



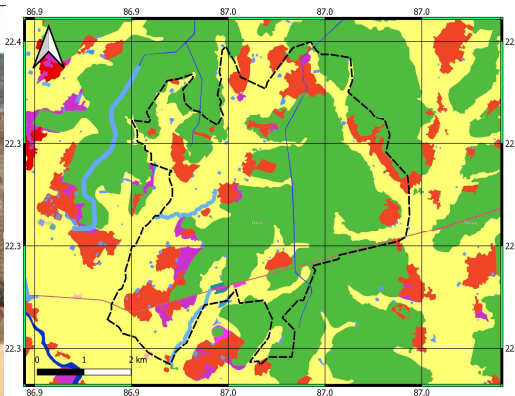
INDIAN INSTITUTE OF TECHNOLOGY KHARAGPUR

Spatial Planning in Gram Panchayats, Ministry of Panchayati Raj, Govt. of India

Nov 03, 2020



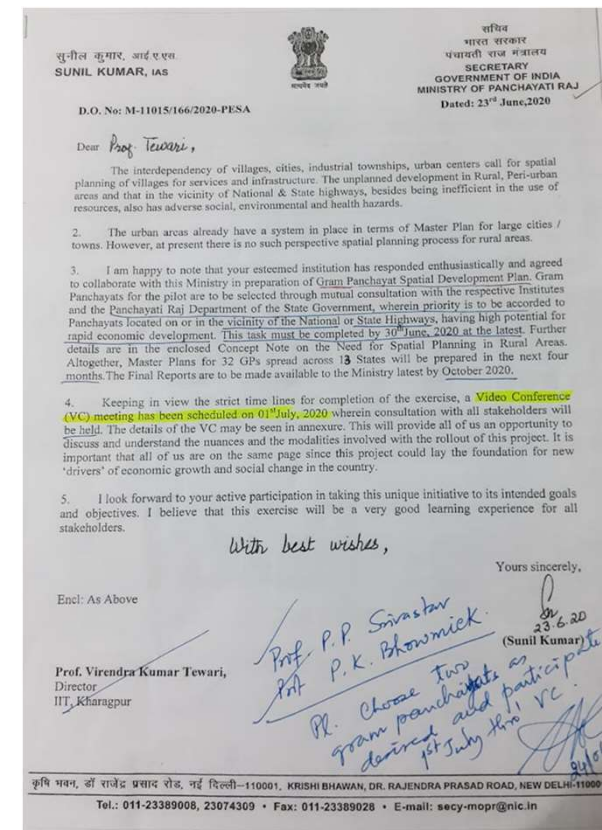
RURAL SPATIAL PLANNING for AGUIBANI GP OF WEST BENGAL



by: IIT Kharagpur

RSP Project: Background and Objectives

- **The Ministry of Panchayati Raj, Govt of India communicated with the Director, IIT Kharagpur in June, 2020 for collaborating with the Ministry in preparation of Gram Panchayat Spatial Development Plan.**
- **The overall pilot programme considered 32 Gram Panchayats (GP) across 13 states for the development of the Rural Spatial Plan.**
- **It was mandated that participating institutes will work in coordination with Panchayat and Rural Development departments of the states along with the Ministry of Panchayati Raj for preparing Spatial Development Plan for identified GPs.**
- **IIT Kharagpur accepted participation as Coordinating Institute for 2 GPs in the State of West Bengal, and a Project Team was constituted by the Director, IIT Kharagpur**



RSP Project Team at IIT Kharagpur

Team Mentor: *Prof. Virendra Kumar Tewari, Director, IIT Kharagpur*

Project Team: *Prof. P. P. Srivastav (Project Lead)*

Department of Agricultural and Food Engineering

- **Prof. M. K. Tiwari,**
School of Water Resources
- **Prof. A. K. Rai,**
Centre for Oceans, Rivers, Atmosphere and Land Sciences (CORAL)
- **Prof. R. Machavaram,**
Department of Agricultural and Food Engineering
- **Prof. A. Shaw,**
Department of Civil Engineering
- **Prof. P. K. Bhowmick,**
Center for Rural Development & Innovative Sustainable Technology

GPs Selected in West Bengal

Aguibani (District – Jhargram)

Gram Pradhan: Smt. Rani Hembram Murmu

Total Area: **20 km²**

Total Population: **10913**

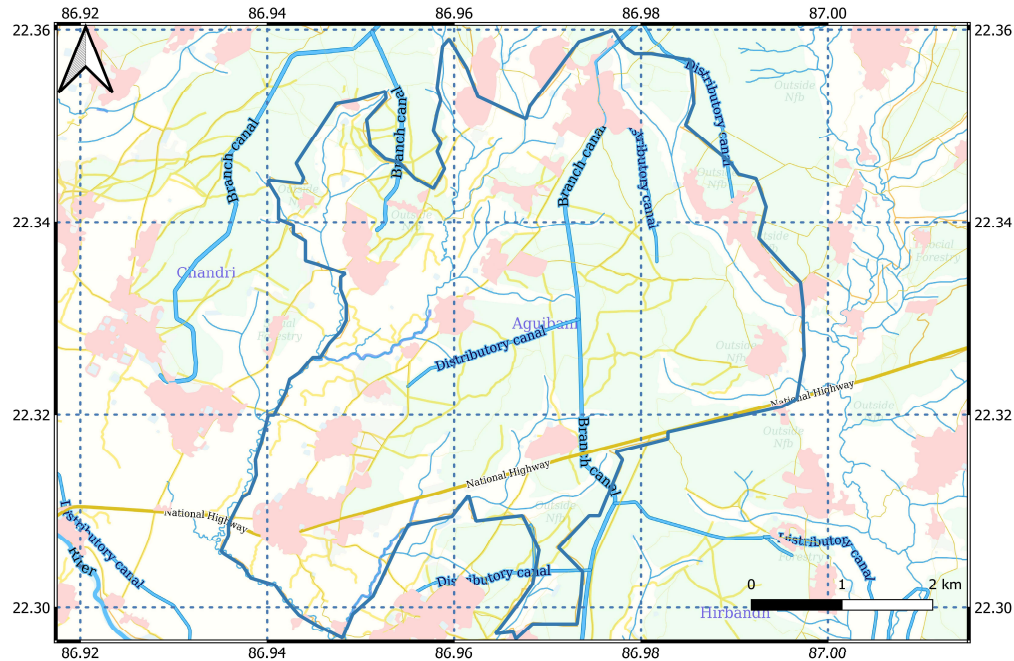
Female/Male Ratio: **0.89**

Literacy Rate: **69.64 %**

Nos of Villages: **38**

Nos of Samsads/Booths: **08**

Nos of Households: **2345**



* Data provided by Respective GPs

Mokrampur (District – Paschim Medinipur)

Gram Pradhan: Sri Jogendranath Doloi

Total Area: **44 km²**

Total Population: **24845**

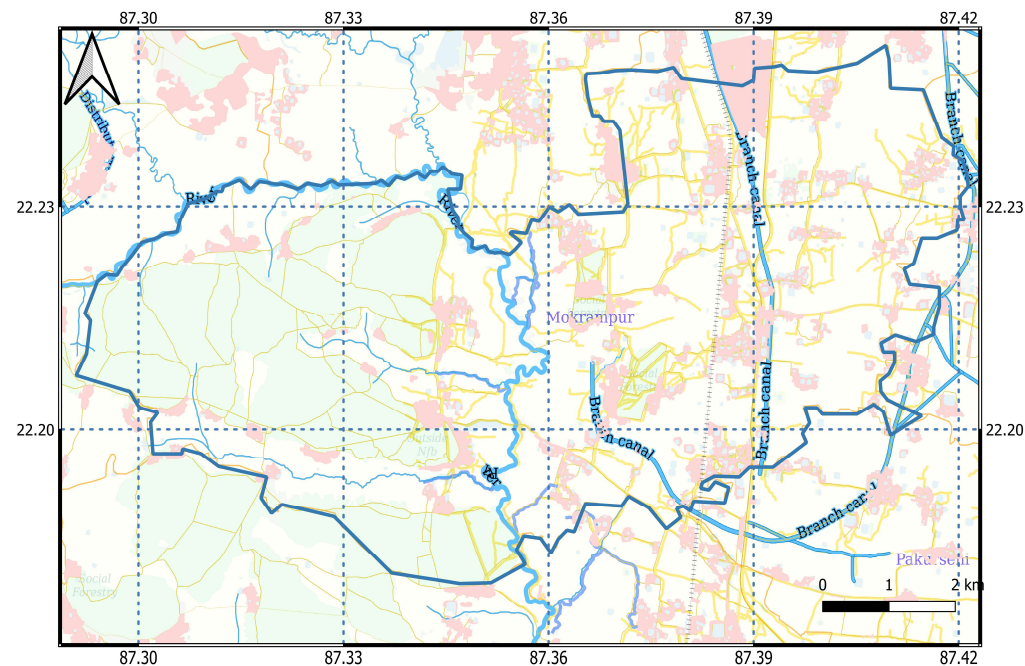
Female/Male Ratio: **0.95**

Literacy Rate: **68%**

Nos of Villages: **44**

Nos of Samsads/Booths: **15**

Nos of Households: **5700**



RSP Project Objectives

- *The chief aim of this pilot programme is to prepare Gram Panchayat Spatial Development Plan for rapid economic development of the GPs. For the purpose, a comprehensive baseline assessment is needed, and thereafter integrated rural spatial planning is to be done for the identified pilot GPs. The specific objectives for IIT Kharagpur, as coordinating institute for West Bengal, include:*
 - *To collect relevant field data for the two selected panchayats (Aguibani and Mokrapur) through onsite and household surveys.*
 - *To conduct data analysis and a baseline assessment of socio-economic status, and available amenities and infrastructure in the two selected GPs.*
 - *To identify the scope for the spatial development in the GPs.*
 - *To make a suggestive spatial development plan for the selected GPs, and analyze the possible benefits and risks associated with implementation of spatial development plan.*

Data Sources and Collection Approach

Secondary Data Collection from

- Panchayat Office
- NRSA
- Open source information on Govt. Web Portals

Primary Data Collection through

- Mobile App based Survey *unsung GPSDP Survey developed by NRSA*
- Paper based survey designed in local language (Bangla)
- Field visits

