DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII
AN APPROACH TOWARDS RURBANISATION

Kimbuva Village
Patan District

PREPARED BY

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GUJARAT POWER ENGINEERING AND RESEARCH INSTITUE, MEVAD

DR. PRANAVKUMAR D. BHANGAONKAR NODAL OFFICER

YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad– 382424 Gujarat

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ON

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CERTIFICATE

This is to certify that the following students of Degree Engineering successfully submitted

Detail Project Report for,

VILLAGE: - KIMBUVA

DISTRICT: - PATAN

Under

Vishwakarma Yojana: Phase-VII

In partial fulfillment of the project offered by

GUJARATTECHNOLOGICALUNIVERSITY, CHANDKHEDA

During the academic year 2020-21.

This project work has been carried out by them under our supervision and guidance.

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ABSTRACT

Vishwakarma Yojana is one of the initiatives towards rurbanization of villages by Government of Gujarat hand over to GTU. The vision of Vishwakarma Yojana is to reduce and remove the rural-urban divide through infusion of urban patterns and services in rural systems to ensure provision of quality lifestyles and livelihood options while keeping the basic rural soul intact. By studying the village life with respect to delivery of basic needs, the main aim is to reimaging, redesign, rejuvenate and strengthen the community life. The main objective of the project is to study the present status and to conduct techno- economic survey of all selected villages of the state. It ascertains the existing basic and public amenities, essential commodities & other infrastructural facilities.

As per the criteria given by VY-VIII, the KIMBUVA village of Patan district is selected for study. Village is located at about 17 km from Patan and 124 km from State capital Gandhinagar. The population of village is 2960 with the area of approximately 11 km^2. Villagers are engaged with Agricultural, House hold industries, government jobs, etc.

The current scenario of village is observed and reviewed through visiting the village personally. All the major facilities available in village like Gram Panchayat Building, Banks, Post office, School, etc. Most of the structures are in moderate condition. Wheat, Mustard seed, Castor are the major crops grown in village. There is underground drainage system in main localities. However, Village is lacking for the proper solid waste management and also seeks focus on maintenance of existing facility such as road, street lights, etc.

After analyzing all the collected data, it is observed that village needs some new facilities and some existing facilities need maintenance. We suggest some design for selected village like Skill Development Center, Library, Public Toilet, Post office. Also, village needs initiative to approach to various Govt. schemes offered by local bodies.

Concept of smart village is followed for proposing and designing the facilities suggested. With the help of this Yojana and Village governance, the village can reach to a digital environment by providing E-facilities. Also, it is important to maintain the existing facilities rather than new development. We always look in future forgetting the past which will keep us as it is in development point of view.

Use of various sustainable technologies is proposed for selected village and the same can be explored for future scope of development. However, awareness is more essential before adopting such technologies.

Key Words:
Rurbanization
Sustainable Development,
Gap analysis,
Design provision.

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We are highly indented to **Gujarat Technological University**, Ahmedabad for providing us such opportunity to work under Vishwakarma Yojana to get real work experience and applying our technical knowledge in the development of Villages.

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ABBREVIATIONS

NGO	Non-Government Organization
NHB	National Housing Bank
LPCD	Liter per Capita per Day
UDPFI	Urban Development Plan Formulation and Implementation
SPV	Special Purpose Vehicle
CSR	Corporate Social Responsibility
SWOT	Strength Weakness Opportunities and Threats
IST	Indian Standard Time
PHC	Primary Health Care
CCTV	Closed-Circuit Television
MoUD	Ministry of Urban Development
ICT	Information and Communication Technologies
BARC	Bhabha Atomic Research Centre
SPT	Standard Penetration Test
NRI	Non-Resident Indian
SC	Schedule Caste
ST	Schedule Tribe
NHB	National Housing Bank
TDO	Taluka Development Officer
DDO	District Development Officer

CHAPTER 1

SMART/IDEAL VILLAGE VISIT FROM DISTRICT OF GUJARAT STATE (MAKTUPUR/RUPPUR)

1.1 BACKGROUND & STUDY AREA LOCATION

Maktupur village is located at 33 Km from Patan. The village is connected with Palanpur-Ahmedabad. This village is developed during recent years very efficiently and now this village have all basic amenities like, Cement Concrete Road, underground drainage, water supply, solid waste management, gram panchayat, most houses are pucca, transportation services, higher education etc. the education is very good in this village. This village has post office. Figure 1 represents the Google map of the village.

Study area location

- Name: Maktupur
- District: Mahesana
- Taluka: Unjha
- Distance from Patan: 33 km
- Pin code: 384170
- Language: Gujarati and Hindi
- Time zone: IST (UTC+5:30)
- Elevation/Altitude**:** 110 meters. Above-Sea level

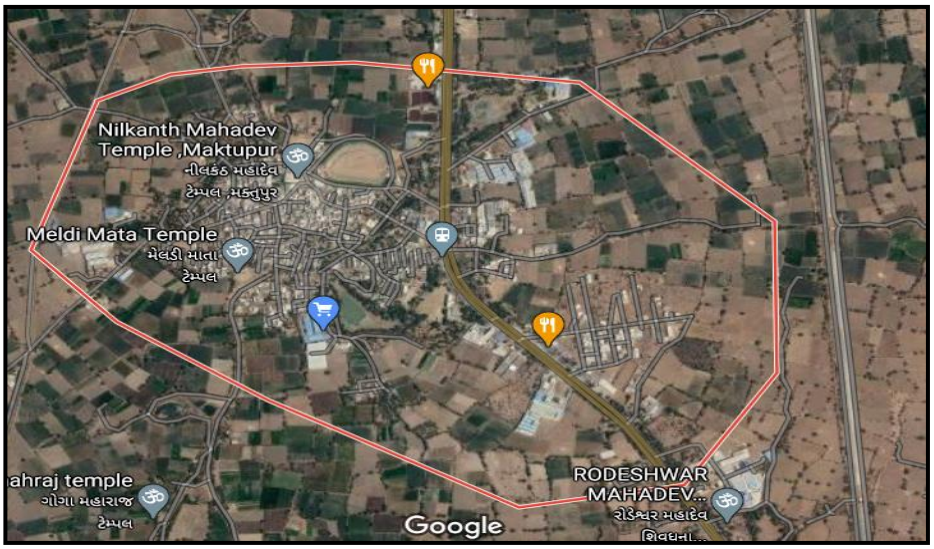


Figure 1 Map of Village

1.2 CONCEPT: IDEAL VILLAGE, NORMAL VILLAGE

1.2.1 Objectives

- Prevent distress migration from rural to urban areas, which is a common phenomenon in India's villages due to lack of opportunities & facilities that guarantee a decent standard of living.
- Better livelihood opportunities which are not in villages.
- To get basic amenities.
- Contribute towards social empowerment by engaging all sections of the community in the task of village development.
- Improving the economic conditions of the Semi-skilled and Un-skilled labour by publishing their availability status on the Internet;
- Providing updated information and databanks to the Government for better analysis and individual profiling

1.2.2 Case study of Smart village Punsari

- Punsari, located in Gujarat, puts most metros to shame. Funded by the Indian government and the village's own funding model, Punsari is no NRI-blessed zone. The village also boasts of a mini- bus commute system and various other facilities. This village in the Punsari village there is100% led system. There is also fully Wi-Fi system with the very minimum rate. Cleaning& fogging system is regularly. has Wi-Fi connection for all people. Efforts have been made for the empowerment of women and increasing security in the village. Some of the facilities provided by the panchayat include local mineral water supply, sewer & drainage.

- Punsari has won national as well as state awards for Best Gram Panchayat in 2011. The case of Punsari Village from the Sabharkantha District of Gujarat is unique as it stands out as India's first model as well as smart village. Using descriptive analytical framework, the paper aims to argue that such smart villages are a ray of hope for rural revitalization in the countryside of India.

- The official document of the state government of Gujarat on smart and model village defines a model village as ―a village which has foresight for the development and proper planning to keep the village clean, healthy, green, pollution free, crime free, and disease free with co-ordination of various community development and welfare schemes of Government.

- Smart village means a village which wishes to increase facilities for the citizen by taking decisions democratically. Smart village means a village in which the youth, women, farmers, village artisans, backward, and deprived people may get equal opportunity for development.

1.2.3 The idea of a model/smart village

- The idea of an “Adarsh Gram” or model village has been explored earlier as well, most notably
- Through the Pradhan Mantri Adarsh Gram Yojana, launched by the Central Government in2009.
- The scheme was implemented in pilot mode in 1000 villages of Assam, Bihar, Himachal Pradesh, Rajasthan and Tamil Nadu, with an allocation of Rs 10 lakh per village. This limit was later raised to
- Rs 20 lakh per village. The target villages under the scheme were those with more than 50%of the
- Population belonging to Scheduled Castes (SCs). Additionally, State governments have also taken
- Steps in this direction. Himachal Pradesh launched a Mukhya Mantri Adarsh Gram Yojana along
- Similar lines in 2011, with the allocation of Rs 10 lakh per village.
- The idea of an “Adarsh Gram” or model village has been explored earlier as well, most notably through the Pradhan Mantri Adarsh Gram Yojana, launched by the Central Government in 2009.

1.2.4 Ancient History in India village

Rural areas are large and isolated areas and open country with low population density. The Indus valley civilization is so far known to be the ancient civilization in India and at mainly comprise two cities of Harappa and Mohenjo-Daro.

1.3 DETAIL STUDY

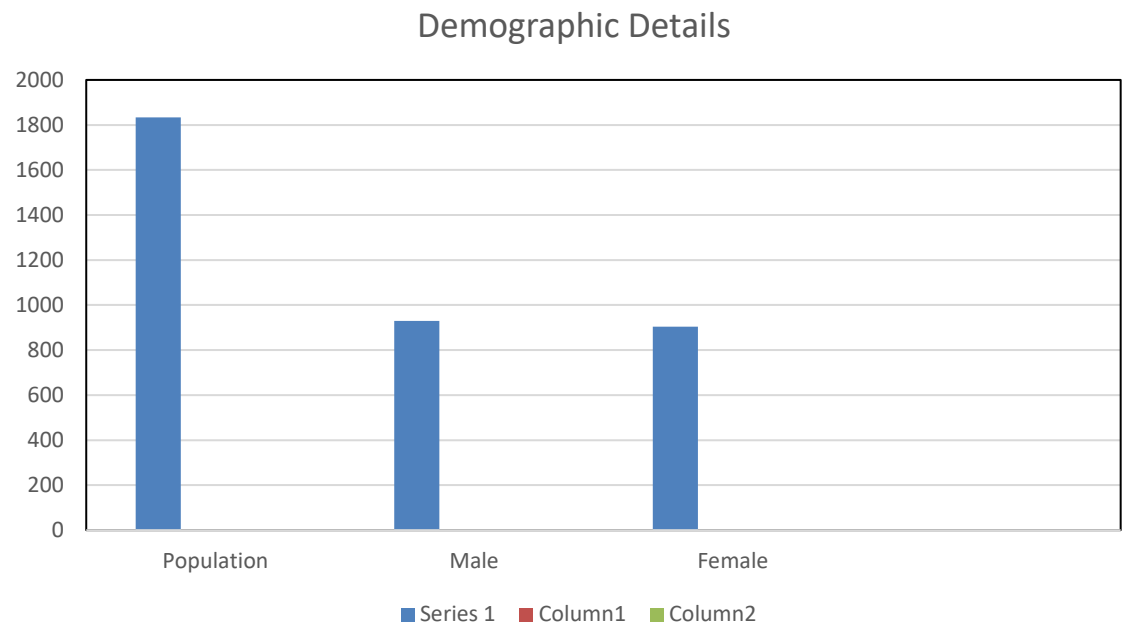
- In detail study of Smart village Ruppur, various details like physical, demographical, occupational, and social details which was collected from the village. Infrastructural facilities available at the village were photographed and surveyed and is shown in the infrastructural details.

- Various city like facilities were available at the village which makes it a smart village. Storm water management, waste water management, solid water management was seen clearly in the pictures.

- **Physical & Demographic Representation**

Table 1.1 Physical & Demographic Representation

State Name	District Name	Sub District	Village Name
Gujarat	Patan	Chanasma	**Ruppur**



- **Demographic Details**

Table 1.2 Demographic Details

Census Year	Population	Male	Female
2011	1833	929	904

- **Occupational details**

1. Farming
2. Business
3. Dairy
4. Animal husbandry

- **Social profile:**

  The social scenario of village is excellent .in the past few years there is 0% migration in the village. The gram panchayat had spent around 12-13 crores for the development of the village and that to with use government schemes and from the revenue, the gram panchayat has zero financing from NRI, NGO and CSR. The income of the village is approx. 5.50-6.00 lakhs

- **Infrastructures:**

  Various infrastructure facilities like educational buildings, Health and Wellness Centers, Administrative buildings, Parks and Banking facilities, etc. are visited and observed. Fig.2 represents the infrastructural facilities at Ruppur village.

