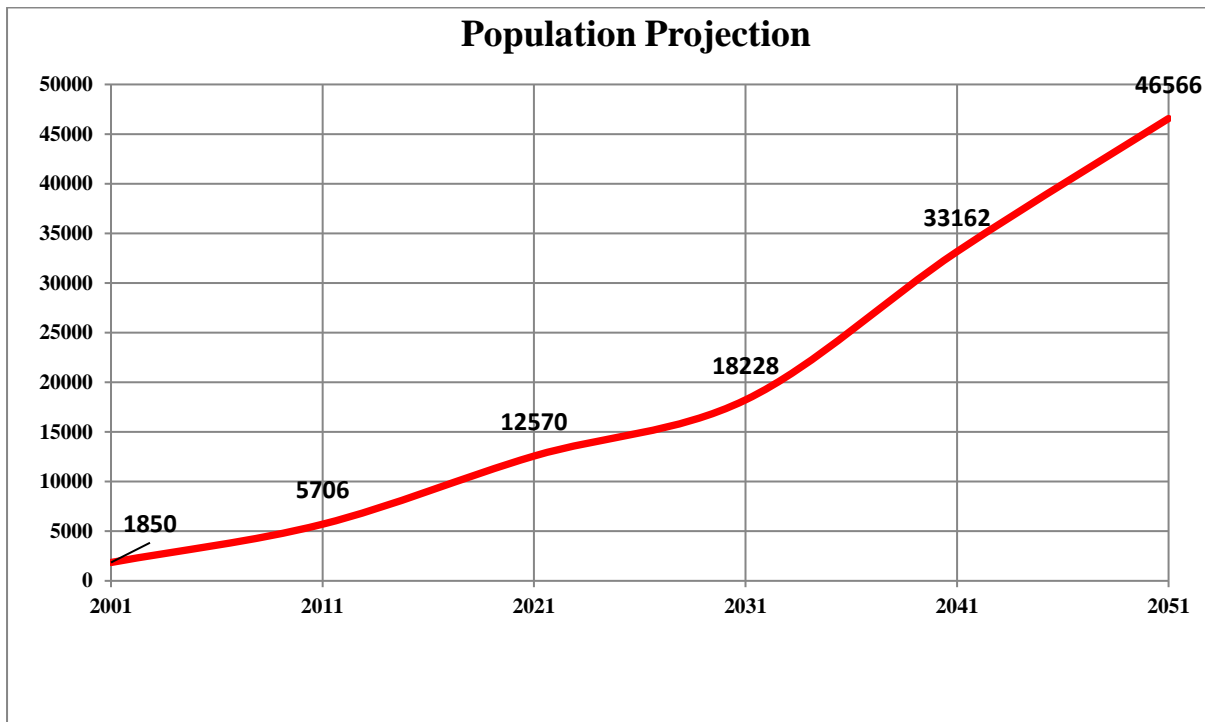


Fig: 2.54 Population projection of Bongshar GP

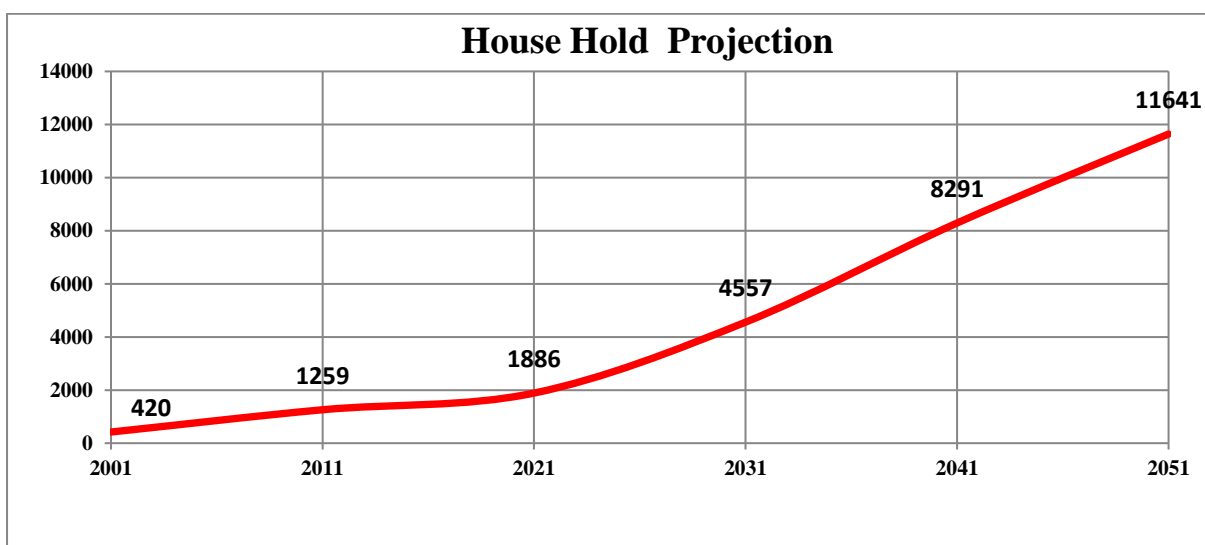


Fig: 2.55 Household projection of Bongshar GP

## 2.11 Livelihood Opportunities & Future Prospect

Survey analysis is done and based on the concerns and potential of the village, various livelihood opportunities are proposed in the village as presented in Table 2.13.




**Table 2.13. Livelihood opportunities**




<p><b>Agro-Based &amp; Allied Industry</b></p> <ul style="list-style-type: none"> <li>▪ Rice mill</li> <li>▪ Oil extraction processing mill</li> <li>▪ Organic Farming</li> <li>▪ Animal Husbandry</li> <li>▪ Livestock Rearing</li> </ul>	<p><b>MSME</b></p> <ul style="list-style-type: none"> <li>▪ Beekeeping</li> <li>▪ Cosmetic</li> <li>▪ Boutique</li> <li>▪ Food Processing centre</li> <li>▪ Broom making</li> <li>▪ handicraft &amp; weaving</li> <li>▪ Art &amp; artwork (painting, jewelry, pottery, etc.)</li> </ul>
<p><b>Ecotourism</b></p> <ul style="list-style-type: none"> <li>▪ Ecofriendly park (yoga, walk, sports)</li> <li>▪ Kitchen garden (household level)</li> <li>▪ Herbal &amp; Medicinal park</li> <li>▪ Boating</li> <li>▪ Annual cultural festivity</li> </ul>	<p><b>Large