পরিবারে সমীক্ষা															
নাম				বসবাসের সময়সীমা				স্থান							
ধর্ম		জাতি		মালিকানা		ভাড়া		বি.পি.এল কার্ড		রেশন কার্ড					
প্রাথমিক তথ্য															
সদস্য	বয়স	লিঙ্গ	বিবাহ	শিক্ষায়তন যোগ্যতা	শিক্ষার স্থান	পেশা	পেশার স্থান	বায়ন নিজস্ব			স্থানস্থল	ডিজিটাল শিক্ষা			
								২ চাকা	৩ চাকা	৪ চাকা			সাইকেল	নেই	
পেশার কোল পরিবর্তন							কারণ এবং সময়								
মোবাইল ব্যবহার / নেটওয়ার্ক															
সদস্য	সংযোগ		ইন্টারনেট এর ব্যবহার		ওয়াইফাই / ব্রডব্যান্ড		যোগাযোগ								
	ভাল	খারাপ	হ্যাঁ	না	হ্যাঁ	না									
পেশা / জীবিকা															
কৃষি / উদ্যান				দক্ষ / অদক্ষ - প্রমিত / মৎস্যজীবী / শিল্পী / উদ্যোগপতি											
সদস্য সংখ্যা				১				২				৩			
সীমানা				ধরণ											
মাটির ধরণ				স্থান											
বীজের ধরণ				পরিবহনের ধরণ											
ক্রিকেট/স্পোর্টস				দুরত্ব											
জলসেচের উৎস				আংশিক / সম্পূর্ণ বছর											
স্কিম / প্রাইভেট				বেতন											
পস্যের পর্যায়ক্রম (কোথা থেকে)															
ফসল ভোলায় ধরনের পরিবর্তন															
মজুত স্থান				কর্মে নিয়োগের সুযোগ				আমি							
বিক্রয়ের স্থান				স্বচ্ছতার সুযোগ				কাজে							
উৎপাদন (বার্ষিক)				স্বাস্থ্য সচেতনের সহায়তা				অনা							

19:43 100% 4G+

← Start New HH Survey 1/12

Name of the Respondent *

Respondent Name

Religion

Select

Caste

Caste

Address

Address

Landmark

Landmark

Resident Since

Year in YYYY format

House

Select

House Rent

Waiting Location Information...

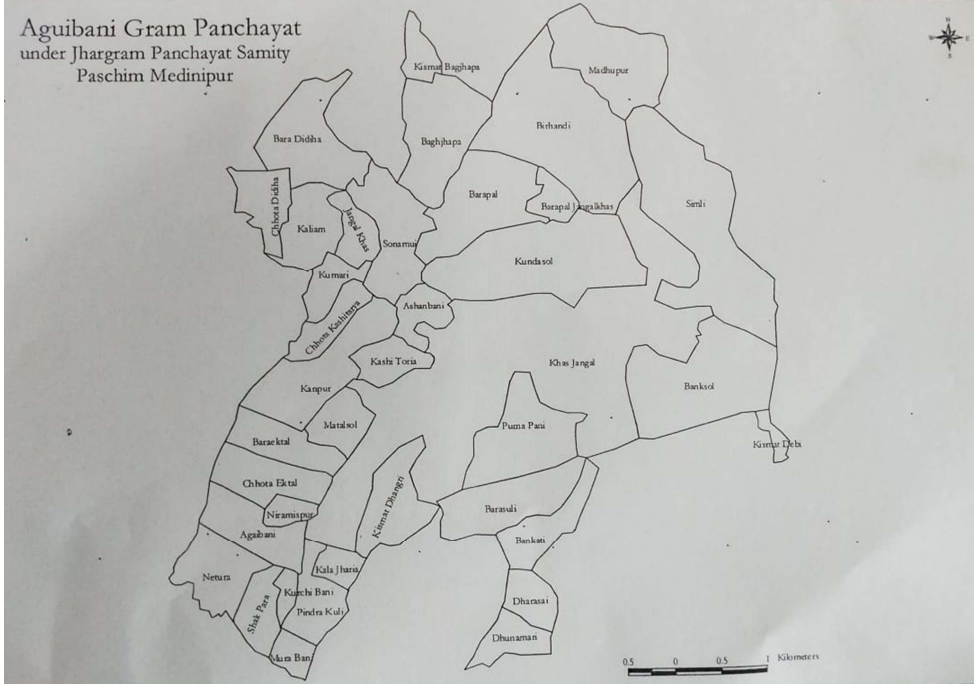
Cancel Send Later Next

Survey Methodology

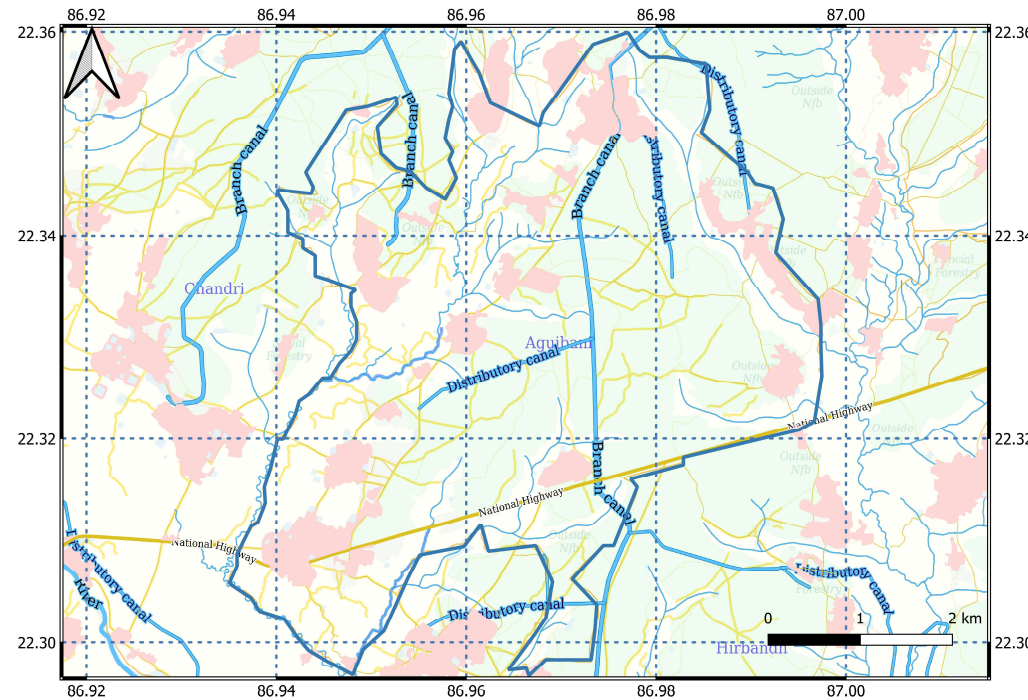
- **Survey Team**
 - *Project Staff and Faculty and Village Resources Persons (VRPs)*
- **Household Survey Sampling Strategy**
 - *Approximately 10-15 % Households were covered under survey*
 - *Stratified sampling strategy adopted for identifying households for survey (to cover various socio-economic classes present in the GP)*
 - *Selection of households were made with the help of VRPs, and “difficult-to-survey” spots were left out*
- **Survey of Common/Public places and amenities**
 - *Survey team visited all villages in the GPs and captured details including images and geo-locations of common amenities*



Aguibani GP



Map of Aguibani GP provided by panchayat



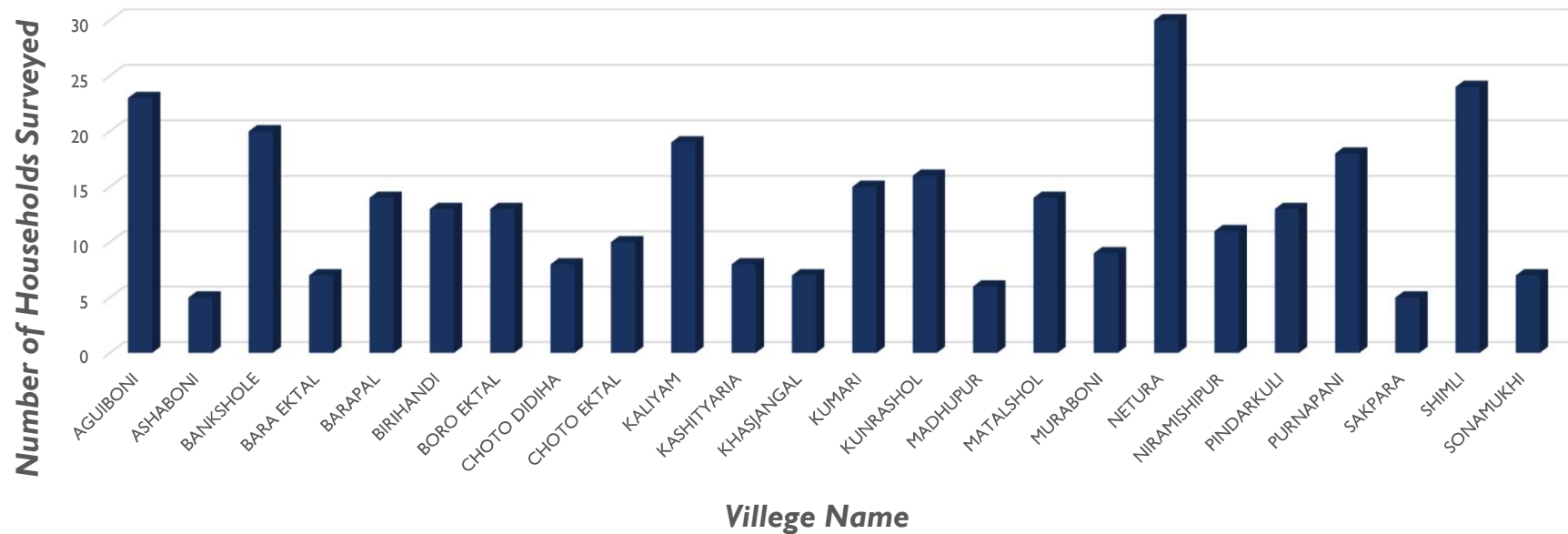
LULC map Aguibani GP prepared by IIT Kharagpur
using RRSE-East and NRSA data

Aguibani GP: Basic Information

S. No.	Parameter	Value / Numbers for Augiboni GP
1.	Total Area (km ²)	20
2.	Total Population	10913
3.	Number of Villages	38
4.	Number of Samsads/Booths	08
5.	Number of Households	2345
6.	Female/Male Ratio	0.89
7.	Literacy Rate (%)	69.64
8.	Number of Health Centres	02 (all government)
9.	Number of Primary/Nursery Schools	14 (all government)
10.	Number of Secondary or Middle Schools	03 (all government)
11.	Number of Degree Colleges	Nil
12.	Number of Banks	01
13.	Number of Post Office	02
14.	Number of Industries or MSMEs	Nil
15.	Kuteer Udyag	04 Poultry, Few Shaal Leaf Plate Processing Units
16.	Number of LPG Distributer	01
17.	Number of Sports Play Grounds	04
18.	Number of Public Toilets	Nil
19.	Number of Community Centre	01
20.	Number of Library	Nil
21.	Park	Nil