- **Infrastructures Facilities**

Arts, Commerce and ITI College

Harshidh Lake

Village Panchayat

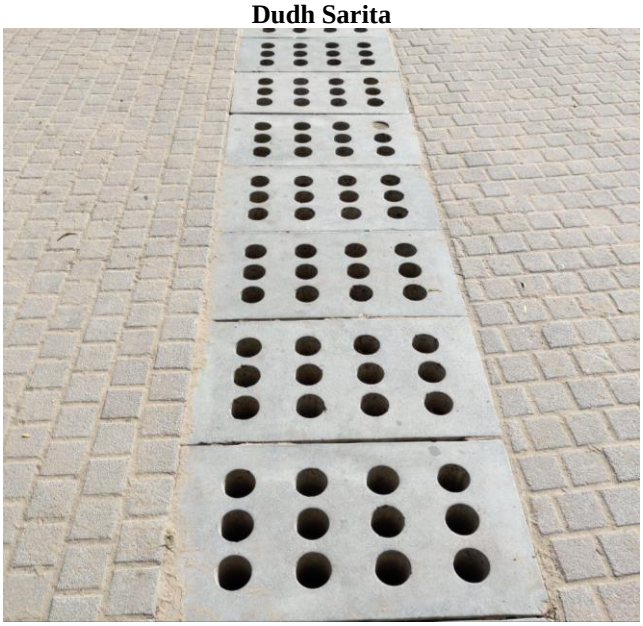
Health and Wellness Center

Paver Block in whole Village

Community Hall

Dudh Sarita

Park



Proper Drainage Facility

Bank

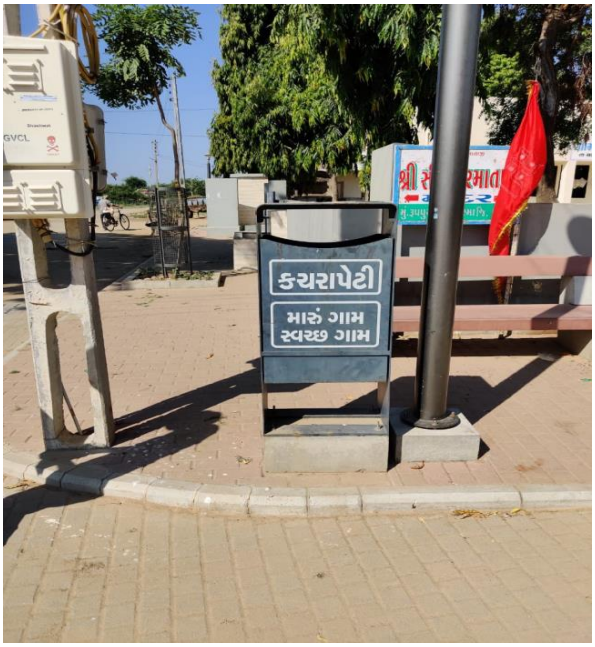
Garden near Lake

Harshidh Mata Temple

Post Office

Primary School

Elevated Service Reservoir



Dust Bin

Public Urinals

Drinking Water Facilities

Figure 2 Infrastructural Facilities at Ruppur Village

1.4 SWOT ANALYSIS OF IDEAL VILLAGE

Herewith the SWOT analysis for ideal village is represented. Such analysis can be useful for understanding scope of future developments with available strength and also the prevailing weaknesses are to be overcome by appropriated techniques.

Strength

- Land
- Transportation system
- Drainage facilities
- Drinking facilities

Weakness

- Illiterecy
- Solid Waste Management
- Low wage payment

Opportunuties & Threats

- Cottage industries
- Govt. Schemes
- Education facilities
- Job insecurity

1.5 FUTURE PROSPECTS OF VILLAGE

- Proper Solid Waste Management should be done in the village.
- Proper Rates for the agricultural good should be given to the farmers.
- Proper drainage of storm water inside village
- The village should use advance technologies in agricultural, water-supply as well as for other fields.
- Easy data base management for agriculture.

1.6 BENEFITS OF THE VISIT OF VILLAGE

- Main purpose of visit was to know the inside condition of village, its strength and weakness
- There were different types of requirement of the village.
- Several factors regarding the village were discussed with the villagers
- Basic amenities and facilities were available in the village
- With the help of better connectivity, village can become smart.
- Due to infrastructural development, aesthetic view of village was enhanced
- Employment and investment were generated due to tourism.
- Term “Smart Village” can coin on the basis of cleanliness, people residing, etc.
- Due to availability of various infrastructural facilities, migration was low.

1.7 CIVIL & ELECTRICAL CONCEPT OF IDEAL VILLAGE

- There were facilities like, schools, colleges, and hospitals, etc. available in the village
- Idea of making a village ideal was decided on the basis of surveys and analysis of all existing infrastructure facilities available
- To make village Ideal there must be basic availability of facilities like public toilet, solid waste management system, gram panchayat, tap water, drainage, etc.
- Village is totally brightened with 100% led system.
- Village Garden was most attractive place in the village
- Street Lighting which was used in the village were giving an aesthetic view to the road and was beautifying the Village.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION: URBAN & RURAL

Urban:

Urban is that area where the population density is more and new facilities are provided to the people. Urban areas are the region surrounding a city. Most of inhabitants of urban areas have non-agricultural jobs. Urban areas have municipality, corporation, cantonment board or notified town area committee etc. According to census 2011, there are 7,935 towns, 4,041 statutory town and 3,894 census towns.

Rural:

All the areas which are not characterized as urban area is called rural area. In which the population is very low compared to urban areas. Mainly they depend on agricultural activities. According to census 2011, there are 6, 40,867 villages in India. The area where more than 75% of male population is associated with agricultural activity is known as rural area.

2.2 IMPORTANCE OF THE RURAL DEVELOPMENT

Rural development is necessary not only for an over-whelming majority of the population living in villages but the development of rural activities is essential to accelerate the pace of overall economic development of the country. Rural development has assumed greater importance in India today than in the earlier period in the process of the development of the country.

It is a strategy package seeking to achieve enhanced rural production and productivity, greater socio-economic equity, and aspiration, balance in social and economic development. The primary task is to mitigate the hunger of about 70 percent of the rural population, providing adequate and nutritious food. Then follow an adequate provision of clothing and footwear, a clean house in a clean environment, medical care, recreational facility, education, transport and communication.

2.3 ANCIENT VILLAGES / DIFFERENT DEFINITION OF: RURAL AREA / VILLAGES

Rural areas are also known as the 'Countryside' or a 'village' in India. It has a very low population density. In rural areas, agriculture is the chief source of livelihood along with fishing cottage industries, pottery etc., as opposed to urban areas which have larger populations. The rural area means any places as per the latest census which fulfils the following criteria.

2.4 SCENARIO: RURAL / URBAN VILLAGE OF INDIA POPULATION GROWTH

POPULATION GROWTH OF INDIA as per Census 2011:

- For the first time since Independence, the absolute increase in population is more in urban area that in rural areas
- Rural – Urban distribution: 68.84% & 31.16%
- Level of urbanization increased from 27.81% in 2001 Census to 31.16% in 2011 Census.
- The proportion of rural population declined from 72.19% to 68.84%. Population of India Population (in Crore) 2001 Difference India 102.9 121.0 18.1 Rural 74.3 83.3 9.0 Urban 28.6 37.7 9.1
- The government has started many programs aimed at improving the standard of living in villages or rural areas. To build rural infrastructure, the government launched a time-bound business plan for action Bharat Nirmanin2005. Under Bharat Nirman, action is proposed in the areas of Water Supply, Housing, Telecommunication and Information Technology, Reads, Electrification and Irrigation.

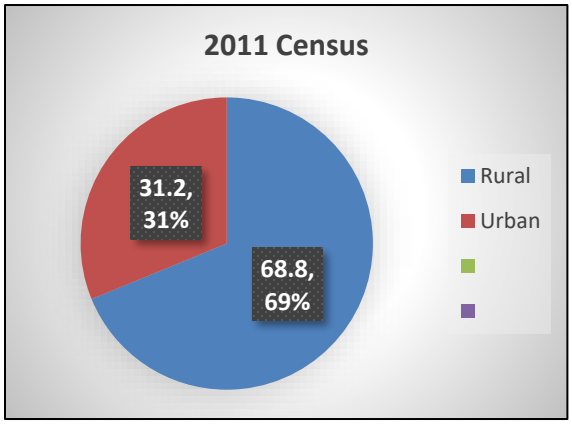


Figure 3 Population as per 2011 Census

Table 2.1 Rural and Urban Scenario

	1991-2001	2001-2011	Difference
India	21.5	17.6	-3.9
Rural	18.1	12.2	-5.9
Urban	31.5	31.8	+0.3

2.5 SCENARIO: RURAL / URBAN VILLAGE OF GUJARAT AS PER CENSUS 2011 AND LATEST

- The total population growth in this decade was 19.28 percent while in previous decade it was 22.48 percent.
- The population of Gujarat forms 4.99 percent of India in 2011. In 2001, the figure was 4.93 percent.

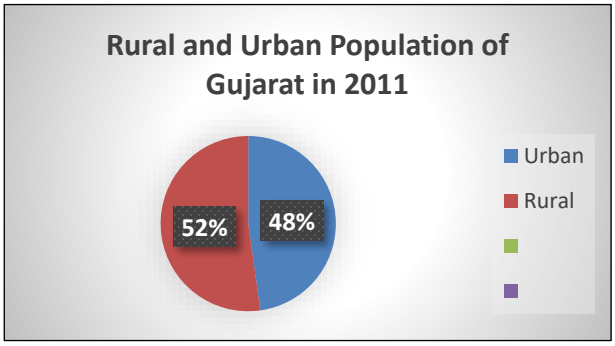


Figure 4 Rural and Urban population in Gujarat

Table 2.2 Population Details

		Total	Rural	Urban
Population	Persons	1210193422	833087662	377105760
	Males	623724248	427917052	195807196
	Females	586469174	405170610	181298564

2.6 RURAL DEVELOPMENT ISSUES & CONCERNS

As we know the 60 to 70 percent of rural population in India lives in primitive conditions. This statement exists even after 70 years of independence of India. So that Rural Development programs have urgency in the present condition also. There are many obstacles in the development programs of rural which are given below:

- People have to migrate to the urban areas due to unavailability of education
- Economy of the people living in rural areas is low
- Very less people are employed in the rural areas
- There is no electricity supply in many villages
- No transportation facility
- Less income opportunity
- Lack of sanitation
- They have not any kind of new technology for the cooking and living etc.
- Now also many rural peoples using primitive methods of cooking, living and farming and they have trust on these methods

Various Measures for Rural Development

- Poverty can be removed and different in gap is minimized in the village is the main objective of any village to developed successfully.
- To develop rural area as whole in terms of culture, society, economy, technology and health
- The village should be proper developed to get basic facilities is and proper plan required to get benefit and also understanding required to get benefit.
- The cost of infrastructure should be less for the proper development of the village and get maximum benefit.so quality of life may increase of the villagers and get pure environment feeling empower women and small-scale farmers, and indigenous peoples, including through securing equitable land tenure supported by appropriate legal frameworks.
- Support of the villagers is requiring to develop the infrastructure in the village and accordingly also proper use of it require.
- Due to development of infrastructure the people may include in work and it get income from that work.