Commercial Industry</b></p> <ul style="list-style-type: none"> <li>▪ Brick Kiln</li> <li>▪ Wood &amp; Furniture Industry</li> <li>▪ Packaged Drinking Water</li> <li>▪ Auto-Mobile Industry</li> <li>▪ Waste Management Treatment Plan</li> </ul>
<p><b>Horticulture</b></p> <ul style="list-style-type: none"> <li>▪ Fruit &amp; Vegetables</li> <li>▪ Mango, jackfruit, coconut, etc. plantation</li> <li>▪ Bamboo</li> <li>▪ Floriculture</li> </ul>	<p><b>Education</b></p> <ul style="list-style-type: none"> <li>▪ Coaching centre for competitive exams</li> <li>▪ Diet and nutrition centre</li> <li>▪ Vocational training (plumbing, repair, painting, carpenter, etc.)</li> </ul>
<p><b>Pisciculture</b></p> <ul style="list-style-type: none"> <li>▪ Fishery &amp; Allied sectors</li> <li>▪ Safety net making industry</li> </ul>	<p><b>Service Industry</b></p> <ul style="list-style-type: none"> <li>▪ Restaurant/Hotels</li> <li>▪ Information Centre</li> </ul>


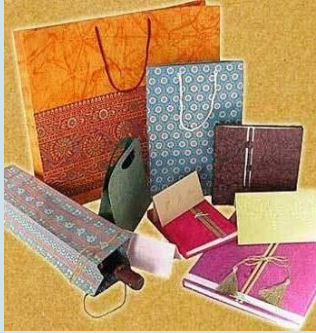

## 2.12 Skill Development




The skills of the villagers can be developed by using various rural technologies, that would make them self-reliant and lead to **Atmarnirbhar Bharat**. Some of the available rural technologies are presented in table 2.14.