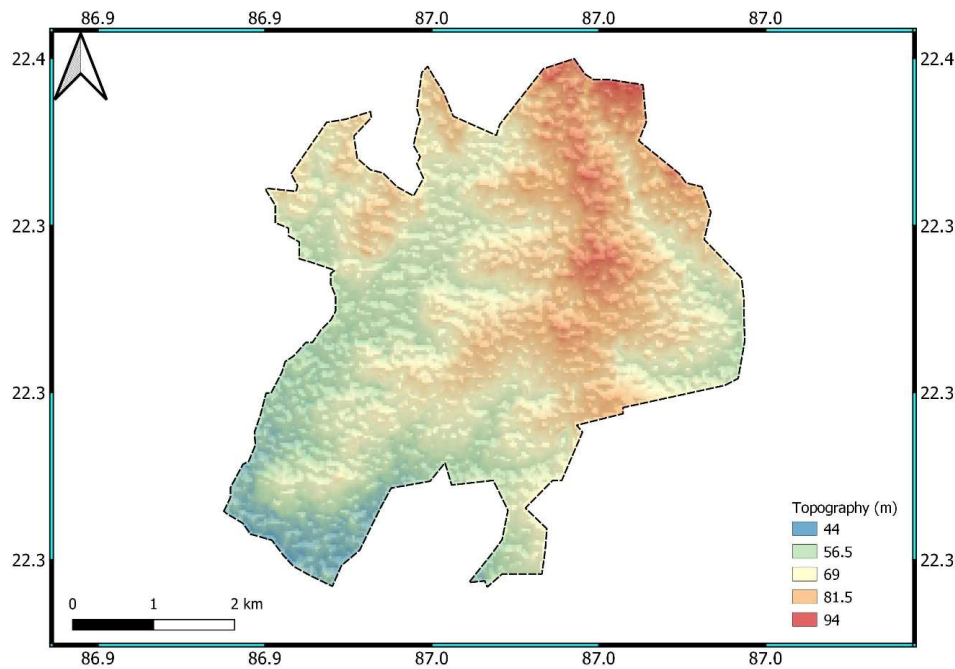
Aguibani GP: Household Survey

Household Surveyed

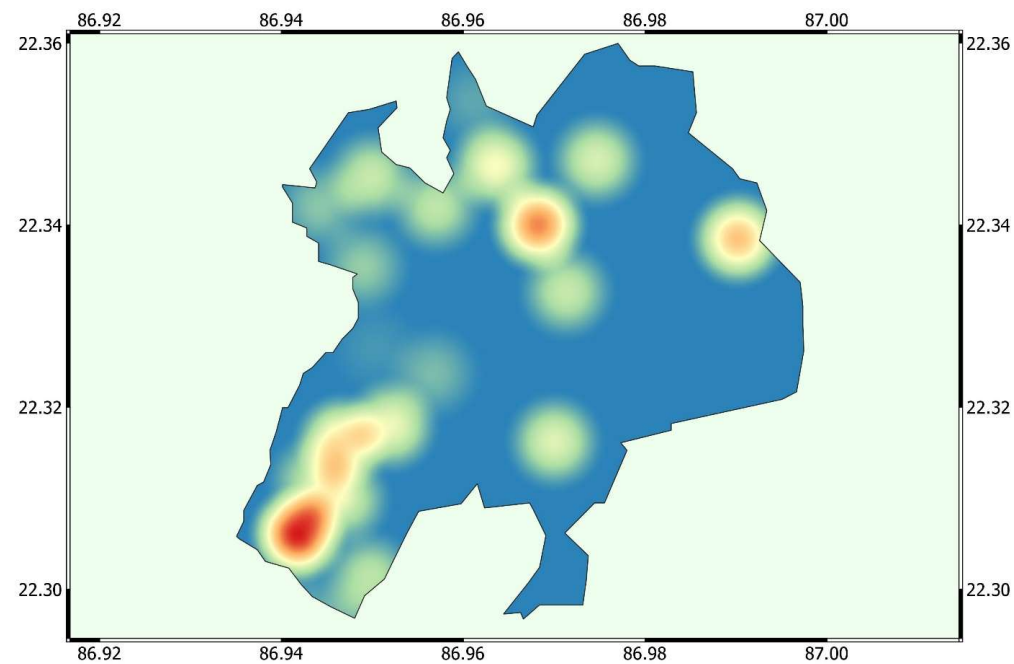


Total household surveyed = 315 (13.43 % of total households in Aguibani GP)

Aguibani GP: Elevation and Population Distribution



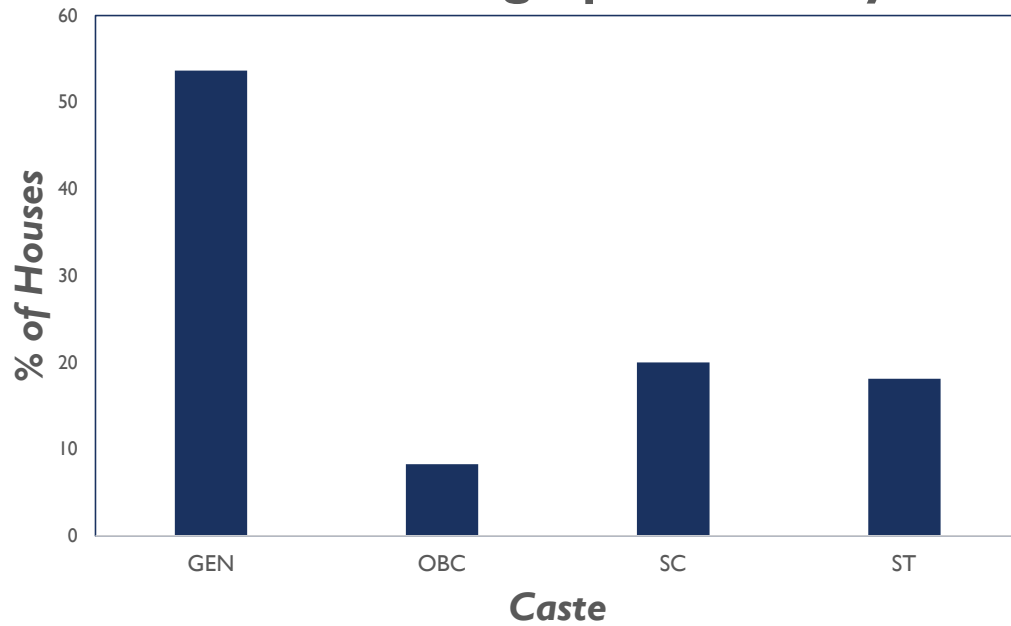
Elevation Map of Aguibani GP prepared by IIT Kharagpur using SRTM data



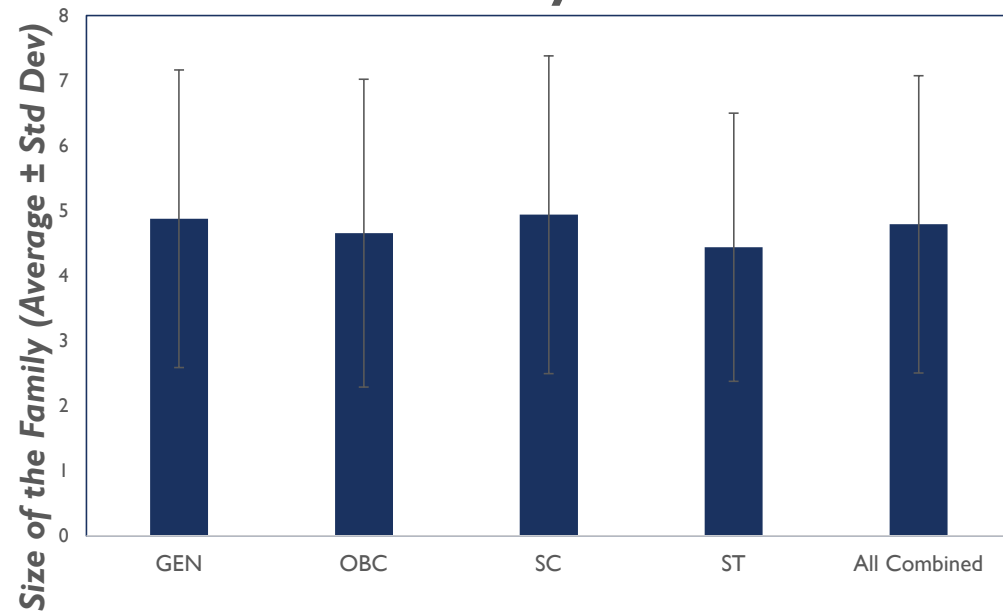
Population Density in the villages under Aguibani GP (based on thermal imaging)