2.7 VARIOUS GUIDELINES/NORMS FOR VILLAGES FOR THE PROVISIONS OF DIFFERENT INFRASTRUCTURE FACILITIES

Table 2.3 Proposed Benchmarks for Rurban Clusters for Social Infrastructure and Economic Activities

Components	Facility	Applicable Standard	SLB (per cent)	Source (s)
Skills Development and Training	Number of people employed in gainful economic activities	Minimum one person per household	50	--
	Number of skilled members in a household	Minimum one person per household	50	--
Agro Processing, Agri-services	Distance to agri-processing services	At least one within 10 kilometer	100	Based on already prepared ICAPs
	Distance to market facilities like mandis and agro markets	At least One within 5 kilometer	100	Based on already prepared ICAPs
Health (Human)	Community Health Centre	1 for every 50,000 population	100	URDPFI Guidelines (2015); National Building Code (2016); National Rural Health
	Primary Health Centre (minimum 6 beds for observation purposes)	1 for every 20,000 in hilly areas and 30,000 in plain areas	100	
	Sub-center	1 for every 5,000 in plain areas and 3,000 in hill areas	100	
	Dispensary	1 for every 5,000	100	
Health (Animal)	Veterinary Hospital	1 for every 50,000 persons	100	URDPFI Guidelines (2015); National Building Code (2016); Sarva Siksha Abhiyan (2002).
	Veterinary Clinic or Centre	1 for every 5,000 persons	100	
Education	Primary School	1 for every 2,500 and within 1 km distance from every habitation	100	
	Secondary School	1 for every 5,000	100	
	Higher Secondary School	1 for every 7,500	100	
Digital Literacy	Number of households with at least one digital literate	At least one person per household	100	National Fiber Optics Network, 2011; E-DISHA
	Number of people with digital know- how	At least 20 percent population	50	

	Internet connectivity through fiber optic cables	Each village is connected with fiber optic network	100	
Citizen Service Centre	Citizen service centers at the village level	1 for every 5,000 persons or 1 per village panchayat (Gram Sabha)	100	National Fiber Optics Network, 2011
LPG Gas Connections	Access to LPG connections at the household level	Each household should have access to LPG	100	Pradhan Mantri Ujjwala Yojana (2016)
	Access to LPG distributary services at village level	One LPG agency per 1,800 households	100	

Table 2.4 Proposed Service Level Benchmarks (SLB) for Rurban Clusters for Physical Infrastructure

Components	Facility	Applicable Standard	SLB (per cent)	Source (s)
Sanitation Facilities	Individual household toilets	One in every household	100	SPMRM (2016)
	Provision of wastewater collection network	One in a Rurban cluster	50	CPHEEO Manual on Sewerage and Sewage Treatment Systems; MOUD Handbook of Service Level
	Collection of wastewater	One in a Rurban cluster	50	Benchmarking (2010).
	Existence of wastewater treatment facility	One for 25,000 people in a Rurban cluster	50	
Piped Water Supply	Household water supply connections	One connection per household	100	MoUD Handbook of Service Level Benchmarking (2010); CPHEEO Manual on Water Supply and Treatment; Manual on operation and Maintenance of Water Supply System
	Per capita supply of water	70 Liters Per Capita Per Day	100	
	Duration of water supply	A minimum of two hours uninterrupted water supply every day	100	
	Quality of water supplied	pH value 6.5 – 8.5; E. Coli is nil; TDS less than 500.	100	IS 10500: 2012 (Bureau of Indian Standards, 2012).
Solid Waste Management	Household level coverage	Door to door collection	50	CPHEEO Manual on Municipal Solid Waste Management; MoUD Handbook of Service Level Benchmarking (2010).
	Efficiency of collection of solid waste	Coverage of all households	50	
	Extent of segregation	Bio- degradable and non-biodegradable	50	Solid Waste Management Rules, 2016
	Extent of scientific disposal	Landfill sites	50	MoUD Handbook of Service Level Benchmarking (2010).

- These guidelines are derived from appropriate national level guidelines such as URDPFI, CPHEEO, etc., and national schemes such as PMKVY, PMGSY, SBM, NCMP, NHM, etc. These guidelines are based on population and are suggestive in nature, and hence open to modifications. Appropriate modifications in these guidelines could be made by the proposed Cluster Development Authority or Committee based on the circumstances on ground, and cluster or village level requirements.

Table 2.5 Space Requirements for Reservation of Land for Amenities at Village Level

Sr. No.	Amenities at Village Level	Population Range	Area Requirements in sqm	Related Road widths
1.	Skill Development Center	1,000 - 5,000	300 - 500	Hilly areas is ≥ 4 m and for plain areas it is ≥ 6 m
2.	Agriculture Services and Processing Center	1,000 - 5,000	300 - 500	Hilly areas is ≥ 4 m and for plain areas it is ≥ 6 m
3.	Warehouses for Cold and Dry Storage	1,000–5,000	300 - 500	Hilly areas is ≥ 4 m and for plain areas it is ≥ 6 m
4.	Primary School	One for 2,500	800	Hilly areas is ≥ 4 m and for plain areas it is ≥ 6 m
5.	Secondary School	One for 5,000	4,000	Hilly areas is ≥ 4 m and for plain areas it is ≥ 6 m
6.	Health Sub – Center	3,000-5,000	800 – 1,200	Hilly areas is ≥ 4 m and for plain areas it is ≥ 6 m
7.	LPG Distribution Center	2,500	100	Hilly areas is ≥ 4 m and for plain areas it is ≥ 6 m
8.	Common Service Center	1,000	100	Hilly areas is ≥ 4 m and for plain areas it is ≥ 6 m

Table 2.6 URDPFI Guidelines

Education Facilities	Planning Commission/UDPFI Norms	Required as per Norms
Aanganwadi	Each Village	4
Primary School	Each Village	2
Secondary School	Per7,500Population	1
Higher Secondary School	Per15,000Population	1
College	Per125,000Population	1
Tech. Training Institute	Per100,000Population	2
Agriculture Research Centre	Per100,000Population	2

Medical Facilities	Planning Commission/UDPFI Norms	Required as per Norms
Govt./Panchayat Dispensary or Sub PHC or Health Centre	Each Village	1

PHC&CHC	Per20,000Population	0
Child Welfare and Maternity Home	Per10,000Population	1
Hospital	Per100,000Population	0

Transport Facilities	Planning Commission/UDPFI Norms	Required as per Norms
Pucca Village Approach Road	Each Village	
Bus/Auto Stand Provision	All Villages connected by PT(ST Bus or Auto)	1

Infrastructural Facilities	Planning Commission/UDPFI Norms	Required as per Norms
Over Head Tank	1/3 of Total Demand	1.6lac capacity
U/G sump	2/3 of Total Demand	3.2lac capacity
Public Latrines	Each Village	60
Cremation Ground	Per20,000Population	1
Post Office	Per10,000Population	1
Gram Panchayat Building	Each individual/group Panchayat	1
APMC	Per100,000Population	0
Fire Station	Per100,000Population	0
Police Station	Per15,000Population	0
Community Hall	Per10,000Population	1

- To ensure coverage of all rural habitations with access to safe drinking water.
- Increase productivity of water and supply of water.
- Availability of pure drinking water to each household.
- Conservation of water through rain water harvesting and ground water recharge structure.
- To essential transportation facilities.
- Village approach road and internal road are in proper maintenance.
- Improve the quality of clinic/hospital to access the health service.
- Door-to-door waste collection system.
- Celebration of national festival like Independence Day/Republic day.
- Celebration of Environment day and also plantation of trees.

Importance in Rural Context

- For the agricultural production water, land and forests are the primary resources and resources essentially maintain human life and wellbeing.
- Rural households are the nearest to the environment or environment sources and they have capacity to protect land, water, and forest.
- Rural households are live in community.
- The villagers not get benefit from the environment so they don't get benefit from the environment so economic should not be possible for the villagers.

Sustainable Village Development Concept

- Sustainable Development is the development with consumption of resources in such a way that may not cause the unavailability of resources for the future generation. In which sustainable agriculture techniques play an important role.
- It includes use of animal waste and farm waste as manures for the fields, use of biogas for domestic use, by using waste crops lands nutrients can be retained. A small-farm management to improve productivity, profitability and sustainability of the farming system will go a long way to ensure all round sustainability and rural development

2.8 OTHER PROJECT SCHEME

Following are the schemes that are running or on board for the rural development by Indian Government:

1. Pradhan Mantri Gram Sadak Yojana (PMGSY)
2. Indira Awas Yojana
3. Pradhan Mantri Adarsh Gram Yojana
4. Mahatma Gandhi National Rural Employment Guarantee Act. (MGNREGA).
5. Swachh Bharat Mission (Garmin)(SBM)

Figure 5 PMGSY

Figure 6 Indira Awas Yojna

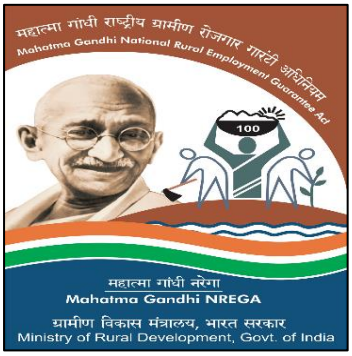


Figure 7 MGNREGA

CHAPTER: 3

SMART VILLAGES & VILLAGE'S CONCEPT

3.1 UNDERSTANDING SMART VILLAGE (CONCEPT, DEFINITIONS AND PRACTICES)

- **Concept**

Asper above diagram shows the proper meaning of smart village, Self-sufficient and Self-Reliant village with empowerment of Manpower through available natural sources and Appropriate Rural Technologies.

A city can be defined as 'smart' when investments in human and social capital, transport and modern (ICT) communication infrastructure fuel SUSTAINABLE ECONOMIC DEVELOPMENT and a high quality of life, with a wise management of natural resources, through participatory action and engagement''.

- **Definition**: -

A city well performing in a forward-looking way in economy, people, governance, mobility, environment, and living, built on the smart combination of endowments and activities of self-decisive, independent and aware citizens.

- **Practices**: -

1. Strategic system planning
2. Demonstration of low energy building
3. Demonstration of nearly zero-energy building renovation for cities and districts
4. Sustainable energy solutions
5. Energy systems for urban heating and cooling

3.2 BENCH MARKS-VISION-GOALS, STANDARDS AND PERFOMANCE MEASUREMENT INDICATORS

Sr no.	Parameter	Benchmark
A	**Transport**	• Maximum travel time of 30 minutes in small& Medium size cities and 45 minutes in metropolitan areas. • Continuous unobstructed footpath for 2 m wide on either side of all street. • Dedicated and physically segregated bicycle tracks with width of 2 m or more, one in each direction, should be provided on all streets with carriage way larger than 10 m. • High quality and high frequency mass transport within 800m & 5-minute walking distance) of all residences in areas over175persons / ha of built area

Sr no.	Parameter	Benchmark
B	Spatial Planning	• 175 persons per Ha along transit corridors. • 95% of residences should have daily needs retail, parks, primary schools and recreational areas accessible within 400m walking distance. • 95% residences should have access to employment and public and institutional transport or bicycle or walk. • At least 20% of all residential units to be occupied by economically weaker sections in each Transit Oriented
C	**Water Supply**	• 24 x 7 supply of water • Every household with direct water supply connections • 135 LPCD of supply of water • Every house should have metered of water connections • Max efficiency in collection of water related charges
D	**Sewerage& Sanitation**	• Every household should have access to toilets • Every schools should have separate toilets for girls • Every household should be connected to the waste water network • Every efficiency in the collection and treatment of waste water • Max efficiency in the collection of sewerage network
E	**Solid management**	• Every household should be covered by daily door-step Collection system. • Max collection of municipal solid waste • 100% segregation of waste at source, i.e., Bio-degradable and non-degradable waste • Max Efficiency in recycling of solid waste
F	**Storm storage**	• Max coverage of road network with storm water drainage network. • Aggregate number of incidents of water logging reported in a Year =0. • 100% rainwater harvesting
G	**Electricity**	• Every households having 24 x 7 supply of electricity. • Every house with metered electricity supply.
H	**Healthcare facilities**	• Availability of telemedicine facilitiesto100% residents • 30 minutes of emergency response time • 1 dispensary for every 15,000resident • Nursing home, child, welfare and maternity center - 25 to 30 beds per lakh population • Intermediate Hospital (Category B) - 80 beds per lakh population • Intermediate Hospital (Category A) - 200 beds per lakh population • Multi-Specialty Hospital - 200 beds per lakh population

3.3 TECHNOLOGICAL OPTIONS

- **Enhanced Use of Smart Phones and Optical Fiber Technology for Internet Techniques**

India has become the second biggest Smartphone market in terms of unique Smartphone users, crossing 220 million users, surpassing the US market, as per the report by Counterpoint research. Over 20 mobile phone brands are now assembling their parts in India. With over 460 million internet users, India is the second largest online market, ranked only behind China. By 2021, there will be about 635.8 million internet users in India. Urban population is adopting latest technology so fast that within a short span of three months, there are more than 10 crore JIO users. Indians often turn to mobile internet, as the large majority of the digital population in India were mobile internet users in 2016.India had an estimate of 262 million mobile internet users living in urban communities and 109 million living in rural areas which is close to one third of urban users. Alongside smart phone, there are alternative mediums for accessing fast internet in villages like optical fiber technology. This is one of the advanced technologies nowadays and is replacing cable network rigorously. Optical fiber communication is more advantageous than cable network due to its comparatively low cost, easy to install, high data transfer speed and abundantly available raw material.

- **Online Library and E- Education**

After provision of internet facility at villages using various advanced technology, our next responsibility towards making villages smarter is to provide a quality education to the villagers. Internet is one of the easy ways of accessing the data and information. This technology can now be explored to more extent by providing online education in schools and colleges. Worldwide digital contents are available on internet which can be accessed by children in villages to make them compatible with rest of the world. All Schools shall be connected with broadband. Free Wi-Fi shall be provided in all secondary and higher secondary schools (coverage would be around 250,000 schools). Fig: - 3.3 Online Education to Children. A program on digital literacy would be taken up at the national level. MOOCs –Massive Online Open Courses shall be developed and leveraged for e-Education.