**Table 2.14: Skill development using rural technology**

SI No	Skills	Usefulness
1	<p style="text-align: center;"><b>Silk Weaving</b></p> 	<p>Different silk-based products like Mekhela Chador, Dhoti, Jacket, Gamocha, Stoles, etc.</p>
2	<p style="text-align: center;"><b>Bamboo- based product</b></p> 	<p>Furniture, accessories, houses, fencing, bamboo vinegar, etc.</p>
3	<p style="text-align: center;"><b>Vermicompost &amp; Vermiwash</b></p> 	<p>The compost which is rich in readily usable plant nutrients forming a part of healthy soil. Vermicomposting is a preferred nutrient source for organic farming</p>

<p>4</p>	<p><b>Neem Cake &amp; Oil Extraction</b></p> 	<p>Bio-pesticides help in weeding out larvae and the neem products such as neem cake &amp; neem powder acts as bio-fertilizers. People can undertake production of these as an income generating activity.</p>
<p>5</p>	<p><b>Apiculture</b></p> 	<p>Beekeeping is an important activity among farmers and families residing in rural areas for income generation. Apart from honey, various valuable by-products of highly medicinal and commercial value can be obtained from various processes. The declining population of honeybees due to chemical farming practices can only be addressed by promoting beekeeping to ensure pollination of plants to sustain life on earth.</p>
<p>6</p>	<p><b>Mushroom Cultivation</b></p> 	<p>Mushroom cultivation helps in improving livelihood of people through economic, nutritional and medicinal contributions. The people can cultivate fresh mushrooms and prepare value added products like mushroom noodles, mushroom papad, mushroom soup powder, mushroom spawn, dried mushrooms, mushroom powder, mushroom spice mix and mushroom capsules.</p>

<p>7</p>	<p><b>Leaf Plate Making</b></p> 	<p>Tree leaves such as <i>beautia superb</i>, <i>beautia Monosperma</i> and <i>bauhinia frondosa</i> (Sal Leaves or Seali Leaves) are traditionally weaved into plates for serving food in many parts of India. However, making these leaf plates into attractive buffet plates can fetch higher returns while reducing the use of plastic plates.</p>
<p>8</p>	<p><b>Handmade Paper Conversion &amp; Value Addition</b></p> 	<p>Handmade paper making is one of the very valuable processes which can help in addressing the issue of waste disposal. Production of recycled handmade paper from waste of plant species like banana, jute, mulberry, manila &amp; hemp and waste like paper, cardboards, cotton fabrics, etc.</p>
<p>9</p>	<p><b>Aromatic Crop Cultivation &amp; Extraction of Essential Oils</b></p> 	<p>Aromatic crops cultivation is a great alternative to traditional crops. These aromatic crops are perennial in nature; it's a onetime investment, less labour and can survive till 5 years. Crops can be grown in low, marginal fertile lands and requires water. Essential oils extracted are used in high grade cosmetics, medicine etc.</p>

<p>10</p>	<p><b>Clay Process &amp; Crafts</b></p> 	<p>Innovative and creative design provides new entrepreneurial opportunities. The making of processed raw clay, i.e., red clay, ceramic clay, pottery clay, other clay raw material can be used for pottery, jewelry, crafts, interior decorations, moulds, etc.</p>
<p>11</p>	<p><b>Cotton &amp; Jute Bags</b></p> 	<p>Manufacturing and promoting use of ethnic eco-friendly bags is an alternative to reduce use of plastic covers/bags. The basic concept of this initiative revolves around the “3 p's concept” which are; protection of environment, provision of sustainable livelihood and promotion of cotton and biodegradable bags.</p>
<p>12</p>	<p><b>Tribal &amp; Fashion Jewelry</b></p> 	<p>Artificial jewelry making is a good option for women who would like to pursue a useful livelihood option right at their doorstep. Products like necklace, bracelet, coin jewelry, Vishnu chakra mala etc., are made with raw materials like oxide white metal, beads, stone crystal, emerald, copper, pearl etc. Also, there is a good demand for tribal jewelry-based products.</p>