Aguibani GP: Household Survey Data Trends

Caste Demographics Surveyed

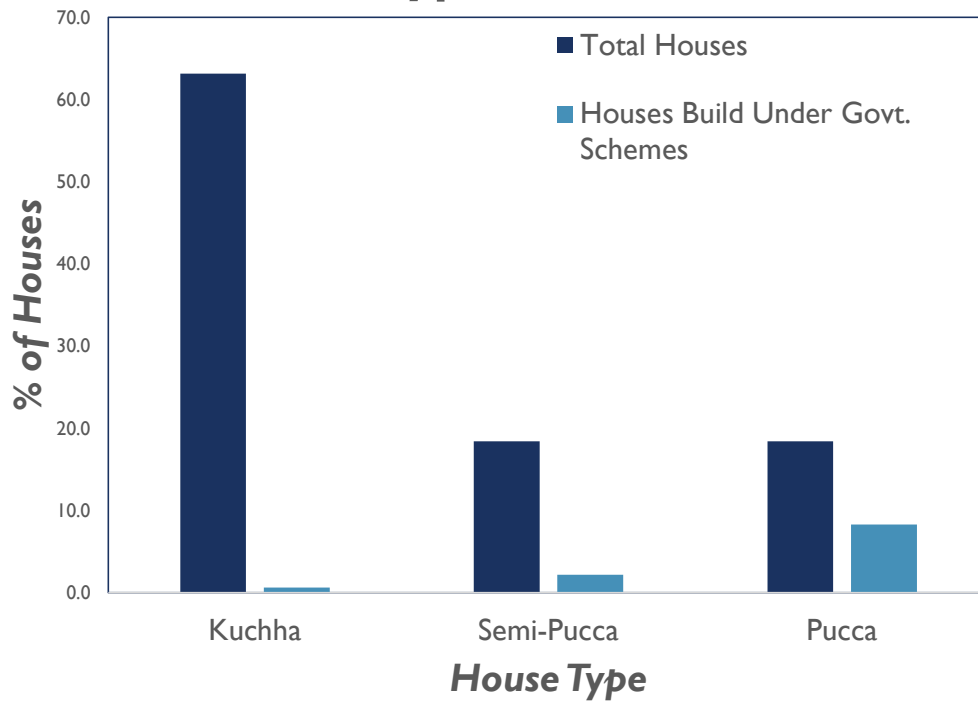


Family Size

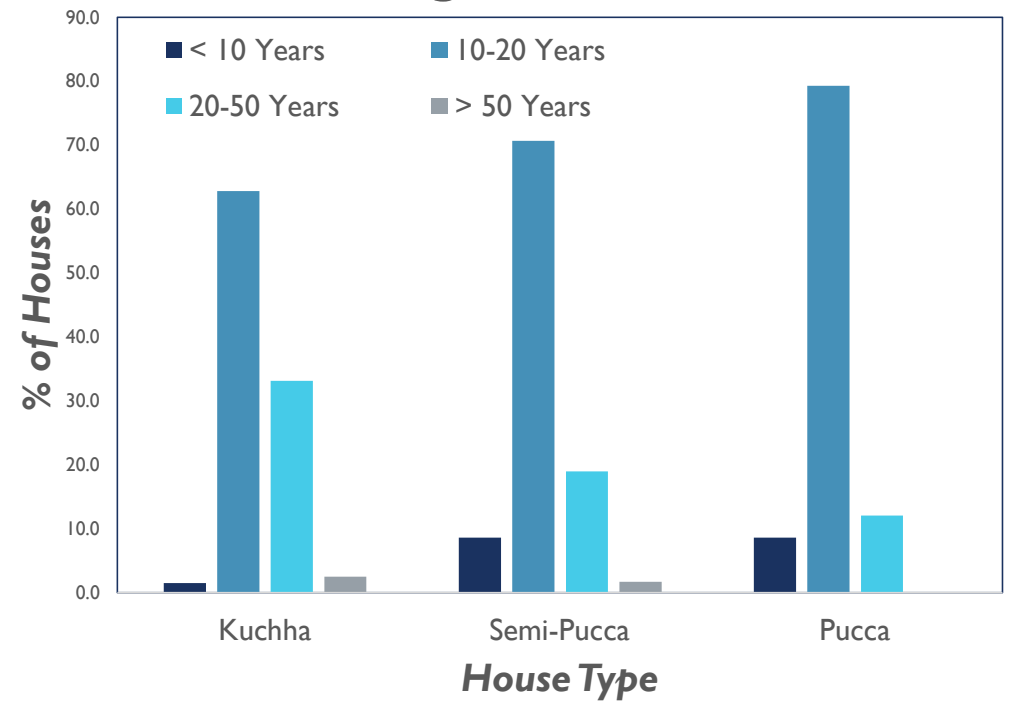


Aguibani GP: Household Survey Data Trends

Types of Houses



Age of the Houses

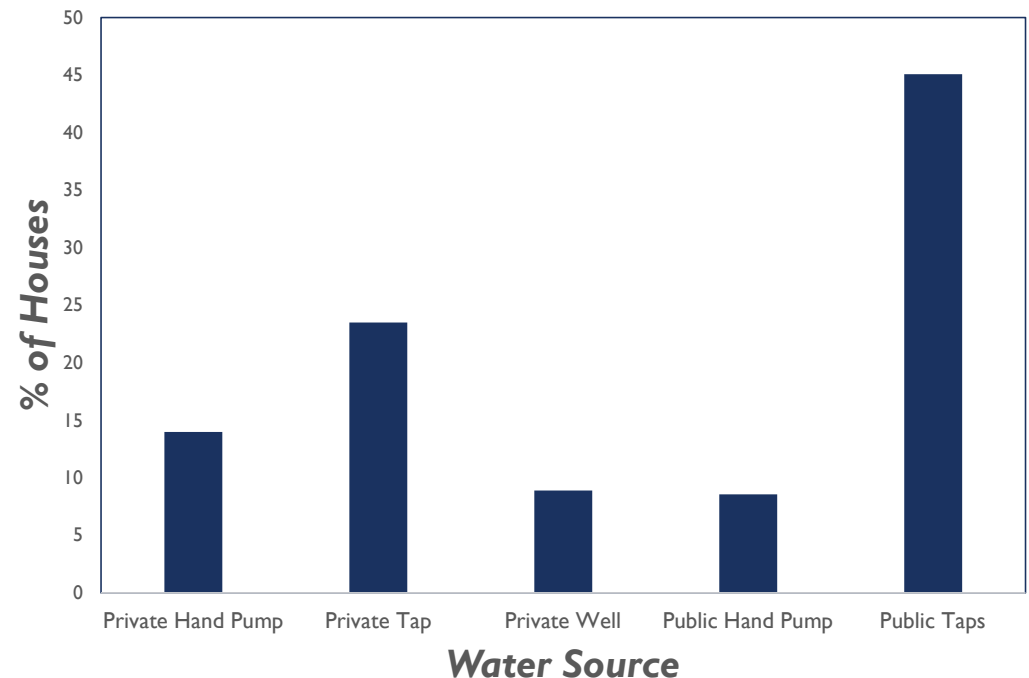


Aguibani GP: Household Survey Data Trends

Observations:

- *Nearly half of the population relies on Public taps*
- *Other half mostly relies on private water sources (hand-pump, boring or open wells)*
- *Piped water connection are not provided in the GP*

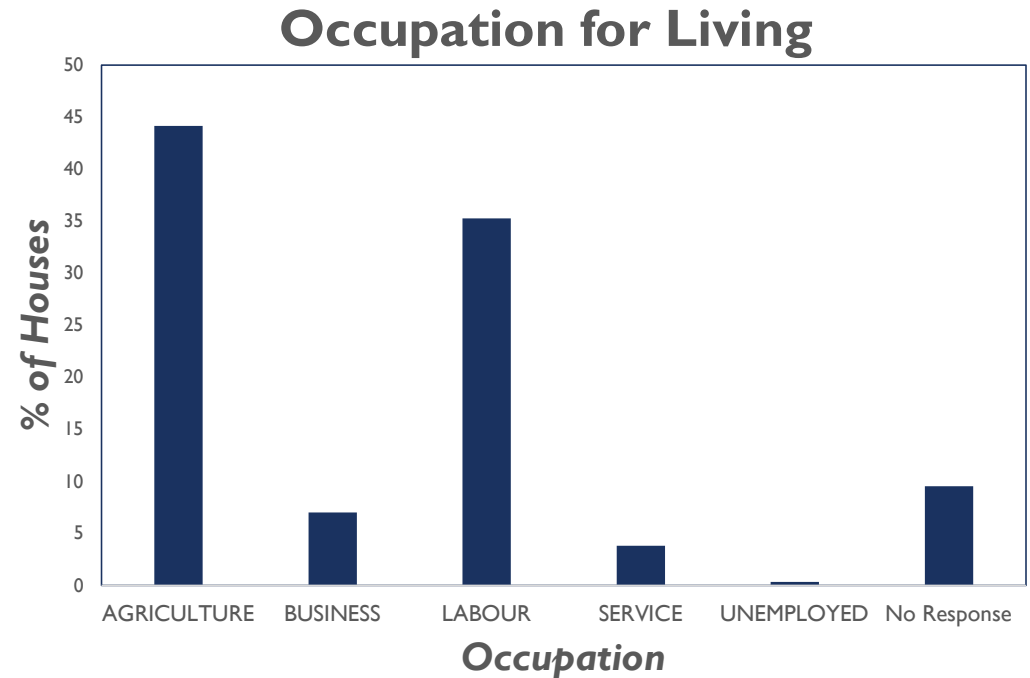
Source for Domestic Water Consumption



Aguibani GP: Household Survey Data Trends

Observations:

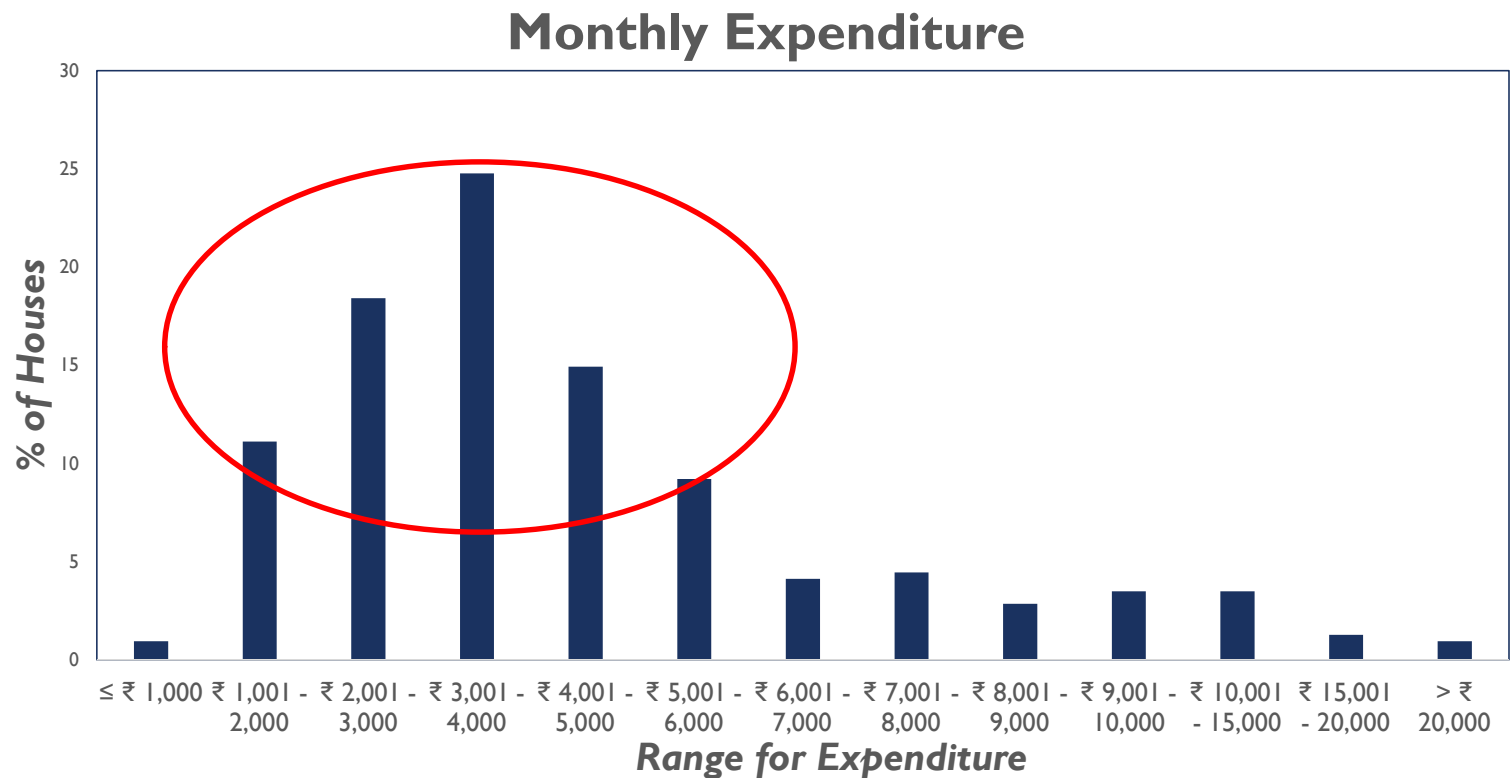
- *Most of the working population is engaged in Agriculture or Labour*
- *Only <10% people are engaged in service or business*