- **Smart Agriculture**

Farming is our country's oldest profession for earning daily wages along with bread and butter and more than half of our population is directly dependent on this profession. But the agricultural productivity in our country is still lacking behind many of other developed countries. Also, most of our farmers are dependent on natural resources like monsoon and old techniques of farming. Due to drought like situation, many of our farmers have committed suicide and this number is increasing day by day. Our Government is trying to control this number through various schemes but all is in vein. Smart agriculture can be life saver to such people if implemented in right direction. Following techniques can be adopted for implementing smart agriculture:

a. In Climate smart technology, a small weather forecasting centers can be opened for group of villages well equipped with advanced technology which will be able to monitor the upcoming weather changes with the help of satellites and same information shall be communicated with the nearby villagers in an advance so that farmers can plan their agricultural activities. This will save farmers from uncertainties of monsoon and other atmospheric effects.

b. Smart apps for smart agriculture like IFFCO KISAN, Agri App can be introduced in villages for providing timely updates regarding availability and cost of seeds, fertilizers, pesticides and other agricultural commodities. Present stock and shortage of seeds, fertilizers and pesticides can be communicated with farmers in an advance by using these apps. Government initiatives like water harvesting, subsidies on

products, crop insurances, agricultural product exhibition, etc. can directly be communicated with the farmers using these smart app. Live streaming of agricultural commodities rates, market network can be done on these smart apps which will help farmers to sell their products with better prizes.

c. A training can be provided to farmers through which organic fertilizers and pesticides can be manufactured at community level to boost its better use than chemical fertilizers and fertilizers. This will help in maintaining soil quality and increasing productivity. Such types of training workshops can be arranged at Tehsil level for nearby farmers and they should be promoted to participate in it.

d. Water harvesting is the today's most essential need and is a part of smart agriculture. Government is running various schemes for rain water harvesting and providing financial support for the same. Recently Maharashtra Government have run "MageltyalaShet tale" scheme and thousands of farmers have benefited through this scheme. Such types of projects can be explored at other ground like roof top rain water harvesting, industrial water recycling and etc. at large scales and should be financially supported by the state and central governments. The proper awareness can be created among villagers for water conservation, monitoring and harvesting.

e. Solar powered bore wells can be installed directly in fields to avoid both the water and electricity crisis. Due to lack of 24 x 7 electricity farmers are unable to install irrigation in their fields and remain dependent on natural sources. Solar powered bore wells can help them in increasing agricultural productivity through timely water supply along with overcoming power crisis.

- **Smart and Efficient Public Transport System**

Lack of transportation facility is the major reason behind isolating villages from rest of the world. Since last 70 years of freedom, roads and train network in rural part of India could not be spread to our expectations. There are thousands of villages in our country to which as such no transportation is available. The direct impact of this is on accessibility of villagers to urban areas, market and lack of any other facilities which is only available in big cities. To overcome this problem, smart transportation can be main melody for development of smart villages. Our government is playing vital role in improving the situation and has already taken steps in right directions. A total of 599 highway projects covering around 12,903 km of national highways have been sanctioned till date incurring an expenditure of INR 108,000 crore over the next 5 years. Under the Smart Cities Scheme, Government of India has already earmarked INR 50,802 crore for the project with a proposed budget of INR 48,000 crore to be utilized for developing first 20 Smart cities. Similar type of bold initiative from government is expected for actual development of smart transportation in rural India too. While supporting to the scheme of Clean and Smart cities & villages, we must promote use of clean fuels like Bio-fuels, ethanol, and compressed natural gas (CNG) for our vehicles. Besides these, electric and solar powered vehicles can also be promoted equally. Vehicles running on hydrogen as fuel and using fuel cell technology are also a clean option available with us. CNG has already become a popular fuel in India due to its low cost. However, it needs infrastructure support in terms of a greater number of fueling stations and accessibility. This will definitely help us in fulfilling our dream of establishing clean and smart cities, smart villages along with saving our environment from pollution by lowering the use of carbon burning fuels like petrol, diesel, and coal.

- **Smart Sewage Management System and Sanitation**

No village or group of villages can be termed truly 'smart' without an effective sewage management system and there is a need for framing a proper sanitation plan for towns intended to become smart. Management of large quantity of household waste and garbage had become major headache for local managing bodies. Also dumping such garbage in locality is affecting common people's health.

To solve the problem related with sewage management, an urgent and effective action plan is required. The knowledge enhancement and capacity building on sanitation diagnostics, town sanitation planning and decision making and analysis of cost effective and sustainable waste water treatment technologies for mainstreaming fecal sludge should be main focus for developing smart villages. Preparing our mind set for sewage management at personal level will be more fruitful.

Every individual can have dust bin fixed outside their home where they can put their household garbage instead of throwing in open space. Different colored dust bins can be chosen for different categories of wastes like dry and wet, decomposable and non-decomposable waste, etc. Ample number of wastes collecting vehicles so called 'Ghantagadi' can be availed for each village to collect it. Waste material dumping yards shall be far away from civilization and shall have provision for categorizing and recycling of collected waste. Also, similar types of actions are required to manage bio waste generated in hospitals as well as e waste generated.

- **Renewable Energy Sources and Solar Energy**

Traditional sources of energy like wood, coal, diesel, petrol, oil, natural gas, etc. are now on the verge of ending. Also, excessive use of these sources is polluting earth's environment and is responsible for remarkable adverse effects, like abrupt climate change, drought and flood situation, green house effects, melting of ice caps on poles, de-thickening of ozone layer in atmosphere collectively known as global warming. Due to fast growing development of urban civilization, forests are reducing with greater rate. By the 1990s, the excess use of traditional sources in developing countries was marked as a leading environmental threat, with negative impacts linked with deforestation, desertification and widespread soil erosion. Thus, to save our earth from the threat of global warming, alternative energy sources which burns less carbon are required to be invented and solar energy source can play vital role to overcome these global environmental effects

- **Latest and Affordable Medical Facilities**

After fulfilling basic needs like food and drinking water, affordable medical facilities are equally important for common man. Many rural residents are not able to take treatment for basic ailments either due to the non-presence of health care services in the vicinity or due to lack of funds to access the same. Lack of public sector infrastructure and latest technology is one major obstacle in providing good healthcare to villagers. There is no sufficient number of primary health centers available for rural parts of India. Even though a well-structured public health care system exists, the infrastructure as well as the staff that are required to provide the health care services is inadequate in many different perspectives. Generally rural public health facilities across the country are having a difficult time attracting, retaining and ensuring regular presence of highly trained medical professionals. Many doctors are not willing to serve in the rural areas due to lack of facilities even if they are paid high salaries. Evaluation reports have also shown that there is lack of equipment's, poor or absence of repairs, improper functioning or lack of complementary facilities in hospitals like 24 hour running water, electricity back-ups, transportation, etc.

To overcome these issues related with the systematic problems a phase wise systematic solution is required. One such step towards ensuring rural public health is introducing an ample number of mobile medical vans in the rural areas can solve the problem of accessibility. Mobile vans equipped with basic medical facilities could supplement a primary health centers and travel to those areas where the primary health centers do not exist or have failed to meet the requirements of common people. These vans can have schedule of visits in particular areas and can be called in times of emergencies. The quality of service can be improved by increasing the awareness level of the users. Awareness is required for many of Government schemes available for economically poor and rural people.

3.4 ISSUE & CHALLENGES

The Smart Cities Mission requires smart people who actively participate in governance and reforms. Citizen involvement is much more than a ceremonial participation in governance. Smart people involve themselves in the definition of the Smart City, decisions on deploying Smart Solutions, implementing reforms, doing more with less and oversight during implementing and designing post-project structures in order to make the Smart City developments sustainable. The participation of smart people will be enabled by the SPV through increasing use of ICT, especially mobile-based tools.

While most everyone can agree that smart technology has the power to make our lives much simpler especially in highly populated urban areas implementing that technology must be done in a carefully planned and highly secure manner. Rather than just focusing on what the solution can do, developers and tech companies must also consider how it will affect the people that come into contact with it. When technology, city governance, and communities of people come together to improve the quality of life for everyone involved, that's when a city truly becomes "smart."

3.5 SMART INFRASTRUCTURE

In a world where infrastructure is truly smart, sensing technologies are embedded in infrastructure and the equipment it interacts with. These sensors are connected to a communication backbone which allows real-time data acquisition and analysis. The information gathered is analyzed, interpreted and delivered as reliable, robust and meaningful information to infrastructure providers, who can then make better informed decisions about the structural health and maintenance of their assets.

In a sensing environment, infrastructure is able to respond in real time to user's needs. Self-aware infrastructure assets direct their own maintenance, leading to condition- based maintenance, reduced down time and greater operational efficiency of the infrastructure overall.

Better information leads to an enhanced understanding of the behavior of infrastructure. The impact of this will lead to transformations in the approaches to design and construction as well as step changes in improved health and productivity, greater efficiency in design and performance, a low-carbon society and sustainable urban planning and management.

For ex. The cameras at the bus stops can identify how many people are waiting to board; the sensors on the approaching bus know how many people ride the bus at any given point in time, and how many people are currently on the bus. The combination of the information from the bus stop and the bus then **leads to the city's response**. There can then be redistribution of people and buses if it appears that the current course of events will not be efficient.

3.6 ROAD MAP AND SAFEGUARDS FOR SMART VILLAGES.

A smart city road map consists of four/three (the first is a preliminary check) major components:

- First, we have to check why we necessary smart village initiative, why we need
- To describe exactly what is the community: maybe that definition can condition what you are doing in the subsequent steps; it relates to geography, links between cities and flows of people between them;
- Study Community: Before deciding to build a smart city, first we need to know that. This can be done by determining the benefits of such an initiative. Study the community to know the citizens, the business's needs – know the citizens and the community's unique attributes,

Figure 8 Components of city road map

- Develop a Smart City Policy: Develop a policy to drive the initiatives, where roles, responsibilities, objective, and goals, can be defined. Create plans and strategies on how the goals will be achieved.
- Engage The Citizens: This can be done by engaging the citizens through the use of - government initiatives, open data, sport events, etc.
- People, Processes, and Technology (PPT) are the three principles of the success of a smart city initiative. Cities must study their citizens; know the processes, business drivers, create policies, and objectives to meet the citizens' needs. Then, technology can be implemented to meet the citizens' need, in order to improve the quality of life and create real economic opportunities.

Figure 9 Road map & safe guard

3.7 SMART VILLAGE: ISSUES & CHALLENGES

Followings are some issues in village:

1) Funding: -

One of the biggest challenges is having a streamlined funding for the development of Smart cities. It was decided that each Smart City will receive 500 Crore over the period of 5Years by Central Government. But this amount won't be sufficient. To match the contribution of Central government there should be some contribution from the state government too in order to create sustainable funding to take the smart cities from pilot phase to execution and then completion. There are many private firms that are providing funding but it requires to be in proper process**.**

2) Technology: -

There are certain technologies that are a part of the project and it is expensive to use them. Because of the advancement, some technologies are borrowed from other countries which Makes it more expensive. This hinders the success of smart city project. Another challenge is in the discovery of technology and the need for a medium that can bring technology users and creators together to adopt faster platform Maintenance, management, recovery of this instrument should be done carefully.

3) Availability of Master Plan: -

Most of our cities don't have masterplans or a city development plan, which is the key to smart city planning and implementation and encapsulates all a city needs to improve and provide better opportunities to its citizens. Unfortunately, 70-80 per cent of Indian cities don't have one.

4) Urban Water and Sanitation Challenges

Swatch Bharat Abhiyaan was launched by Hon'ble Prime Minister of India on 2nd October 2015, which caught attention of everybody not only in India, but also in the world. The government has taken various steps to create awareness among the masses for keeping the area surrounding them neat and clean. Government is also paying special attention for cleaning of rivers, railway stations, tourist destinations and other public places.

5) Education / Job Opportunity

- Smart learning is an important support to bridge educational systems and citizen living experience. The building of smart learning environments for citizen will provide individuals more opportunities to learning easy, engaged and effective, and therefore provide wisdom into the creativity of the whole city.
- The future of a smart city is reliant on human talent and skills, making job creation one of the biggest benefits. These jobs will obviously be smart and focus on skills including data analytics, programming, high-end consulting, and system and network integration. With IT infrastructure being the backbone of any smart city, IT professionals will certainly be in greater demand
- We are already seeing a shift towards the creation of technologically strong business sectors with more and more mid-sized technology teams (10+ people) being established. This shift creates new employment opportunities and a more competitive market for the top tech talent. But to play a significant role and carve a space for yourself within a smart city, you need to be willing to develop and maintain smart skills, engage in learning and be ready to adapt.