## 2.13 Resource Envelope

Financial Resources of Bongshar Gaon Panchayat for the year <u>2020-21</u>		
Sl No	Nature of Resource	Amount in Rs
1	<b>Untied Funds</b>	
1.1	State Finance Commission Grant	Fund not received for the FY 2020-21 165102 (FY 2019-20)
1.2	Own Source of revenue (taxes, non-tax, rents, fees for markets & ponds, user charges, etc.)	25000
1.3	Others, if any.	NIL
2	<b>Partly tied funds</b>	
2.1	MGNREGA	485159 (2020-21)
2.2	14 <sup>th</sup> Finance Commission Grants	4323990 (FY 2019-20)
	15 <sup>th</sup> Finance Commission Grants	745000 (2020-21)
2.3	Community Contribution (cash/kind/labour)	NIL
2.4	Corporate Social Responsibility Fund	NIL
2.5	Any other sources	NIL
3	<b>Tied Funds</b>	
3.1	Swachh Bharat Mission	NIL
3.2	National Rural Health Mission	NIL
3.3	Other centrally/state sponsored schemes fund allocated to GP	NIL
3.4	Others	NIL
<b>TOTAL (2020-21)</b>		<b>1255159</b>

## CHAPTER 3

### 20 YEARS VISION PLAN

---

In this chapter, 20 years vision plan is proposed for Bongshar GP. The vision is proposed for the next 5 years, 10 years and 20 years, respectively. Primary objective is to ensure sanctity of agricultural and green/vegetation/grazing lands, for a sustainable future. For holistic development and planning, keeping in mind the 3 pillars of Sustainability, the following elements of Spatial planning were iteratively developed:

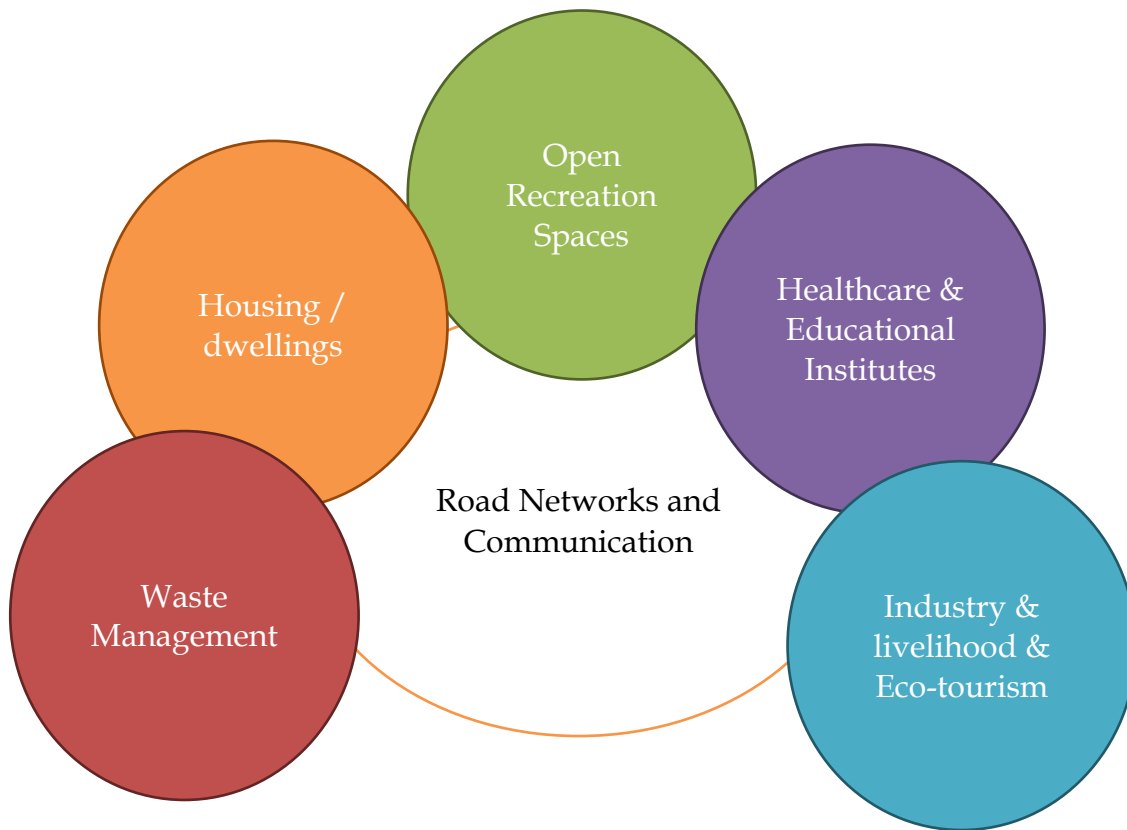


Fig 3.1 Elements of Spatial planning



Table: 3.1 Proposed 5 Years Vision for Bongshar GP

<b>Proposed 5 Years Vision for Bongshar GP</b>	
<b>Road Networks &amp; Communication</b>	<p>Immediate action plan on:</p> <ul style="list-style-type: none"> <li>• Making Kutcha Roads into Pucca, with necessary embankments</li> <li>• Adding Solar Streetlights, street signages and dustbins,</li> <li>• Completion of drains along roads</li> <li>• Improve internet and data penetration</li> </ul>
<b>Housing/Dwellings</b>	<p>Immediate requirement of:</p> <ul style="list-style-type: none"> <li>• Policies on land-use restricting encroachment of agricultural land and green/open spaces;</li> <li>• Implementation of rain water harvesting and</li> <li>• Solar panel integrations for household subsidy schemes</li> <li>• Provision of drinking water line to all houses</li> <li>• Assistance in setting up of toilets</li> </ul>
<b>Open Recreation Spaces</b>	<p>Immediate action on:</p> <ul style="list-style-type: none"> <li>• Demarcation and beautification of Open, recreation spaces</li> <li>• Restrictions with respect to time and type of use – Children’s play area/ indoor and outdoor sports area</li> <li>• Provision of adequate lights and dustbins</li> <li>• Assignment of caretaker-community of spaces - each space to be cared by its immediate locality/neighbourhood members</li> <li>• Begin reclamation of wet/wastelands</li> </ul>
<b>Waste Management</b>	<p>Immediate action plan on:</p> <ul style="list-style-type: none"> <li>• Establishing waste segregation and collection protocols</li> <li>• Training of waste handlers</li> <li>• Provision of protective gears for waste handlers</li> <li>• Educating populace on waste segregation and management protocols</li> <li>• Demarcation of site for waste management – composting/ segregating recyclable waste, appropriately discarding e-waste, setting up sump tanks.</li> </ul>

<p><b>Healthcare &amp; Educational Institutes</b></p>	<p>Immediate support to:</p> <ul style="list-style-type: none"> <li>• Allocate location for establishing a veterinary hospital</li> <li>• Upgrade existing healthcare facilities in terms of infrastructure to extend facilities, such as, more no. of clinics, operating theatres, immunization facility, labs, pharmacy, etc.</li> <li>• Upgrade existing schools/colleges in terms of space, infrastructure, and technology for incorporating NEP2020 best practices, such as, experiential learning and games-integrated learning, offer support with inter connectivity for online learning</li> </ul>
<p><b>Industry &amp; livelihood &amp; Eco-tourism</b></p>	<p>Immediate support to :</p> <ul style="list-style-type: none"> <li>• Organize the existing MSMEs, market areas , etc.</li> <li>• Development of cultural and religious sites, such as the Bhingeswar Devalaya and other Naamghars , to promote cultural events and tourism</li> </ul>

Table: 3.2 Proposed 10 Years Vision for Bongshar GP

<p><b>Proposed 10 Years Vision for Bongshar GP</b></p>	
<p><b>Road Networks &amp; Communication</b></p>	<ul style="list-style-type: none"> <li>• Development of Secondary and tertiary road networks</li> <li>• Use of sustainable materials, such as permeable concrete paving</li> <li>• Integration of clear footpaths</li> <li>• Demarcation of traffic flow and</li> <li>• Curtailment of vehicular access</li> </ul>
<p><b>Housing/Dwellings</b></p>	<ul style="list-style-type: none"> <li>• Increasing of FAR in consideration with increase in no. of floors per residential building</li> <li>• Standardised design implementation of Assam type roof for the upper floors, using local materials</li> <li>• Planned expansion of housing area as proposed, with clear plot sizes having adequate area around as per NBC</li> <li>• Regular assessment of building condition and health</li> </ul>
	<ul style="list-style-type: none"> <li>• Complete phase-wise reclamation of wet/wastelands</li> <li>• Demarcation and allocation of the same for various purposes</li> </ul>