Aguibani GP: Household Survey Data Trends

Observations:

- *For most houses, the monthly expenditure ranges between ₹ 1,000 - 6,000 with average value as ₹ 5,022.*

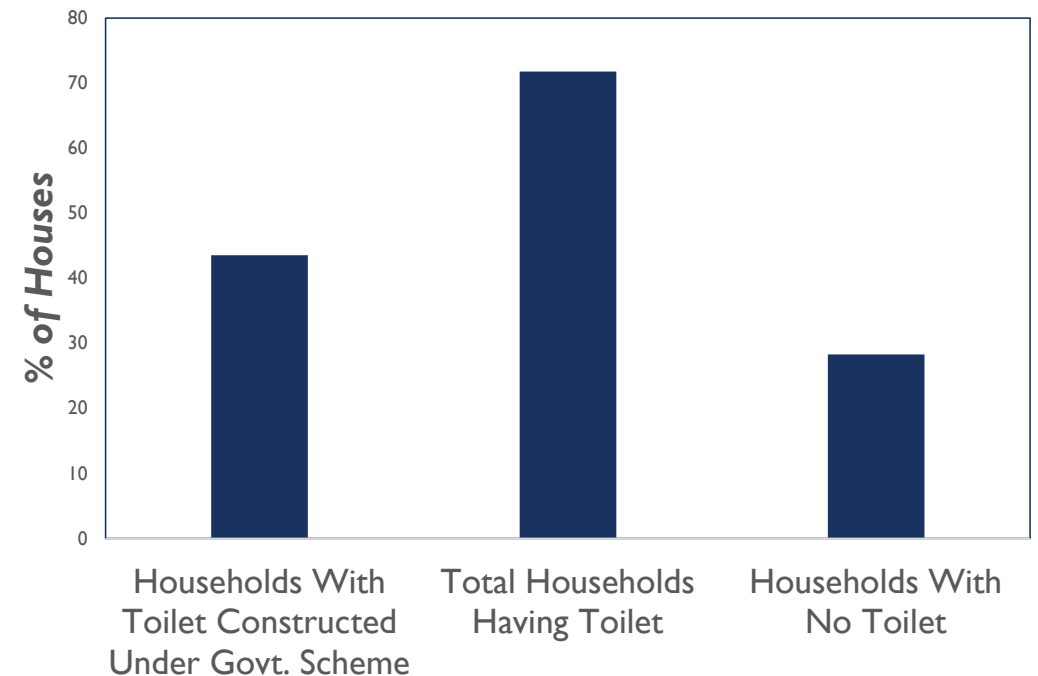


Aguibani GP: Household Survey Data Trends

Observations:

- *Nearly 70% houses have toilets.*
- *30% houses still defecating in open*
- *Over 45% households have availed Govt. Schemes for building toilets*

Status of Toilets

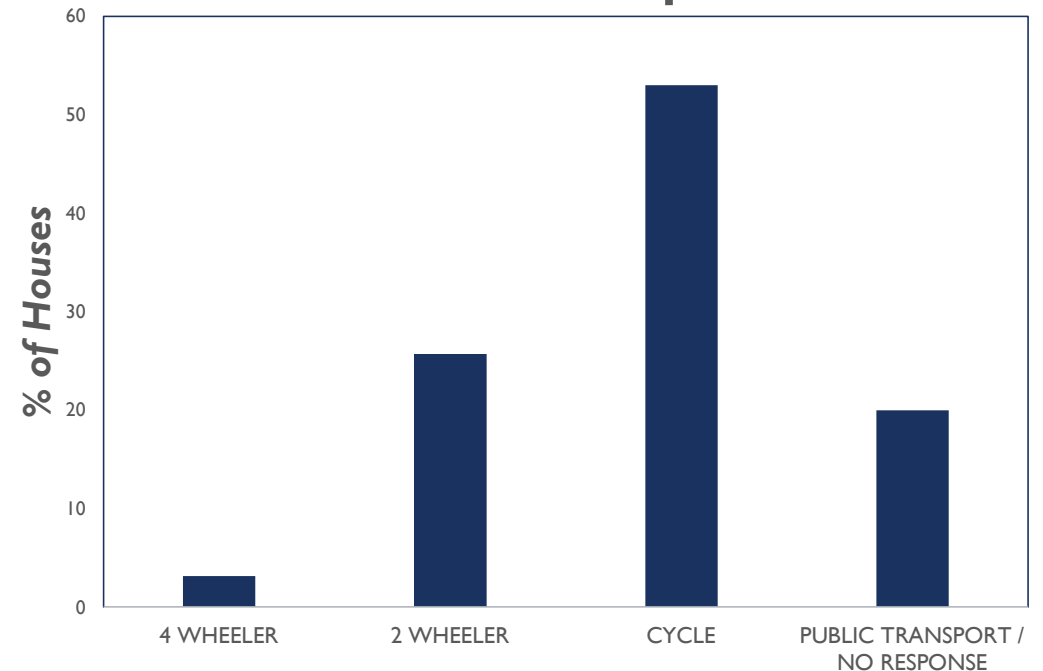


Aguibani GP: Household Survey Data Trends

Observations:

- *Bicycle is the most common mode for local transport followed by Moterbikes*
- *One-fourth population only rely on Public Transport means*

Means for Transport

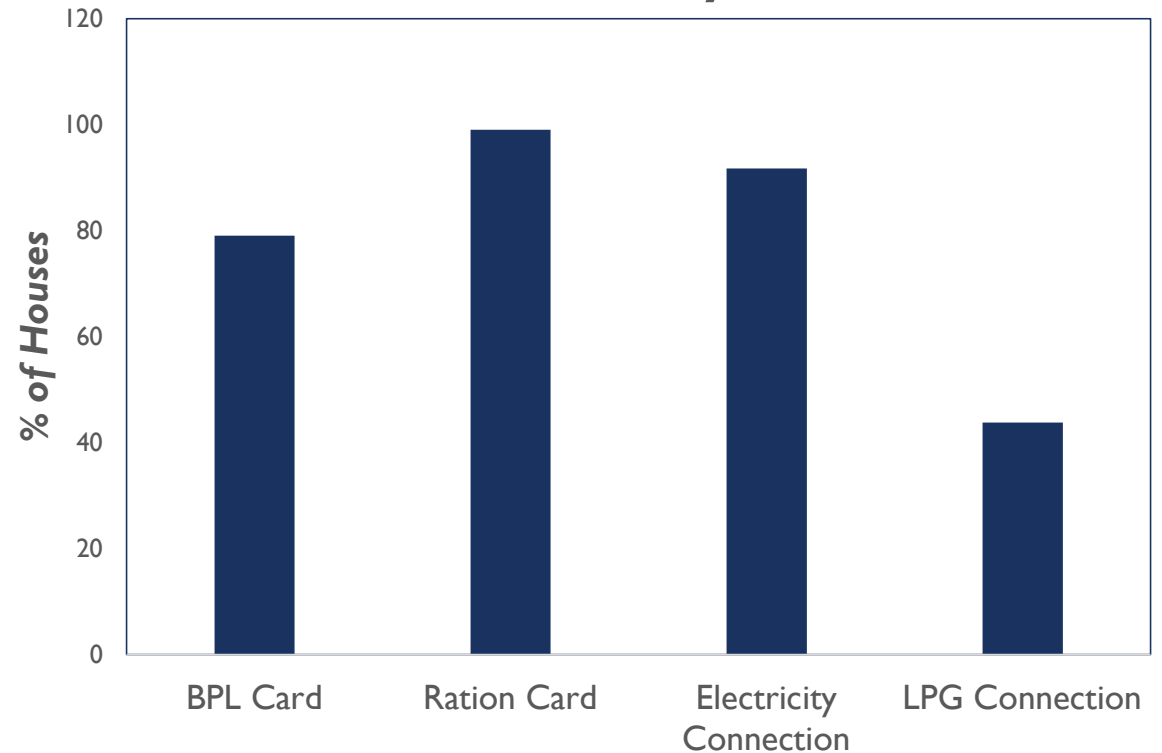


Aguibani GP: Household Survey Data Trends

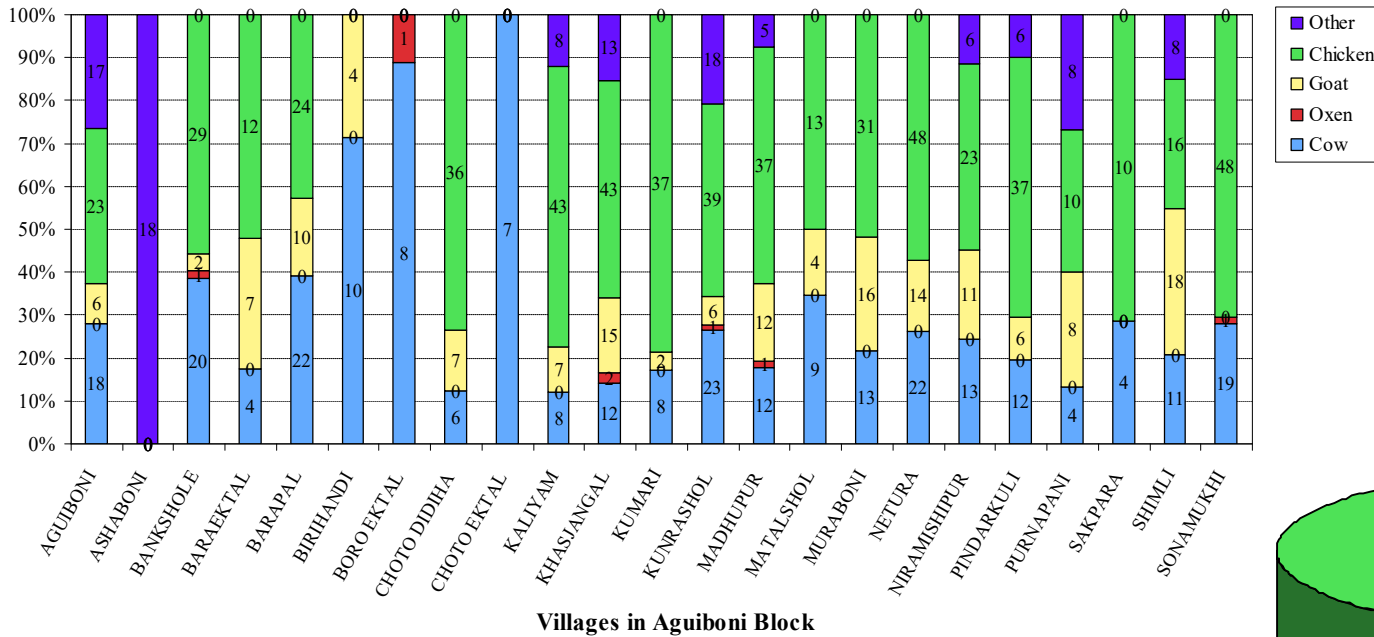
Observations:

- *Nearly 80% houses posses BPL Card.*
- *Almost all (>99%) houses have Rashan Card*
- *Most of the houses have electric connection*

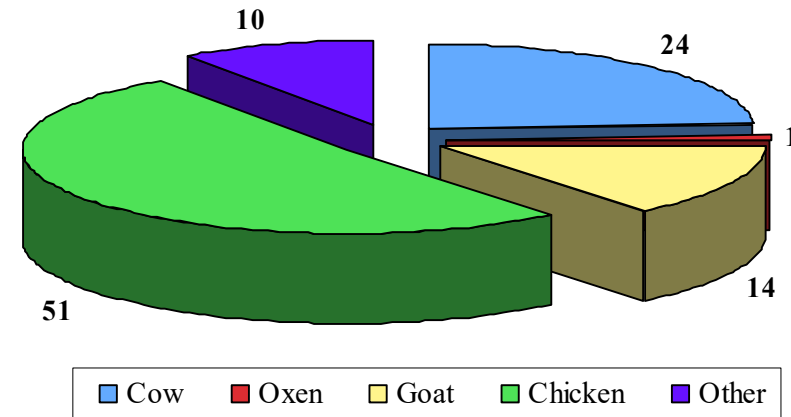
Cards and Amenity Connections



Aguibani GP: Household Survey Data Trends



Village-wise Livestock Distribution in Aguibani GP



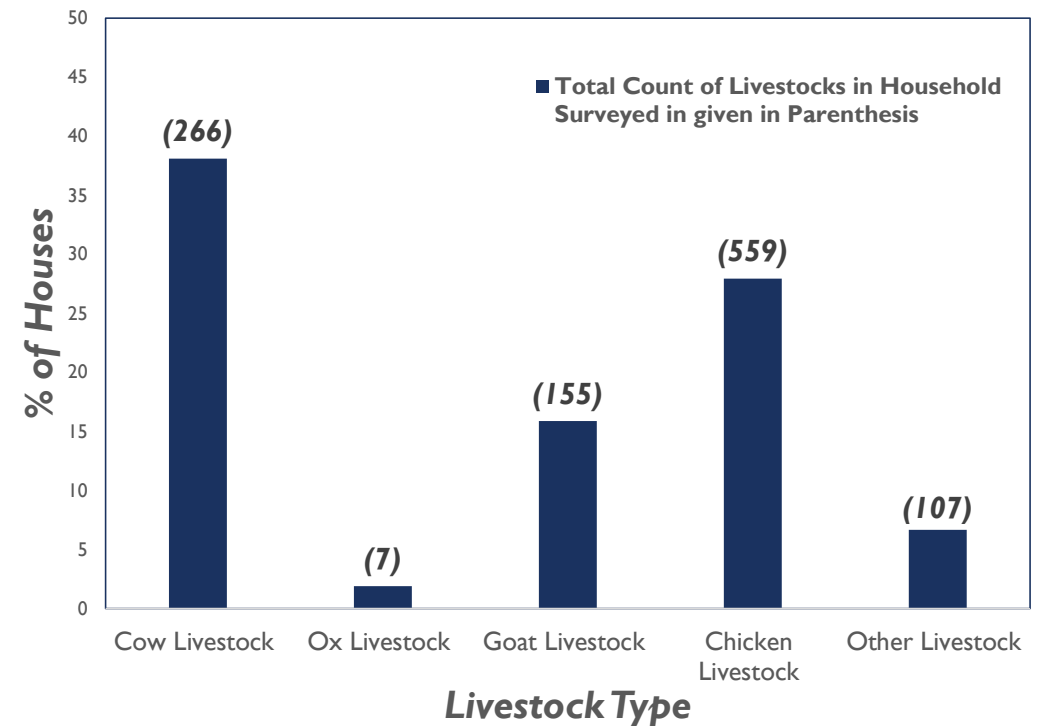
Cow Oxen Goat Chicken Other

Aguibani GP: Household Survey Data Trends

Observations:

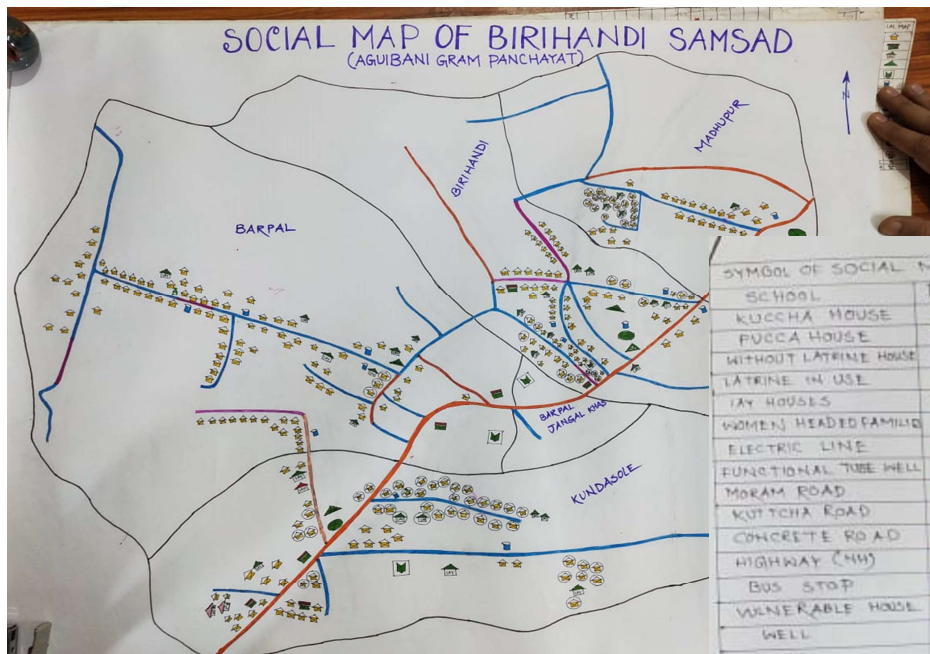
- *Nearly 50% household have some sort of Livestock.*
- *Cow and Chicken livestock are more common followed by Goat livestock.*

Livestock Details



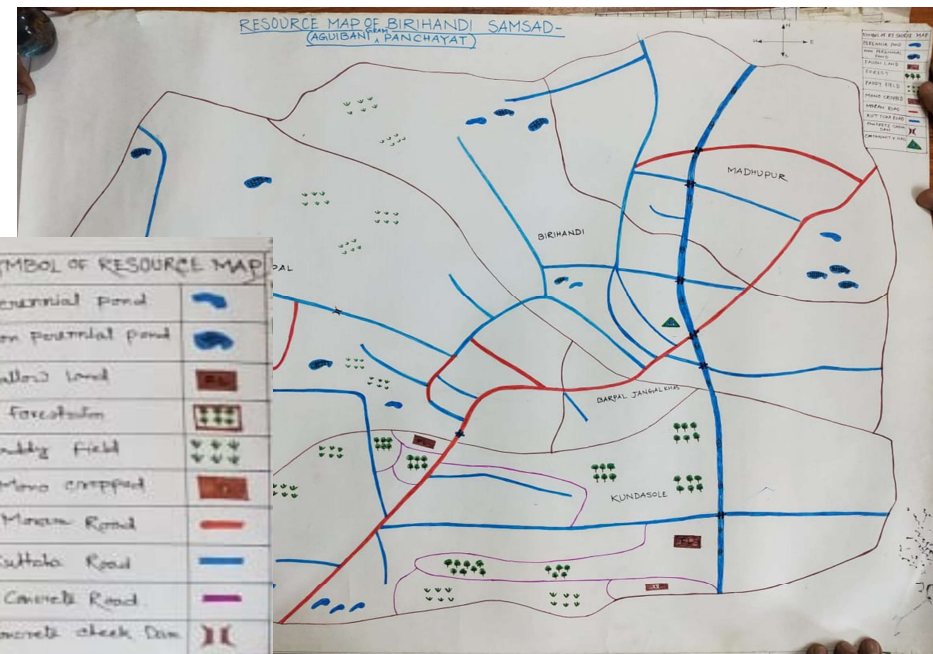
Aguibani GP: Secondary Data Collections

- Social Maps represent location of houses, schools, roads and other community structures
- Resource Maps represent pond, river, canal, forest, fallow land, paddy fields, roads etc.