6) Governmental Issues:

Three-tier governance: Successful implementation of smart city solutions needs effective horizontal and vertical coordination between various institutions providing various municipal amenities as well as effective coordination between central government (MOUD), state government and local government agencies on various issues related to financing and sharing of best practices and service delivery processes

3.8 SMART INFRASTRUCTURE

- Smart infrastructure provides the foundation for all the key themes related to a smart city, including smart people, smart mobility, smart economy, smart living, smart governance and smart environment.
- Smart infrastructure has many components like Digital management of infrastructure, sensor networks, digital water and waste management, institutional, physical, social, economic infrastructure
- Physical Infrastructure refers to its stock of cost efficient and intelligent physical infrastructure such as the rural mobility system, high speed broadband infrastructure, the housing stock, the energy system, the water supply system, sewerage system, sanitation facilities, solid waste management system, drainage system, etc. which are integrated through use of technology
- Social Infrastructure relates to components that enable development of human and social capital, such as the education, healthcare, entertainment, etc. It also includes performance and creative arts, sports, the open spaces, children's parks and gardens
- Economic Infrastructure includes developing proper infrastructure that generates employment opportunities and attract investments.

3.9 CYBER SECURITY

Cyber security in the context of Smart Cities is a hot topic. The objective of Smart Cities is to Optimize the city in a dynamic way to offer a better quality of life to the citizens through the Application of information and communication technology (ICT). The range of areas where cities can become smarter is extensive: it is an evolution of "Connected Cities" with the prevalence of data exchange at a larger scale.

- Municipalities should support the development of a harmonized cyber security framework
- The European Commission and Member States should foster knowledge exchange and collaboration in cyber security among industry, Member States and municipalities
- IPT Operators should develop a clear definition of their security requirements.
- IPT Operators and Municipalities should allocate higher spending on cyber security
- Manufacturers and solution vendors should integrate security in their products.

3.10 DISTRICT COOLING AND HEATING

- In the Southeast, air conditioners are almost crucial pieces of equipment for home comfort. However, it can be difficult to find the right air conditioner for your home, one that will provide enough cool air in the summer to cool your home without driving your energy costs through the roof
- District cooling is the cooling equivalent of district heating. Working on broadly similar principles to district heating, district cooling delivers chilled water to buildings like offices and factories needing cooling
- In winter, the source for the cooling can often be sea water, so it is a cheaper resource than using electricity to run compressors for cooling.
- Alternatively, District Cooling can be provided by a Heat Sharing Network which enables each building on the circuit to use a heat pump to reject heat to an ambient ground temperature circuit.

3.11 STRATEGIC OPTIONS FOR FAST SMART VILLAGES DEVELOPMENT

The strategic components of area-based development in the Smart Cities Mission are

- City Improvement (retrofitting),
- city renewal (redevelopment) and city extension (Greenfield Development)
- Pan-city initiative in which Smart Solutions are applied covering larger parts of the city.

Below are given the Deion's of the three models of Area-based smart city development.

- Retrofitting will introduce planning in an existing built-up area to achieve smart city objectives, along with other objectives, to make the existing area more efficient and livable.
- Redevelopment will affect a replacement of the existing built-up environment and enable eco-creation of a new layout with enhanced infrastructure using mixed land use and increased density.
- Green field development will introduce most of the smart solution in a previously vacant area using innovative planning, plan financing and plan implementation tools with provision for affordable housing, especially for the poor
- Pan-city development envisages application of selected smart solution to the exist in city wide infrastructure. Application of smart solution will involve the use of technology, information and data to make infrastructure and service better.

3.12 INDIA'S URBAN WATER AND SANITATION CHALLENGES AND ROLE OF INDIGENEOUS TECHNOLOGIES

Swachh Bharat Abhiyaan was launched by Hon 'blue Prime Minister of India on 2nd October 2015, which caught attention of everybody not only in India, but also in the world. The government has taken various steps to create awareness among the masses for keeping the area surrounding them neat and clean. Government is also paying special attention for cleaning of rivers, railway stations, tourist destinations and other public places. To achieve the target of cleanliness, the technologies to treat the waste material should also be developed along with creating awareness.

There are many technologies that are used to treat waste material. They are usually very costly, very complex to be understood and viable only for large size units. At the same time, indigenous technologies are low-cost capital and easy to use and they can also be used by different size units. In India, they are particularly suitable for the small and medium units.

The objective of the workshop was to disseminate indigenous technologies of water, wastewater and solid waste treatment developed by the Bhabha Atomic Research Centre (BARC) under ―Swachh Bharat Abhiyaan‖ and to bridge gap between the research at the research centers and the practical application of the technologies. The BARC is playing a pivotal role in the development of these technologies.

Some of these technologies are as follows:

- **Indigenous water purification technologies:**

  These technologies can improve the drinking water quality of smaller villages as well as larger cities. It uses the Pressure Driven Membrane Processes. These are suitable for all capacity units e.g.; they are adaptable from household level unit or community level unit to large scale unit. Water purification technologies make use of the nuclear energy and solar energy also.

- **Environment friendly Plasma technologies:**

  Solid waste dumping sites or landfill sites need more amount of land which is not available in urban areas. Incineration of solid waste pollutes the environment if the incinerators are not designed or operated properly. Thermal Plasma Technology is ideally suited for waste treatment. By plasma technology Hazardous & toxic compounds are broken down to elemental constituents at high temperatures; Inorganic materials are converted to Vitrified Mass; and Organic materials are Paralyzed or Gasified, converted to flue gases (H2 & CO) & Lower hydrocarbon gases when operated at low temperature (500 – 600^{o}C). Disposal of carcass is also being thought of using plasma pyrolysis.

- **Role of environmental isotope techniques in the water resources development and management:**

  There are two type of isotopes, stable isotopes and radioactive isotopes. Isotope techniques are used to find out the type of contamination in surface water and ground water, the sources and origin of contamination, pollutant dispersion in surface water bodies, to assess the groundwater salinity, to assess the changes due to long-term exploitation of groundwater, for hydro-chemical investigation and to carry out geochemical evolution of groundwater.

- **The BARC UF Membrane Technology for Domestic Water Purifiers:**

  Water filters manufactured by Sondhka based on membrane-based water Purification Technology has been developed by BARC. Benefits of BARC Polysulfone Membrane are high tech 0.02micron or 20nm, simple form factor, rugged (life of more than 1 year) and low maintenance (about Rs. 500 per year). It is very easy to use and very low-cost solution for the water contamination.

- **Radiation Hygienization of Municipal Sewage Sludge:**

  The Sewage is the waste water generated from domestic premises and consists mainly of human waste. It typically contains 99.9% water and about 0.1% solid. The solid waste in sewage is typically organic in nature and is broken down in the sewage treatment plants resulting in sewage sludge as a byproduct. In Radiation Hygienization process dry sludge generated at STP ‘s is 52hygienized using radiation technology using standard Gamma facility at a Dose of 10 kgs. Such radiation plants are operating in India for sterilizing medical products.

3.13 INITIATIVES IN VILLAGE DEVELOPMENT BY LOCAL SELF-GOVERNMENT

- In the past "government as provider" approach, the priorities were to secure budget allocations and develop projects. The Housing Policy and the NCU statement implicitly give higher priority to two other requirements: first, the reform of policies and regulations that now inhibit development initiatives by the people; and second, more efficient resource management and the building of institutional capacity.

- Resource Management and Institutional Development. India's urban institutions do not have the capacity to provide adequate services at present, let alone address the requirements of accelerated urban growth in the future. Proposals relate to three types of institutions.

- He primes public sector actors in the urban development process; call for clearer allocations of responsibility and authority to them; and recognize the need for new organizational relationships between local governments and development authorities and State governments that would avoid overlaps and facilitate coordinated programming. Improved personnel incentives will be needed to permit the recruitment and retention of qualified staff as will skills training programs. Resource constraints, however, preclude simply expanding local government under current practices in proportion to urban growth. In many areas, the very nature of the way work is conducted will have to be redesigned to permit much higher levels of productivity.

- The NCU recognizes reforms of internal management as vital. This is likely to entail implementing more systematic and efficient approaches in many areas: for example, budgeting and financial management; project management and control; billing and collections; infrastructure systems maintenance; and personnel management. A. Financial Systems constraints on government budgets and the rigidities of the present system of intergovernmental transfers prevent an adequate response of traditional arrangements to the challenge of urbanization. A new and more decentralized system of public and private financial intermediaries will be required.

- The establishment of the NHB represents an important step: an apex institution that will stimulate the creation of a network of mortgage financing. The NCU also calls for the creation of Urban Infrastructure Development banks to permit local governments to borrow for infrastructure. B. Non-Governmental Organizations given the size of the job and the difficulty governmental agencies have in dealing directly in some aspects of the development of urban areas (e.g., stimulating informal sector enterprise and provision of shelter) there is a recognition of the need for new and expanded NGOs to assist in facilitating the urbanization process

3.14 SMART INITIATIVES BY DISTRICT MUNICIPAL CORPORATION

- Maintenance of roads
- Publicize and propagate the scheme in the district
- Encourage Gram Panchayat for taking part in the competition
- Give in principle/administrative approval to works under Smart Village
- Guide the Gram Panchayat and help it achieve the goals of Smart Village
- Submit progress report periodically to state level
- Mosquito repellent smokes spread out in the city for prevention of malaria and dengue.

3.15 ANY PROJECTS CONTRIBUTED WORKING BY GOVERNMENT / NGO / OTHER DIGITAL CONCEPT

- The Government of India launched the *Shyama Prasad MukherjiRurban Mission* (SPMRM) in 2016, with the objective to spur social, economic and infrastructural development in rural areas. The mission aims at making villages smart and growth centers of the nation. In its first phase, it targeted to develop a cluster of 300 Smart Villages over the next three years across the country. *SansadAdarsh Gram Yojana*, which envisages integrated development of selected villages was another step taken by government in this direction.

- **Pradhan Mantri Awas Yojana** (**PMAY**) is an initiative by Government of India in which affordable housing will be provided to the urban poor with a target of building 20 million affordable houses by 31 March 2022. It has two components: **Pradhan Mantri Awas Yojana (Urban)** (**PMAY-U**) for the urban poor and Pradhan Mantri Awas Yojana (Garmin) (**PMAY-G** and also **PMAY-R**) for the rural poor. This scheme is converged with other schemes to ensure houses have a toilet, Saubhagya Yojana electricity connection, Ujjwal Yojana LPG gas connection, access to drinking water and Jan Dhan banking facilities, etc. Total 88 lakhs houses are approved against total demand of 1.12Cr as of 29 Aug 2019.

- Ayushman Bharat is National Health Protection Scheme, which will cover over 10 crore poor and vulnerable families (approximately 50 crore beneficiaries) providing coverage up to 5 lakh rupees per family per year for secondary and tertiary care hospitalization.

- While the government-led initiatives rely on integration and convergence of the existing central and state government schemes to develop these Smart Villages or clusters, the CSR initiatives are generally more innovative in terms of implementation and use of technologies. For example, smartphone-maker Nokia has launched a Smartpur project which aims to create a sustainable ecosystem where community members can leverage digital tools to bring efficiency in daily lives. It aims to bring transparency in governance, economic prosperity for households and ease of access to various government services and information

Figure 10 PMAY

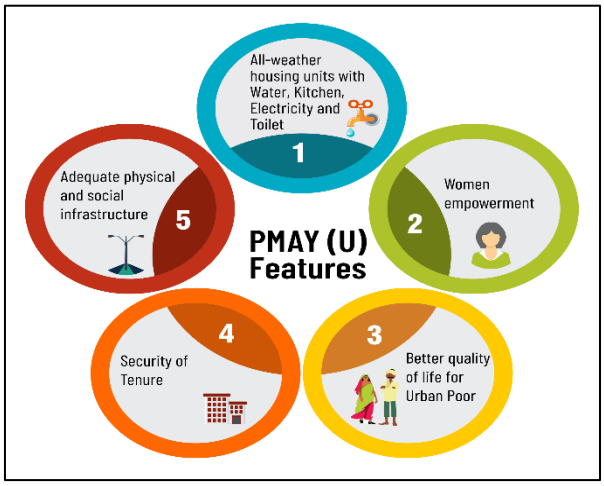


Figure 11 Features of PMGSY

CHAPTER-4

INFORMATION ABOUT ALLOCATED VILLAGE KIMBUA

4.1 INTRODUCTION

4.1.1 Introduction about village

- Kimbuva is a Village in Saraswati Taluka in Patan District of Gujarat State, India. It is located 17 km towards North from District headquarters Patan. 124 km from State capital Gandhinagar. As per census board of India 2011, Kimbuva had a population of 2960. Males are 1518 and females are 1442.
- Area of village (approx. in hectare) 1092/0505 hector
- Nearest Bus Station: -Patan
- Nearest Railway Station: -Patan
- Major Occupation: farming & job
- Major crop grown are Castor, Mustard& wheat

4.1.2 Justification/ need of the study

- Vishwakarma Yojana is one of the initiatives towards Rurbanization by Government of Gujarat, which was allotted as a pilot project to GTU. The students and Faculty Members meet all the stake holders in a village, survey the existing facilities. Then they re-imagine and re-design the whole of the infrastructure of the village. The students and Faculty Members meet all the stake-holders in a village, survey the existing facilities. Then they re-imagine and re-design the whole of the infrastructure of the village. The students use their engineering skills to prepare detailed project reports for the infra-structure as a part of their Final Year project work.
- The basic need of the study is to provide the basic requirement in the Kimbuva village so that all urban amenities are available to the villagers. For this purpose, various information is like physical, social & socio – cultural, and infrastructures facilities are obtained.
- After the collection of the all information and doing the gap analysis the requirement of the basic amenities required to develop the village is provided.