<b>Open Recreation Spaces</b>	<ul style="list-style-type: none"> <li>Establish large recreational open or semi-built facilities for sports, games and healthcare</li> </ul>
<b>Waste Management</b>	<ul style="list-style-type: none"> <li>Successful waste segregation and management protocol best practices</li> <li>Establishment of complete waste handling plant (solid and liquid) with provision of generation of bio-fuel and bio-based electricity</li> <li>Integration of state-of-the-art technologies to monitor and improve management</li> </ul>
<b>Healthcare &amp; Educational Institutes</b>	<ul style="list-style-type: none"> <li>Establishment of full-fledged veterinary hospital and college</li> <li>Establishment of a dedicated agriculture institute &amp; college to support farmers in science, technology and competence</li> <li>Expanding the classroom learning to vocational training and remote learning through ICT</li> </ul>
<b>Industry &amp; livelihood &amp; Eco-tourism</b>	<ul style="list-style-type: none"> <li>Organizational and entrepreneurial support to locals for establishing MSMEs</li> <li>Establishment of warehouses and cold-storage, with e-commerce backed inventory and B2B/B2C linkages</li> <li>Development of eco-tourism by establishing a “eco village” holiday resort</li> </ul>

Table: 3.3 Proposed 20 Years Vision for Bongshar GP

<b>Proposed 20 Years Vision for Bongshar GP</b>	
<b>Road Networks &amp; Communication</b>	<ul style="list-style-type: none"> <li>ICT integrated, monitoring of vehicular traffic and emission to manage pollution</li> <li>Conversion of all navigable spaces to permeable and sustainable material</li> </ul>
<b>Housing/Dwellings</b>	<ul style="list-style-type: none"> <li>Further increasing of FAR in consideration with increase in no. of floors per residential building as proposed</li> <li>Further planned expansion of housing area as proposed, with clear plot sizes having adequate area around as per NBC</li> </ul>

	<ul style="list-style-type: none"> <li>• ICT enabled progression monitoring of building condition and health</li> </ul>
<b>Open Recreation Spaces</b>	<ul style="list-style-type: none"> <li>• Maintenance of existing and expansion in response to LULC at the time</li> </ul>
<b>Waste Management</b>	<ul style="list-style-type: none"> <li>• Become fully competent and independent at waste handling plant (solid and liquid)</li> <li>• Become model GP with excess generation of bio-fuel and bio-based electricity</li> </ul>
<b>Healthcare &amp; Educational Institutes</b>	<ul style="list-style-type: none"> <li>• Become model veterinary hospital and college</li> <li>• Become a regional education hub and support for expertise and the local</li> </ul>
<b>Industry &amp; livelihood &amp; Eco-tourism</b>	<ul style="list-style-type: none"> <li>• Become an entrepreneurship hub for indigenous o-based and skill-based agro-products</li> <li>• Become a tourism hub for heritage and eco-tourism</li> </ul>

## CHAPTER 4

### CONCLUSIONS

---

In this study emphasis on the various aspects for preparing a template for a spatially integrated version of the GPDP, namely the GPSDP (Gram Panchayat Spatial Development Plan) for a long-term perspective with respect to the spatial layers corresponding to attributes like physical Infrastructure, Social Infrastructure, land use in Abadi area, Agriculture, overall land and Water Management plan etc. are made. Panchayat members through Panchayat meetings verified the spatial proposals made by the team and this proposed spatial plan is a participatory plan of the GP.