Social Map of Birihandi Samsad

SYMBOL OF SOCIAL MAP	
SCHOOL	
KUCCHA HOUSE	
PUCCA HOUSE	
WITHOUT LATRINE HOUSE	
LATRINE IN USE	
WOMEN HEADED FAMILY	
ELECTRIC LINE	
FUNCTIONAL TUBE WELL	
MORAM ROAD	
KUTCHA ROAD	
CONCRETE ROAD	
HIGHWAY (NH)	
BUS STOP	
VULNERABLE HOUSE	
WELL	
ICDS	
RELIGIOUS INSTITUTION	



Resource Map of Birihandi Samsad

SYMBOL OF RESOURCE MAP	
Perennial pond	
Non Perennial pond	
Fallow land	
Forestland	
Paddy field	
Mono cropped	
Moram Road	
Kutcha Road	
Concrete Road	
Concrete check Dam	
Community Hall	

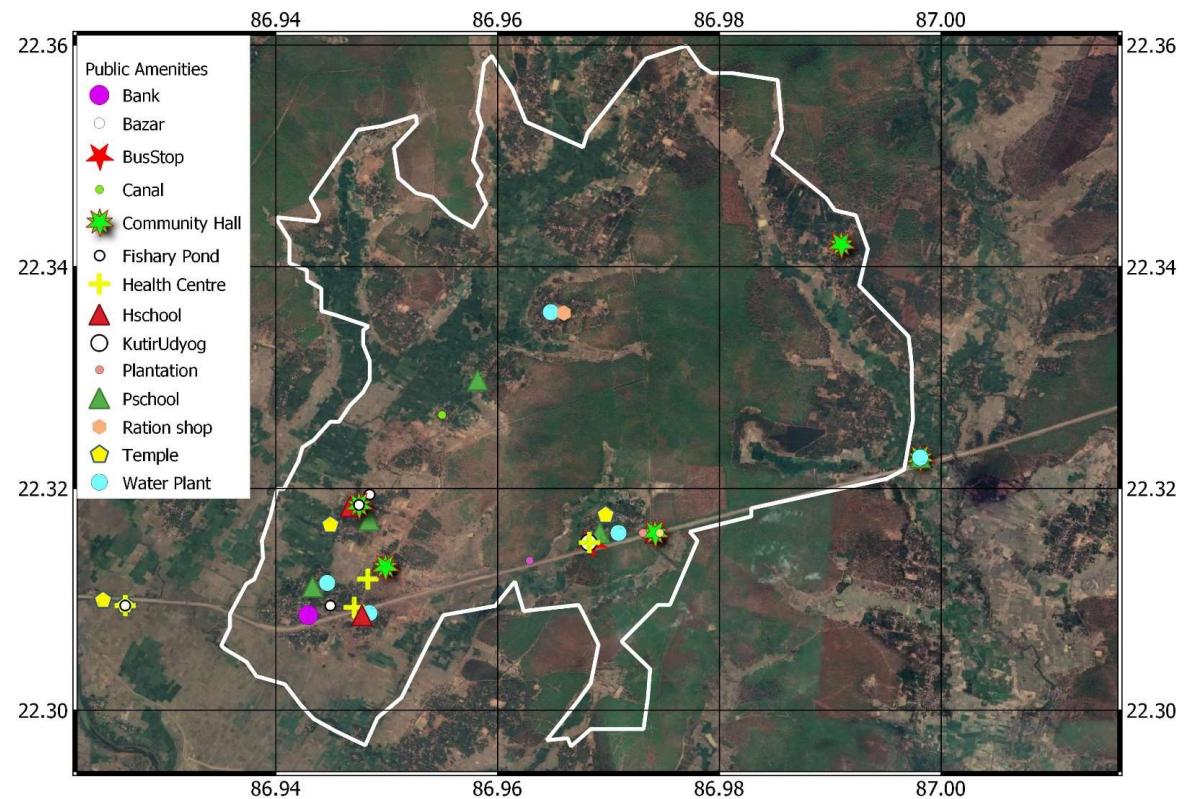
Aguibani GP: Basic Amenities

Boundary		Education Institution		ICDS	
Match Line	1	High School	3	ICDS Centre	11
		Primary School	13		
		SSK	5		
		Upper Primary School	2		
Health Institution		Waterbody		Government Offices	
Health Sub Centre	2	Bandh (Check Dam)	3	GP Office	1
		Jhora/Stream	1		
		Water Reservoir	14		
Road - Length (in Km.)		Utility		Other	
	All Roads	Bank	1	Important Place	2
National Highway	1	Post Office	1		
		Ration Shop	1		
Boundary Wall		Road - Length (in Km.)		Drinking Water Source	
Primary School B.W.	4		All Roads	Hand Tube well	All Tubewells
		Blacktop Road	1.842		90
		Earthen Road	4.408		
		Morum or Brick Road	47.897		
		Concrete Road	7.773		
		Gravel Road	4.206		

Aguibani GP: Spatial Distribution of Amenities

Observations:

- *Most of the public amenities are centred near highway.*
- *The interiors of the GP are mostly devoid of common and even essential public amenities like health centre, bank and ration shops.*



Aguibani GP: Future Projections

Future Population Forecasting

Year	Population of Jhargram	Population of Aguibani GP
1991	42094	
2001	53145	
2011	61712	10193
2021*	72964	12051
2031*	85522	14126
2041*	99654	16460

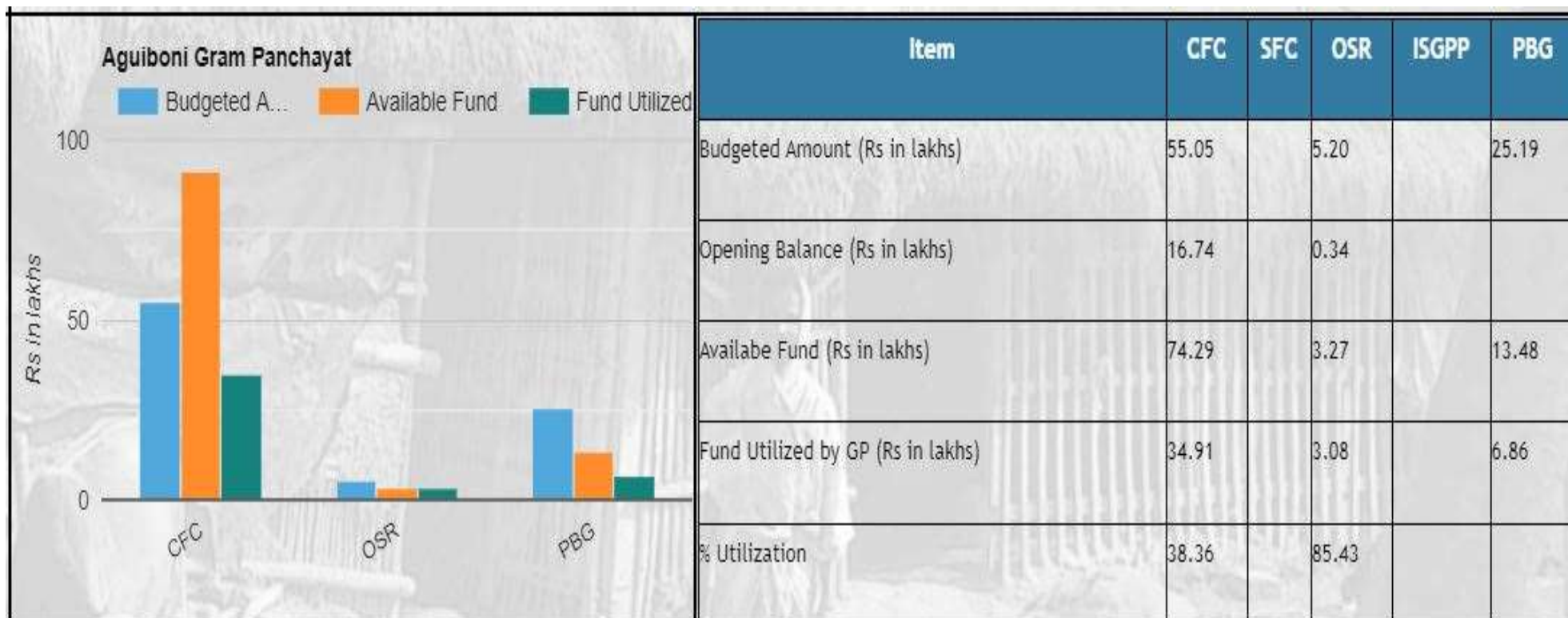
* Forecasted population using mean of arithmetic increase and geometric increase populations for Jhargram, and ratio approach for Aguibani GP population.

Aguibani GP Amenities Current vs Future ?

Year →	2011	2021	2031	2041
Population →	10193	12051	14126	16460
Population Density (persons/Sq. Km)	509.7	602.6	706.3	823
Number of health centres		2	?	?
Number of Primary/Nursery Schools		14	?	?
Number of Secondary/Middle Schools		3	?	?
Number of Degree Colleges		Nil	?	?
Number of Banks		1	?	?
Number of Post Office		2	?	?
Number of LPG Distributer		1	?	?
Number of Public Toilets		Nil	?	?
Number of Community Centre		1	?	?
Number of Library		Nil	?	?

* The National Sample Survey Organisation (NSSO) defines 'rural' as an area with a population density of up to 400 per square kilometer

Aguibani GP: Financial (2017-18, WB Govt. Website)



Aguibani GP: SWOT Analysis



Strengths

- Good connectivity and approachability (Located on Kolkata Mumbai Highway NH49, and the nearest railway station is within 10 Kms)
- Adequate land (fertile) and water resources, and healthy forest cover
- Nearly 70 % Literacy Rate
- Low-risk region for flood and droughts
- Under newly created (in 2017) Jhargram District Administration

→ The population lacks in financial resources and most people (~ 80%) are below poverty line.

→ There is lack of opportunities for employment, business and skills refinement

→ Although, the villages near highway have easy access to several amenities, the interior areas have not seen any development

→ The entire GP area have been in the naxalite affected region in the past, and, still some parts in the GP has naxal influence.