4.1.3 Study Area in Detailed

- Village: Kimbuva
- Taluka Name: Patan
- District: Patan
- State: Gujarat
- Pin code: 384265
- Total Area(hectare): 1092/0505
- Total Agriculture Land(hectare): 0949/43/77
- Total Residential Area (hectare): 17/69/51

Figure 12 Study Area

4.1.4 Objectives of the study

1 The main objective of the project is to study the present status and the conduct techno economic survey of selected village.
2 To provide basic amenities of people.
3 To provide physical facilities, social facilities, social-cultural facilities and infrastructure facilities.
4 To reduce migration of people.
5 To promote integrated development.
6 To provide sustainable development.
7 To propose the comprehensive planning suited for ideal village.

4.1.5 Scope of the Study

- The study will focus the development trend, intensity of growth of the village, and find out the problems related to the physical development of the area and infrastructure services of the village. Project proposal and sustainability aspect not consider in micro level; it is only guide way. The study focused to only village Kimbuva.
- It is very essential to develop village because India's development depends upon the progress of the villages. India is agricultural country and poverty can be removed through improvement in agriculture. Solution of rural problems can bring the change in the rural society. The country and its society can be reconstructed only through rural developments. For successful implementation of democratic decentralization, the village community is to be studied in detail.
- Rural sociology can help to organized Indian n detail. The extension worker must know the rural culture, rural institution, problems, resources etc. for successful transfer of technology for improvement of agriculture.

4.1.6 Methodology Framework

- **Methodology Implementation**: The techno-economic survey of villages has been conducted in different districts of the Gujarat state in terms of basic and public amenities, other infrastructural facilities. The project had been divided into three parts:
- **Techno-economic survey of villages**: Collected all essential information from village such as: Household data, Occupational detail, Water facilities, Drainage facilities, Sanitation availability, Storm water network, Solid waste Management facilities, Electricity Networks

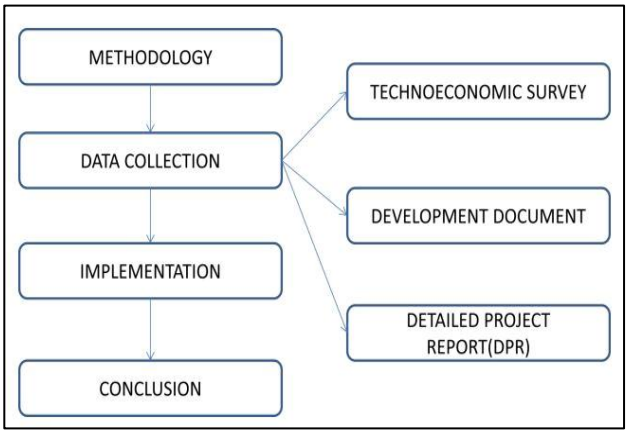


Figure 13 Methodology Framework

Recreation facilities, Education facilities, Health Facilities, Transportation facilities, Road network, Irrigation system, Use of nonconventional energy sources, Migration rate, Literacy rate and other necessary data

- Development document preparation: Plan and estimate of proposed development by assessing gap analysis.

- Detailed Project report (DPR): Preparation of development strategies and action plan for allocated village by detailed analysis of infrastructural facilities and gap analysis. This will result in the indication of drawbacks of the village.

4.1.7 List of Objects Available related to Civil / Electrical Methodology

- Techno-economic survey of villages: Collected all this essential information from village such as: Household data, Occupational detail, Water facilities, Drainage facilities, Sanitation availability, Storm water network, Solid waste Management facilities, Electricity Networks, Recreation facilities, Education facilities, Health Facilities', Transportation facilities, Road network, Irrigation system, Use of non-conventional energy sources, Migration rate, Literacy rate and other necessary data.
- Development document preparation: Plan and estimates of proposed development by assessing gap analysis.
- Detailed Project report (DPR): Preparation of development strategies and action plan.
- Data Analysis: GAP analysis for all the selected villages were performed by comparing existing with the required facilities. Rural Planning Norms and UDPFI (Urban Development Plans, Formulation and Implementation) guidelines were taken as a reference for providing infrastructure facilities.
- Design Proposals: As per the gap analysis the proposed development and planning Strategies have been designed as per all the regulations and norms along with the consultation of concerned Government Official's (TDO, DDO &Sarpanch). Students of all respective villages have prepared design proposals for essential infrastructure facilities, prepared ready to execute document's, Detail estimates with abstract sheet, Measurement sheets, Recapitulation Sheet and Detail Drawings.

1. Post Office
2. Library
3. Public Garden
4. Toilet Block
5. Skill Development Centre
6. Drinking Water tank for Animals

4.2 KIMBUA VILLAGE STUDY AREA PROFILE

4.2.1 Study Area Location with brief History land use detail

Kimbuva is a village situated in Patan district and taluka is Same. The village is located at about 17 km from the Patan and 124 km from Gandhinagar. The village has transformation under the panchayat. Majority of land is used for Agriculture and Residential. From which total Area(hectare): 1092/0505, total Agriculture Land(hectare): 0949/43/77 and total Residential Area (hectare): 17/69/51

- **Village**: Kimbuva
- **Taluka Name**: Patan
- **District:** Patan
- **State**: Gujarat
- **Pin code**: 384265
- **Area**: 561 Hectares
- **Population**: 2960
- **Language:** Gujarati and Hindi.
- **Time zone:** IST (UTC+5:30)
- **Elevation / Altitude:** 84 meters Above Sea level
- **Telephone Code / STD Code:** 02766

Figure 14 Kimbuva map

4.2.2 Physical & Demographical Growth

Kimbuva village has total population of 2960 people. In this village male population is 1518 and female population is 1422 as per the 2011 census. The number of houses in this village is 627 approx. The male Literacy rate is 91.17% and female Literacy rate is 69.51%.

4.2.3 Brief history

Kimbuva village situated in Patan. Castor, Mustard & wheat are major agriculture commodities grow in Patan. Castor of this village are living in very peaceful manner. This village having very proud history.

- Agriculture is the main profession of this village.
- Most of the people are labors.
- Still the village is waiting for industrial development, waste management and roads are the main concerns of this village.
- Young generation is attracted towards mobile, laptop and computer technology these days.
- If banks and finance institutes proved loan and other financial aid to the villagers, this village will see the real development.
- Medical and health services must be improved.

4.2.4 Economic profile / Banks

- There are two banks (Dena bank and Baroda Bank). There is no ATM in village.
- There is Post-office poor condition
- The village doesn't have any better facilities regarding infrastructure but has good electrification system which distributed 24*7 hours for domestic use and 8 hours for agricultural use.
- Farming and Dairy is a good income source for the villagers.
- Laboring work was high.

4.2.5 Social scenario

- Another essential facility for any village is social infrastructure facility which leads to development of the village to the greater extent. The village is highly unplanned and the amenities provided in the village are not properly maintained.
- The village is highly unplanned and the amenities provided in the village are not properly maintained. Also, there are no facilities for proper disposal of waste due to this the aesthetic appearance of the village is reduced. Industrial development in the village will boost employment opportunities in the village and will reduced the rate of migration

Table 4.1 Social Details

Sr. No.	Details	Data
Total Population		
1	Male	1518
2	Female	1442
3	Total No. of family	627
Village literacy rate		
1	Village literacy rate	80.33%
2	Male	91.17%
3	Female	69.51%

4.2.6 Base Location map, Land Map, Gram Tal Map

Figure 15 Satellite map of Kimbuva

4.2.7 Preservation of traditions, Festivals, Cuisine

The youth are encouraged to celebrate the festivals & they celebrate almost all festivals

1) Diwali
2) Uttarayan
3) Holi
4) Navaratri

4.2.8 To know the reasons of migration / trends of migration / problems and potentials of migrants

Reasons of Migration are:

- Due to improper health Facilities in the village.
- Not higher education available in the village.
- For employment opportunities people are also migrate from village.
- To improve standard of living.
- Lack of basic Facilities.

4.3 DATA COLLECTION OF KIMBUVA VILLAGE

4.3.1 Methods for data collection

What is a Survey?

A Survey is any activity that collects information in an 73organized and methodical manner about characteristics of interest from some or all units of a population using well defined concepts, methods and procedures, and compiles such information into a useful summery form. A survey usually begins with the need for information where no data- or insufficient data-exist. Sometimes this need arises from within the statistical agency itself, and sometime it results for a request from an external client, which would be another Gov. agency or department, or private organization. Typically, the statistical agency or the clients wises to study the characteristics of population, build a data base for analytical purpose or test a hypothesis.

A survey can be thought to consist of several interconnected steps which includes:

- Defining the Objectives
- Survey methodology as a scientific field seeks to identify principals about the sample design,
- Data collection instrument, statistical adjustment of data, and data processing, and final data. Analysis that can create systematic and random survey errors. Survey errors are sometimes analyzed in a connection with survey cost. Cost constraints are sometimes framed as an improving quality within cost constrains, or alternatively, reducing cost for a fixed level of quality. Survey methodology is a both scientific field and a profession, meaning that some professional in the field focus on survey errors empirically and other designs survey to reduce them. For survey designers, the task involves meeting a large set of decision about thousands of individual surveys in order to improve it.

Survey Methodology Topics:

- Identify and select potential sample members.
- Contact sample individuals and collect data those who are hard to reach.
- Evaluate and test questions.
- Select the mode for posing questions and collection responses.
- Train and supervise interviewer.
- Check data files for accuracy and internal consistency.
- Adjust survey estimate to identify the errors.

4.3.2 Primary survey details

The Primary survey was conducted to identify the various general problems of the villagers by interacting with them and enquiring about the problems faced by them in daily life. They were asked to suggest the possible and desirable solutions for these problems as well as other infrastructural facilities they would like to have in their village.

Following questions were asked to the different age group and status of village people:

1. Do you have enough water supplies?
2. Which type of irrigation facility you are using? Is it enough?
3. Are you comfortable with your Road network facility?
4. What is your Sources of economy?

5. Which type of medical facility is available?
6. What is your primary need? Which type of facility you want first?
7. Where you dispose your waste?
8. Are comfortable with available medical facility?

4.3.3 Geo-Tagging of House.

23.932893, 72.177465 (Kimbuva)

4.3.4 No of Human being in One House

Total No. of house in Kimbuva village are 1316. Total population in village is 2960. Average 4-5 human being in one house.

4.3.5 Which Material used locally

In Kimbuva village brick, cement, sand, aggregate, R.C.C materials are mainly used. Out Sourced Material. In Kimbuva village no material available for any construction work all material are out sourcing from nearer city Patan

4.3.6 Labor work

In Kimbuva village labor are locals or come from Patan because in village a smaller number of labors living so labor charges are more.

4.3.7 Geographical Detail

This village is coming under Patan district. Total area of the village is 1092.05 hectares.

Table 4.2 Geographical Details

Village	Taluka	District	State	Language	Time zone	Pin code
Kimbuva	Saraswati	Patan	Gujarat	Hindi, Gujarati	IST (UTC+5:30)	384265

4.3.8 Demographical Detail

As per census board of India 2011, Kimbuva had a population of 2960. Males constitute 52% of the population and females 48%.

Table 4.3 Demographical Detail

Census	Population	Male	Female	Total number of households
2011	2960	1518	1442	627

4.3.9 Agricultural Details / Organic Farming / Fishery

In Kimbuva village 949/43/77-hectare land is used for agricultural activities. For agriculture activity water is used from well and form Sujalam Sufalam canal which is near around 1 km. Mainly showing a Mustard, castor, Wheat is grown.

4.3.10 Manufacturing HUB / Ware Houses

In Kimbuva village no HUB and no Ware houses.

4.3.11 Tourism Cluster

Kimbuva has well known stepwell and Jogni Mata Temple

4.3.12 Service center

There are services in the villages like Mahila Mandal and Milk co-operative society.