The Gram Panchayat chosen for this demonstration project is Bongshar GP situated in Sualkuchi block, Kamrup District, Assam. It is located at a distance of 25 km from the Guwahati city. The geographical area is 9.57 sq. km. Total number of households is 1886 and the present total population of the GP is 12570.

There are some specific findings inferred from the present analysis which are as follows:

- i. Around 6% of total GP area is occupied by wasteland/water-logged area which is basically located to the southern part of the village and these areas are not properly utilized for sustainable development.
- ii. The wastelands reclamation can be done for better purposes like irrigation, pisciculture and eco-tourism aspect as well that would create excellent livelihood opportunities for the people.
- iii. The soil of Bongshar GP is 100% alluvial. Being one of the most important and fertile soils of India they support growth of wide variety of crops such as Rice, wheat, sugarcane, cotton, jute, potato and vegetables, but they are deficient in nitrogen, phosphorous and humus.
- iv. Due to abundance of Bamboo plantation, people have alternate source of income, and bamboo-based industry is very much feasible in the region.
- v. The Bongshar GP has a museum-cum park dedicated to Silk based culture and has the potential to become Silk-Hub of India. There are around 1500 haal present in the GP as of now.
- vi. The total agricultural land is spread over 5.05 sq. km comprising of single, double and multiple cropping intensity. Majority of area around 78% is used for double cropping, 18% for single crop and around 4% is used for multiple cropping. The major cultivation in the region comprises of rice, mustard, sugarcane and some vegetables.