Weaknesses

Aguibani GP: SWOT Analysis



Opportunities

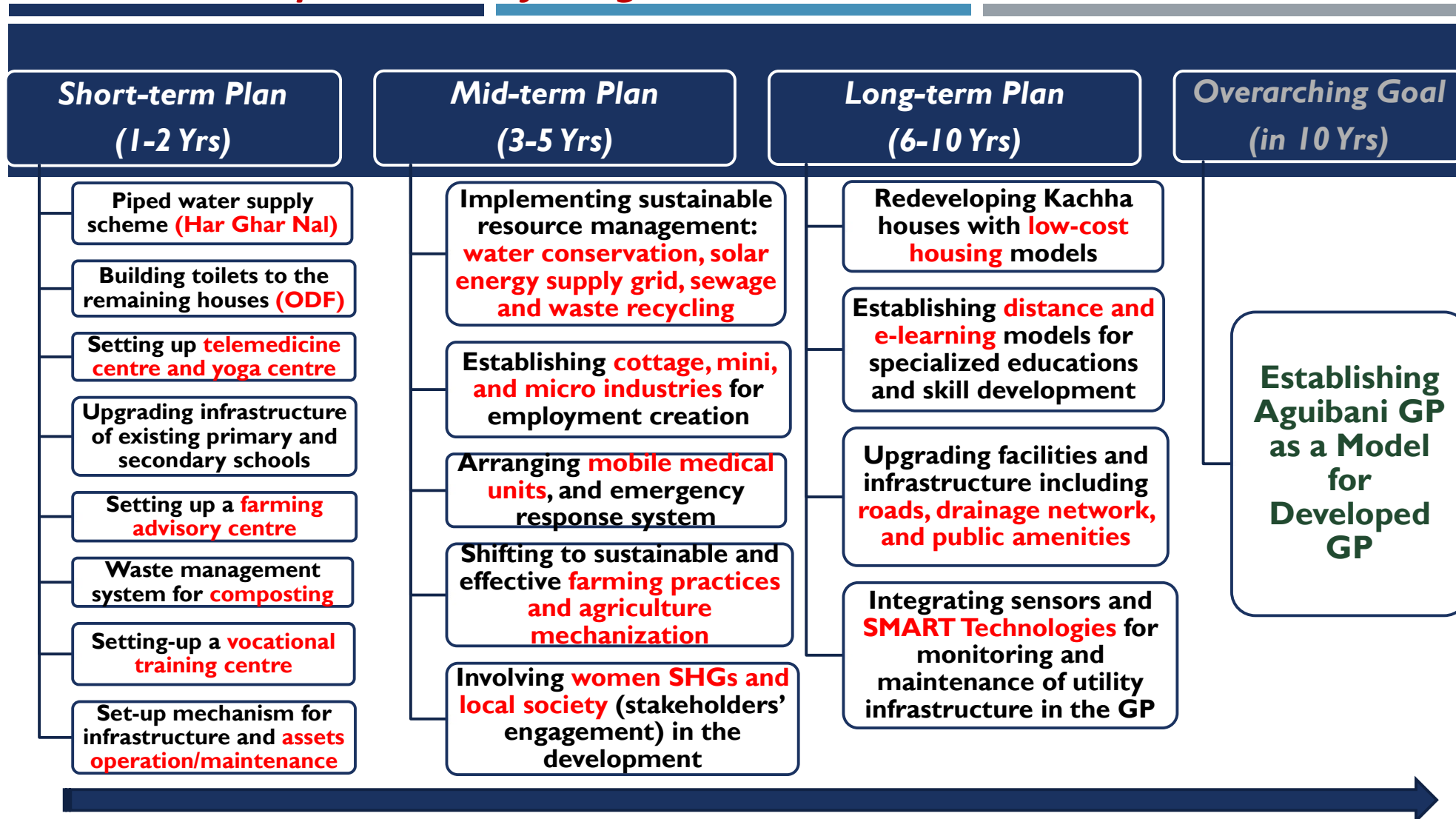
- Huge potential for green-field development
- Use of local resources to plan for development and economic growth
- Opportunity to integrate deprived and tribal population with the mainstream development projects
- Proximity of the region to major industrial, commercial and educational hubs like Kharagpur, Tatanagar and Kolkata

- Safety and security of infrastructure assets
- Retaining skilled workforce in the villages for operation and maintenance of infrastructure installed
- The integration of stakeholders from the naxal influenced regions is a challenge
- The wild elephants roam around in the region, and, at time, destroy the crop fields



Threats

10 Year Development Plan for Aguibani GP



Sector Specific Development Plan for Aguibani GP

Proposed Development Activities **Water, Sanitation and Waste Management**

Har Ghar Nal

Harvested rainwater + Ground-water based piped water supply scheme for cluster of villages

Shuddh Jal

Water quality monitoring and water treatment systems for piped water supply schemes

Catch the Rain

Rainwater harvesting and beneficial reuse

ODF Villages

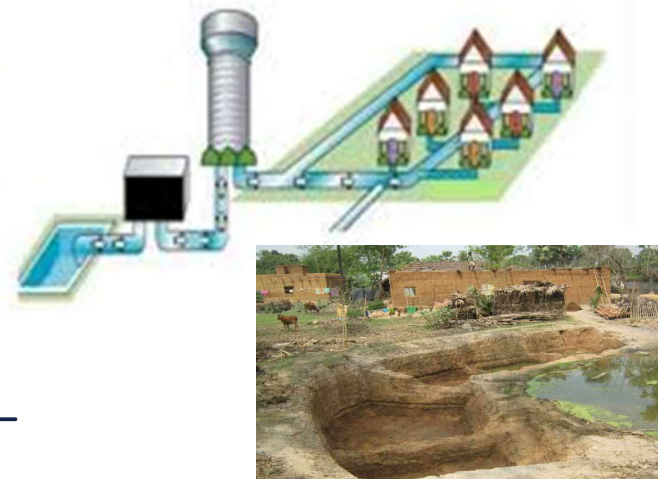
Building toilets for households with no toilets

Swachh Bharat (Gramin)

Wastewater collection, fit-for purpose treatment, and reuse in farming (decentralized system)

Waste Management

Solid waste segregation, followed by organic waste composting and non-degradable waste recycling



IIT Kharagpur can help with planning, detailed designing, and overseeing implementation and maintenance of all these programmes in the villages

Sector Specific Development Plan for Aguibani GP

Proposed Development Activities Education and Skill Development

Enhancing Resources

Equipping existing Scholes with good laboratories, library, and other facilities

- *IIT Kharagpur can help setting up modern teaching laboratories & other required infrastructure*

Pedagogy Trainings

Infusing art and skills for effective teaching in the teachers of the schools

- *NSS volunteers at IIT Kharagpur can help in this. Also, IIT Kharagpur offers several pedagogy training sessions.*

Skill Development Centre

Establishing vocational training and skill development centre in the GP

- *In addition, specific training and skill development program may be organized at IIT Kharagpur or other centres*

Tele-learning

Setting up tele-learning centres at middle and secondary schools

- *IIT Kharagpur students can volunteer to help village students seeking academic support*

NDLI (National Digital Library of India)

Wider access to academic resources through NDLI.

- *IIT Kharagpur can train local youth on NDLI access and operations*



Sector Specific Development Plan for Aguibani GP

Proposed Development Activities **Affordable Health-Care and Naturopathy**

Tele-Medicine

Arranging telemedicine points in GP to facilitate expert medical advisory from distant locations

Mobile Medical Units

Mobile medical units to be made available on demand

Ayurveda and Natural Care

Opening Ayurveda and Naturopathy Centre in the village

Yoga Centre

Establishing and Yoga and Physical Fitness Centre

Emergency Response System

First-Aid Training, CPR Training, Ambulance Facility



IIT Kharagpur has developed and demonstrated telemedicine system for affordable healthcare, and can facilitate village-scale adaptation of the system

Sector Specific Development Plan for Aguibani GP

Proposed Development Activities Employment and Income Generation

Cottage Industries

Milk processing units, Primary/secondary processing of crops, Muri making, Local art and craft



Mini- /Micro- Industries

Rice parboiling, Rice milling, Cash-crop farming, Wood machinery, Farm machinery, Supply-chain industry



Infrastructure/ Assets Management

Skilled manpower needed for operation & maintenance of water, energy, health-care etc. infrastructures



Small Business Enterprises

Carpentry, Automobile repair, Mobile repair, Cold storages and warehouses

Attracting Investments

Exploring government and private supported schemes for employment creation



IIT Kharagpur can facilitate in training and skill development, machineries designs, development of business models etc. with all of the listed items

Sector Specific Development Plan for Aguibani GP

Proposed Development Activities **Energy Self-Sustainability and Resources Management**

Solar Systems

Adopting solar energy systems for energy-intensive applications (Schools, water pumping, street lightings)

Energy Efficient Utilities

Switching to energy efficient lights and devices (LEDs), and promoting energy conservation at household levels

Forest Preservation

Vigilant supervisory system for illegal deforestation

Canal/Ponds Management

Restoring and reviving canal, ponds, and wells and use them effectively with water conservation/harvesting plans

Groundwater Recharge

Monitoring groundwater levels and setting up groundwater recharge stations for harvested rainwater



IIT Kharagpur can help in planning, execution and monitoring of all aforementioned programmes

Sector Specific Development Plan for Aguibani GP

Proposed Development Activities Agriculture and Food Security

Enhancing Agricultural Production

- **Soil and water testing of soils at farmers fields**
- **Planning of crops for seasonal cultivation and marketing**
- **Water efficient cropping with micro-irrigation, canal and drainage planning**
- **Promotion for plastic mulching, greenhouse cultivation, bee-keeping, vermicomposting**



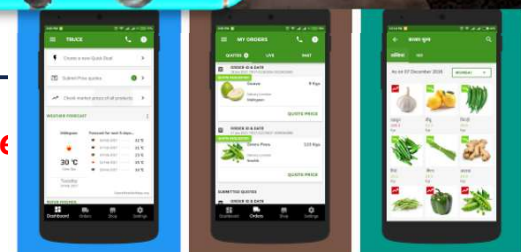
Agri-Mechanisation

- **Custom Hiring Centre for Agri-Machines**
- **Training of Youth for Operation and self-servicing of Agri-Machines**
- **Promoting safety measures during machine operation and spray application**
- **Women Friendly Tools to reduce drudgery operation**



Production Storage and Processing

- **Proper crop storage facility for minimization of crop loss**
- **Creation of small-scale packaging and distribution of vegetables through e-commerce**
- **Training the women for setting-up of small scale food processing units**
- **Creation of cold-storage facility for vegetables, fruits and milk.**



Sector Specific Development Plan for Aguibani GP

Proposed Development Activities Rural Housing and Road Infrastructure

Bamboo-reinforced Concrete Buildings

Feasible solution for low cost rural housing developed by IIT Kharagpur

- *Renewable raw material, with lesser carbon footprint*
- *Energy requirement is 1/50th of equivalent mild steel*
- *Cost reduction by 20% – 30% compared to conventional steel reinforcement*
- *Bamboo can be grown easily in village – local employment generation*
- *Bamboo-reinforced structure can have life span 20 – 30 years*



Cell-filled Concrete Road

Suitable pavement technology for rural roads, developed by IIT Kharagpur

- *Cost-effective as compared to black top road.*
- *The expected life can be about 15-20 years.*
- *Flexible, and the surface does not crack.*
- *Maintenance free and ideally suited to rural road*



Summery and Way Forward

- *Aguibani GP lacks in several basic amenities (especially for villages located in the interior parts), and the majority of population is poor (below poverty line). The household survey revealed that over 60 % population still leaving in Kachha houses*
- *The GP has huge scope and potential for development in terms of all basic human development aspects*
- *Through this short-term study, IIT Kharagpur conducted SWOT analysis, and could identify the possible interventions which could improve the overall standard of living of the people in the GP*
- *Further, detailed planning, design and implementation schemes may be developed by IIT Kharagpur on specific aspects, as and when needed.*



THANK YOU !

JAI HIND