4.3.13 Male / Female Details

Table showing the total population, no. of females and males and total no of households of kimbuva village

Table 4.4 Male / Female Details

Census	Population	Male	Female	Total number of house holds
2011	2960	1518	1442	627

4.3.14 Cast Wise Population Details

Table showing the Cast Wise Population of kimbuva village

Table 4.5 Cast Wise Population Details

Particulars	Total	Male	Female
No. of house	627	-	-
Population		1518	1442
Child (age 0-6)	331	204	127
Schedule Cast	542	-	-

4.3.15 Occupation wise Details / Majority business

Table showing the Occupational Details of kimbuva village

Table 4.6 Occupational Details

Name of three major occupation groups in village	1 Farming
	2 House hold work
	3 Labour (Farm worker)

4.4 INFRASTRUCTURE DETAILS

4.4.1 Drinking Water Supply Facilities

All houses get 24 hours' water supply for the residential use. The water is safe and free from impurities. To get full water supply there are must be Over head water tank of 1 Lakh liters and Underground Sump.

Figure 16 Elevated Service Reservoir

Figure 17 Distribution System

4.4.2 Sanitation Facilities/ Drainage Network

In the Kimbuva village the facility of underground drainage of the waste water. In the village there is no open drainage system available

In the Kimbuva village sanitation facility is not adequate. Only Public Urinals are constructed. In the village there is no facility available for the public latrine blocks. Condition of Solid and liquid waste collection and disposal is very poor.

Figure 18 Public Urinals

Figure 19 Internal Streets

4.4.3 Transportation & Road Network

- The internal streets are constructed of R.C.C and have in good condition. The main road of the village is made of the R.C.C type and also in good condition. The village approach is made of Black Top Pucca road.

4.4.4 Housing condition

- 1316 Houses is there in the village

4.4.5 Social Infrastructure facility

- **Health Facilities**

  There is no facility available like PHC or any private hospital. In the village a Sub center is available. For the any major medical emergency people are choosing Patan.

Figure 20 Kuccha and Pucca House

Figure 21 Sub Center

- **Education Facilities and Panchayat Building**

  In the village there is 4 Aanganwadi, 1 primary and 1 secondary school. Schools are in good condition.

Figure 22 Higher Secondary School

Figure 23 Primary School

Figure 24 Anganwadi

Figure 25 Panchayat Building

- **Community Hall**

  In the Kimbuva village there is no facility for the community hall.

- **Public library**

  In the village there is no facility available for the public library.

4.4.6 Existing Condition of Public Buildings

Major every public building in the village is in good condition

4.4.7 Technology Mobile/ WIFI / Internet Usage Details

Good Mobile network connectivity. No WIFI facility available

4.4.8 Sports Activity as Gram Panchayat

In the village there is no sport activity done by the Gram Panchayat.

4.4.9 Socio-Cultural Facilities, Public Garden /Park/Playground /Pond/ Other Recreation facility

- **Public Garden/Park/Play ground**

  In Kimbuva village there is no facility available like Public Garden/ Park.

- **Community hall**

  In the village there is no community hall

- **Village Pond/Lake**

  In the village, lake is situated at the center of village. Lake is in very bad condition. Waste dumped into the Pond

Figure 26 Pond

4.4.10 Other Facilities

- There is an Artificial Insemination Centre in the village
- There are 2 banks in village

Figure 27 Artificial Insemination Centre

Figure 28 Drinking Water Facilities

Figure 29 Baroda Gujarat Garmin Bank

Figure 30 Dena Gujarat Garmin Bank

4.4.11 Any other details

No other details in terms of Infrastructure were found in the village

4.5 EXISTING INSTITUTION LIKE - VILLAGE ADMINISTRATION – DETAIL PROFILE

4.5.1 Dudh Mandali

There is a Dudh Sarita where village people use to sell their milk produce. Villagers make good profit by selling their milk in village itself. They don't need to go to near city to sell their produce.

Figure 31 Dudh Mandli

CHAPTER: 5

SUSTAINABLE TECHNICAL OPTION WITH CASE STUDY: - HYDROPONICS

5.1.1 Advanced Sustainable Construction Techniques (3-D Printing)

What is 3-D Printing: - 3D printing (sometimes referred to as Additive Manufacturing (AM)) is the computer-controlled sequential layering of materials to create three-dimensional shapes. It is particularly useful for prototyping and for the manufacture of geometrically complex components.

Abstract: 3D printing concrete is an emerging technology in which structures are made only using concrete in layers with the help of Software. With this technology, even geometrically intricate structures, heavy load bearing structures and hydraulic structures can be made easily in no time with less wastage of materials and minimum costs. It does not require any additional form-work during construction and also the human resource required is comparatively less. It is a sustainable technology which can also be used for aesthetic purpose. This technology was invented by Charles Hull in 1984. This review paper is about the methods of using 3D printer in the construction field and its future trends.

Figure 32 3-D Printed Building

Introduction: 3D printing is a technology for producing 3D models of an object of any shape or size in layers using computer software. This technology was first invented by Charles Hull in the year 1984, as he designed the first 3D printer. He was the pioneer of the solid imaging process called Stereo lithography and the stereo lithographic file format, which is the widely used format for 3D printing even today. The first solid object from a digital design was printed by Hideo Kodama of Nayoga Municipal Industrial Research Institute.

Following this several advancements were made to make the printers more efficient, affordable and applicable for several fields like research, engineering, military, construction and architecture, fashion, medical industry, computer industry, etc. The production of metal parts like engine brackets and nuts began from 2010.

3D printing is mainly based on Additive Manufacturing (AM) process. AM is defined as the process of joining materials to make objects from 3D model data, usually layer upon layer. In this process the model is first created using CAD software and then transferred to the printer as a set of stereo lithography language, which is then converted to layers that can be laid directly.

Each layer has an activating agent and a power material which helps in bonding of the layers. For large scale construction computer-controlled placement of extruded cement-based mortar to create objects in layers.

5.1.2 Soil liquefaction:

- **What is soil Liquefaction**

Soil Liquefaction occurs when a saturated or partially saturated soil substantially loses Strength and Stiffness in response to an applied stress such as shaking during an earthquake or other sudden change in stress condition, in which material that is ordinarily a solid behaves like a liquid.
The phenomenon is most often observed in saturated, loose (low density or uncompacted), sandy soils. This is because a loose Sand has a tendency to compress when a load is applied. Dense sands, by contrast, tend to expand in volume or 'dilate'. If the soil is saturated by water, a condition that often exists when the soil is below the water table or sea level, then water fills the gaps between soil grains ('pore spaces'). In response to soil compressing, the Pore water pressure increases and the water attempts to flow out from the soil to zones of low pressure.

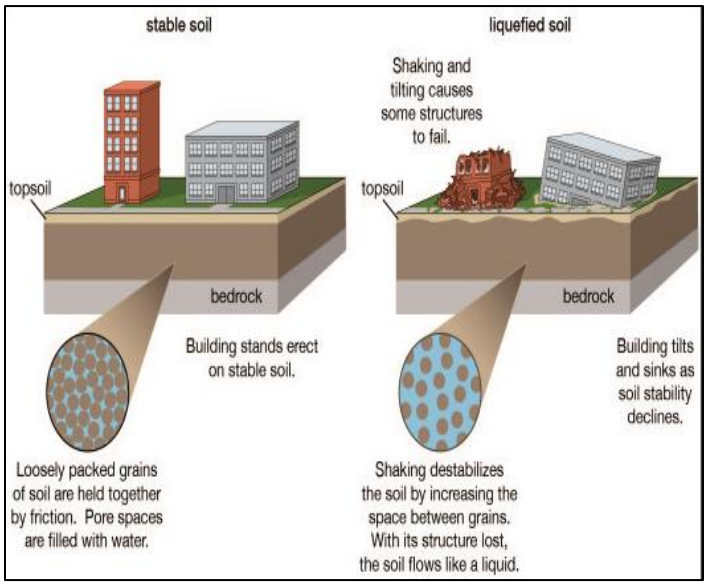


Figure 33 Soil Liquefaction

Abstract: Liquefaction hazard is one of the major concerns for earthquake geotechnical engineering. In this paper an attempt has been made to assess liquefaction potential of Chennai city using SPT N values. Chennai is located between 12.75° to 13.25° N and 80.0° to 80.5° E on the southeast coast of India and in the northeast corner of Tamil Nadu. To understand the liquefaction possibility of Chennai city, about 650

Bore logs have been collected from different geotechnical agencies and used for the analysis. These boreholes were drilled for different projects in Chennai, most of them were drilled up to hard stratum and a minimum depth of 10m. SPT borehole data contains information about depth of water table, the classification of soil and the field observed 'N' values, index properties, rock depth. This borehole information is used to prepare N corrected table by applying the universally followed correction factors for liquefaction study. These corrected N values are further used to estimate the factor of safety against

liquefaction of soil layer. Based on the factor of safety, the regional liquefaction hazard maps have been developed for depths of 1.5m, 3.0m, 6.0m and 10.0m. To represent the worst scenario, least factor of safety has been identified for each borehole location and mapped. Further the estimated factor of safety against liquefaction is used to estimate liquefaction potential index by considering depth of layer. These results are analyzed and compared in this paper.

5.1.3 Sustainable Sanitation

Sanitation has been always neglected area at local, regional, national and international level. The recent statistics declared that India is the most populated open defecated country i.e. 660 million people in rural and urban do not have access to safe sanitation, besides most town, cities, mega cities in India face serious problem in providing adequate sanitation, sewer and waste water management systems, collectively producing more than 27,000 million liters of waste water per day. The continuous declining of fresh water quantity and quality (from 3400 cu m/cap to 1967 cu m/cap over last 50 years) is a major cause of concern. It is also estimated that

by 2025, India will be water stress country which may lead to conflict between three major users of water i.e. Agriculture, Industrial and Domestic. Thus innovative, decentralized, cost effective, environment friendly and energy efficient solution treating the waste as close to the source and reusing the same after proper treatment, there by taking care of environment is the need of an hour!

Ecosan services foundation, a Pune based NGO has taken up this imperative task of closing the loop between taking and giving, by providing the sustainable sanitation solutions…. the task to convert waste into wealth! ESF works in close association with German Development Cooperation, gtz, Seecon International; Switzerland has proven it's expertise to Department of drinking water supply and Ministry of Urban Development, Govt. of India in shortest span through knowledge, communication and implementation. Ecological Sanitation, 'Ecosan', is endeavoring to provide economically viable, socially acceptable and technically appropriate sanitation solutions for protecting the environment and natural resources and achieving long term sustainability. With its philosophy of moving from flush and forget attitude towards Waste to Wealth recycle approach, Ecosan claims to have awakened in a resourceful dawn. While closing the loop between sanitation and agriculture without compromising the health Ecosan has provided many eco friendly, user friendly, cost effective and low maintenance solutions for reuse of waste water as nutrients for crops. 'Ecosan' concept is based on segregation of different flow streams at source reuse after appropriate treatment.

1. Urine Diverting Dehydration toilet: The 'Urine diverting dehydration toilet' is principally a collection system of separating human urine at the source before it mixes with faeces. Here Urine, human excreta and anal cleansing water is separated by three holes pan. Urine is stored separately for about 90 days, Faecal is separately collected which is flushed with dry material for dehydration and composting and anal cleansing water is percolated in to the ground through sand filter.

2. Decentralized treatment system: The 'Decentralized treatment system' treats waste water making maximum use of natural gifts like gravity, microorganisms and temperature. The core system consists of four treatment steps in respective modules, which are Separation of stream flow Primary treatment and sedimentation in biogas settler, Secondary treatment in anaerobic baffle reactor and anaerobic upflow filter, Tertiary treatment in aerobic and anaerobic tertiary filter ie. Planted gravel filter, And Tertiary aerobic and anaerobic treatment i.e. polishing pond.

3. Water Saving Urinal: The 'Water Saving Urinal technology' promoted by ESF which is made by Sheetal Ceramics is a state of art solution saving substantial amount of flush water, energy (for pumping) and plumbing cost. It is an odor free operation and saves about 45,000 liters of water per year per urinal and the concentrated urine can be stored. So far ESF has converted more than 2000 regular urinals in to water saving urinals at different places in all over India like some industries, schools, forest department offices and MoUD office in Delhi.

5.1.4 Sustainable Transportation/System

Introduction: Transportation infrastructure, as a complex network, connects cities and accommodates human activities coupling the social, economic and environmental systems with the urbanization and population growth. Additionally, the transportation network contributes to the socioeconomic development and the increased quality of life through generating inter- or intra-city connections during urbanization in addition, goals such as low-carbon, resilient and sustainable development should not be ignored. when the transportation network is expanded. In detail, transportation infrastructure among cities leads to urban aggregation and diffusion, greatly boosting the regional and national economic development. However, the irrational planning of transportation infrastructure also generates negative effects, such as the ecological

destruction, increased traffic accidents, climate change, CO_2 emissions and lower transport efficiency. Therefore, it is necessary to identify multiple impacts of transportation infrastructure from existing studies.