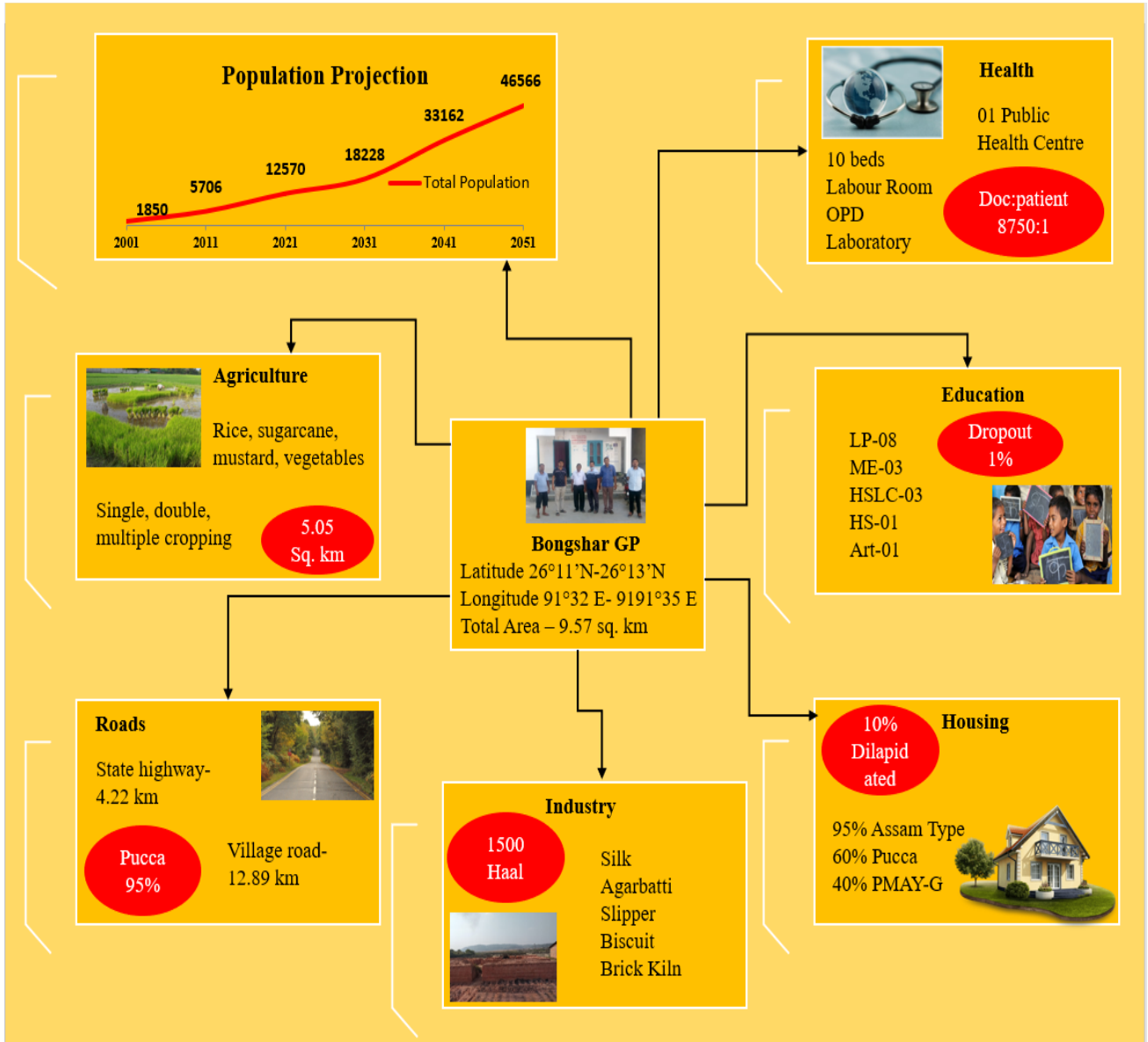
## REFERENCES

---

- [1] Gaon Panchayat Development Plan Guidelines, Assam (Dated: 08-12-2015)
- [2] Census of India 2000 and Census of India 2011 (Office of the Registrar General & Census Commissioner, India, Ministry of Home Affairs, Government of India)
- [3] District census handbook, Kamrup, Assam, 2011. (Directorate of Census Operations, Assam, Ministry of Home Affairs)
- [4] People's Plan Campaign for Gram Panchayat Development Plan (GPDP), Sabki Yojana Sabki Vikas 02nd October 2020 – 31st January 2021 (Ministry of Panchayati Raj & Ministry of Rural Development Government of India)
- [5] Kaushik, H., & Babu, K. R. (2009). Assam-type house. World Housing Encyclopedia. Oakland, Tokyo: International Association for Earthquake Engineering, 154
- [6] Kumar, P., Tiwart, K. N., & Pal, D. K. (1991). Establishing SCS runoff curve number from IRS digital data base. Journal of the Indian society of remote sensing, 19(4), 245-252
- [7] Study Report on to set up Food Processing Industries in the States of Assam, Mizoram & Tripura. (Prepared by ITV Agro & Food Technologies Pvt. Ltd. New Delhi July, 2015)
- [8] Pandey, J., & Singh, A. (2012). Opportunities and constraints in organic farming: an Indian perspective. Journal of Scientific Research, 56, 47-72
- [9] <https://www.india.gov.in/topics/housing> accessed on 3rd February 2021
- [10] <http://kamrup.gov.in/admfr.htm> accessed on 3rd February 2021
- [11] Khakhlari, P. (2020). Silk Products and Marketing Strategy of a Weaving Industry in Assam. Humanities & Social Sciences Reviews, 8(2), 91-101

## APPENDIX

### Bongshar Gaon Panchayat at a Glance:



## APPENDIX

### **Spatial Data Provided by National Information Centre (NIC), Delhi and National Remote Sensing Centre (NRSC), Hyderabad**

Thematic layers namely roads, rails, drainage, slope, contour, soil, Settlement and land use landcover have been provided in the format of vector files with further classification in the attribute table for each theme. The Information sources for development planning are presented in Table A.

**Table A. Information sources for development planning**

<b>SL No</b>	<b>Data/Map</b>	<b>Source</b>	<b>Spatial/Non-spatial</b>
1	Digital Elevation Model	NIC, NRSC	Spatial
2	Geomorphological Map	GSI	Spatial
3	Lithological Map	GSI	Spatial
4	LULC Map	High Resolution Satellite Imagery	Spatial
5	Soil Map	NRSC, NIC	Spatial
6	Groundwater Quality Map	NRSC, NIC	Spatial
7	Meteorological Data	IMD	Spatial
8	Road	NRSC, NIC	Spatial
9	GP Boundary	NIC	Spatial



# GLIMPSE OF FIELD SURVEY



*Empowered Village,  
Empowered Nation!*

**- Thank You**