Abstract: Transportation infrastructure has an enormous impact on sustainable development. To identify multiple impacts of transportation infrastructure and show emerging trends and challenges, this paper presents a scientometric review based on 2543 published articles from 2000 to 2017 through co-author, co-occurring and co-citation analysis. In addition, the hierarchy of key concepts was analysed to show emerging research objects, methods and levels according to the clustering information, which includes title, keyword and abstract. The results expressed by visual graphs compared high-impact authors, collaborative relationships among institutions in developed and developing countries. In addition, representative research issues related to the economy, society and environment were identified such as cost overrun, spatial economy, prioritizing structure, local development and land value. Additionally, two future directions, integrated research of various effects and structure analysis of transportation network, are recommended. The findings of this study provide researchers and practitioners with an in-depth understanding of transportation infrastructure's impacts on sustainable development by visual expression.

5.1.5 Vertical Farming

Introduction: Due to the limited access to land for farming, there is a need for sustaining farming tasks so as to pave the way for adding to food needs. Many aspects press on food industry and processing such as: growth of population and its growing needs accordingly, reduction of natural sources due to growing cities, earth erosion, different forms of contamination, advent of biofuels, restrictions imposed on food production techniques affected by customers and rule providers which requires better quality, less use of chemicals and many useful environmental attempts 'from farm to fork. Recently, environmental obsessions have been mixed with rising obsession with health as architecture design is concerned. Therefore, it has led to more interest in providing healthy food and incorporating it in the sustainable development project. The answer to these issues is Vertical Farming (VF). VF has grown as a project which combines the design of building and farms all together in a high-rise building. VF is a system of growing crops in skyscrapers, to maximize the use of land by having a vertical design whereby plants, animals, fungi and other life forms are cultivated for food, fuel, fiber… by artificially stacking them vertically above each other. Vertical farms are now used in a lot of countries. At present, these farms are largely grown and produce different types of crops inside cities.

Figure 34 Vertical Farming

Abstract: Recently, the application of Vertical Farming into cities has increased. Vertical farming is a cultivating vegetable vertically by new agricultural methods, which combines the design of building and farms all together in a high-rise building inside the cities. This technology needs to be manifest both in the agricultural technique and architectural technology together, however, little has been published on the technology of Vertical Farming.

In this study, technology as one of the important factors of Vertical farming is discussed and reviewed by qualitative approach. In the first, identifying existing and future VF projects in Europe, Asia, and America from 2009 to 2016. Then a comprehensive literature reviewed on technologies and techniques that are used in VF projects. The study resources were formed from 62 different sources from 2007 to 2016. The technologies offered can be a guide for implementation development and planning for innovative and farming

industries of Vertical Farming in cities. In fact, it can act as a basis for evaluating prospective agriculture and architecture together. The integration of food production into the urban areas have been seen as a connection to the city and its residents. It simultaneously helps to reduce poverty, adds to food safety, and increases contextual sustainability and human well-being.

5.1.6 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure.

Introduction: Reinforced concrete (RC) has been developed and applied extensively in the twentieth century and it continues to be used in this century as well. It combines the good compressive strength of concrete with the tensile strength of steel and has proven to be successful in terms of both structural performance and durability.

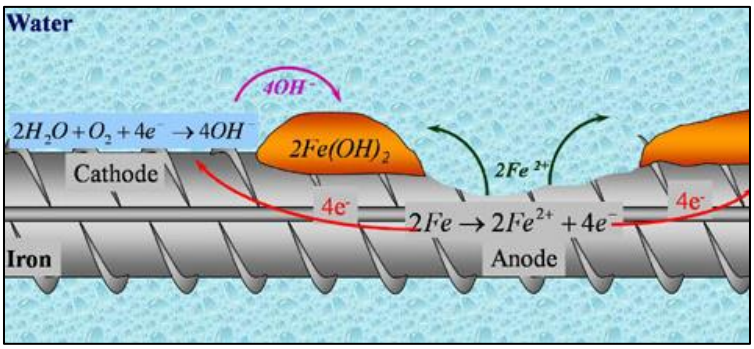


Figure 35 Corrosion Mechanism

One major flaw, namely its susceptibility to environmental attack can severely reduce the strength and life of these structures. In humid conditions atmospheric pollutants percolate through the concrete cover and cause corrosion of steel reinforcements. The resulting corrosion products occupy volumes several times that of the steel. The increased volume induces tensile stresses in the concrete that result in cracking, delamination and spalling.

As a result, the reinforcements get exposed to direct environmental attack and the corrosion is accelerated. Along with unpleasant appearance it weakens the concrete structure to a high degree. Moreover, bond between the steel and the concrete is reduced. Pitting corrosion may also reduce the ductility of the steel bar by introducing notches on the surface of the steel bars that leads to a premature necking.

A large proportion of damage is caused due to insufficient planning and incorrect assessment of the environmental attack such as carbonation and chloride exposure. Corrosion affected structures are highly susceptible to catastrophic collapse. Unlike other devices and facilities that are renewed periodically with newer one's human endeavor has been to maintain centuries old structures. As a result, structural engineers deal with RC structures of age varying more than hundred years. They are also subjected to a wide range of environmental load regimes. Typically, an RC structure that is subjected to heavy environmental loading requires major restoration work within fifteen years of its construction.

Abstract: The reduction in the useful service-life of reinforced concrete structures, mainly due to reinforcement corrosion, is a cause of concern to the construction industry worldwide. It not only effects the physical appearance of the structure but it leads to notable effect on structural performance of the RC structures. The present research paper focus on mechanism of corrosion, types of corrosion, various parameters effecting corrosion and different strategies to monitor corrosion. It also discusses various effects of corrosion on reinforced concrete structures

5.1.7 Sewage Water Treatment

What is Sewage Water Treatment?

Sewage treatment is the process of removing contaminants from domestic and municipal wastewater, containing mainly household sewage plus some industrial wastewater. Physical, chemical, and biological processes are used to remove contaminants and produce treated wastewater (or treated effluent) that is safe enough for release into the environment. A by-product of sewage treatment is a semi-solid waste or slurry, called sewage sludge. The sludge has to undergo further treatment before being suitable for disposal or application to land.

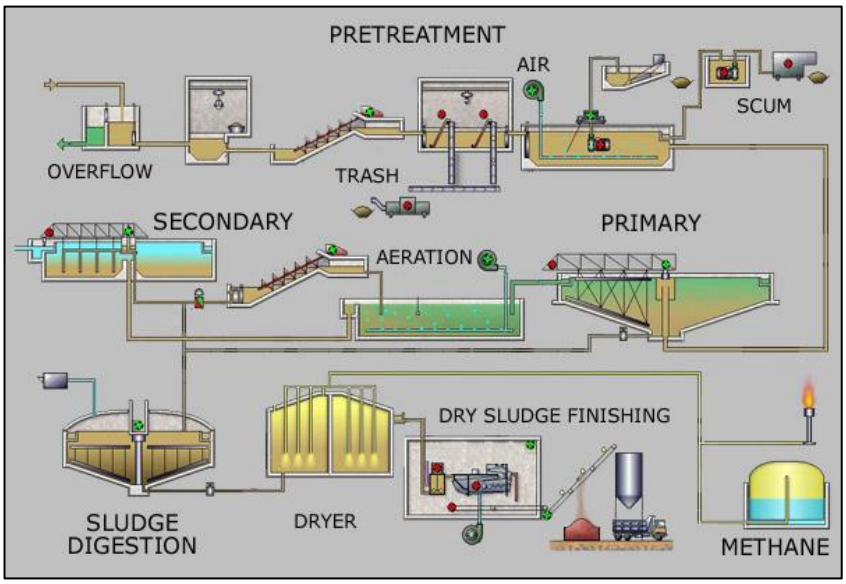


Figure 36 Sewage Treatment Process

Introduction: Discharge of untreated sewage water in the water body is a common practice in many countries. This is the common cause for pollution of surface and groundwater because there is a large gap between generation and treatment of domestic wastewater in India. In general, the wastewater discharged from domestic premises like residences, institutions, and commercial establishments is termed as sewage or wastewater.

Normally domestic and municipal wastewater are composed of 99.9 % water and remaining 0.1 % suspended, colloidal and dissolved solids, mainly organic in nature because it consists of maximum amount of carbon compounds, viz., human waste, paper, vegetable matter, etc., and it also contributes pathogens which consumes available oxygen from water bodies. Besides this, industrial wastewater gets mixed with municipal waste polluting the water bodies and land which is irrigated by the wastewater.

Abstract: This is a conventional kind of monitoring study. The objective of the study was to assess and monitor the physicochemical parameters in wastewater at inlet and outlet of sewage treatment plant (STP) and also to study the effectiveness of the STPs. The average concentration of parameters at inlet sampling site pH, electrical conductivity, total dissolved solids, are 7.16, 2,169 µS/cm, 766.06 mg/l, and major ions bicarbonate, nitrate, sulphate, phosphate, chloride, sodium, potassium, magnesium and calcium values 515.88, 4.28, 82.85, 15.17, 7.01, 23.08, 29.34, 4.14 and 84.31 mg/l. While the average concentration of these parameters, after treatment shows following values 7.47, 2,161.43 (µS/cm), 695.81, 436.52, 1.25, 99.22, 12.69, 6.83, 23.18, 29.07, 4.40 and 82.65 mg/l, respectively.

Further, to check the Na % and sodium absorption ratio at inlet and outlet which 27.89 %, 0.67 and 28.19 %, 0.68, respectively, for the suitability of the wastewater. Finally, the agglomerative hierarchical clustering techniques were used to study the similarity in the sewage treatment plants. The result suggests that there is considerable improvement in the wastewater quality after treatment except at the Pappankalan and Coronation Pillar, Timarpur.

Hydroponics (Vertical Farming): - A Case Study

What is Hydroponics:

- Hydroponics is the cultivation of plants without using soil. Hydroponic flowers, herbs, and vegetables are planted in inert growing media and supplied with nutrient-rich solutions, oxygen, and water. This system fosters rapid growth, stronger yields, and superior quality. When a plant is grown in soil, its roots are perpetually searching for the necessary nutrition to support the plant. If a plant's root system is exposed directly to water and nutrition, the plant does not have to exert any energy in sustaining itself. The energy the roots would have expended acquiring food and water can be redirected into the plant's maturation. As a result, leaf growth flourishes as does the blooming of fruits and flowers.

Figure 37 Setup of Hydroponics (NFT method)

- Plants sustain themselves by a process called photosynthesis. Plants capture sunlight with chlorophyll (a green pigment present in their leaves). They use the light's energy to split water molecules they've absorbed via their root system. The hydrogen molecules combine with carbon dioxide to produce carbohydrates; which plants use to nourish themselves. Oxygen is then released into the atmosphere, a crucial factor in preserving our planet's habitability. Plants do not need soil to photosynthesize. They need the soil to supply them with water and nutrients. When nutrients are dissolved in water, they can be applied directly to the plant's root system by flooding, misting, or immersion. Hydroponic innovations have proven direct exposure to nutrient-filled water can be a more effective and versatile method of growth than traditional irrigation. There are six separate types of hydroponic systems that you can use, which include the Wick System, Water Culture, Ebb and Flow, Drip, N.F.T. (Nutrient Film Technology), Aeroponic systems

Abstract: Hydroponic systems have been utilized as one of the standard methods for plant biology research and are also used in commercial production for several crops, including lettuce and tomato. Within the plant research community, numerous hydroponic systems have been designed to study plant responses to biotic and abiotic stresses. Here we present a hydroponic protocol that can be easily implemented in laboratories interested in pursuing studies on plant mineral nutrition.

This protocol describes the hydroponic system set up in detail and the preparation of plant material for successful experiments. Most of the materials described in this protocol can be found outside scientific supply companies, making the set up for hydroponic experiments less expensive and convenient. The use of a hydroponic growth system is most advantageous in situations where the nutrient media need to be well controlled and when intact roots need to be harvested for downstream applications. We also demonstrate how nutrient concentrations can be modified to induce plant responses to both essential nutrients and toxic non-essential elements.

Figure 38 Setup for NFT method

Figure 39 Pipes

Figure 40 Seeding Tray

Figure 41 Plants Bowls

- **Cost Analysis**

Table 5.1 Cost description for NFT Method

Sr. No.	Equipment	Features
1	Pipes	• Length: 5ft • Breath: 5ft • 8 rows with 48 holes • Hole diameter– 3inches • Distance b/w holes – 6 inches • Diameter of pipe - 4 inches
2	Tank	• Capacity-70 lit • Price-Rs 700
3	Mixture	• Price: Rs 800/Lit
4	Fountain Motor (1 No.)	• Rs 200
6	Plant Bowls	• Rs 300/pack
7	Clay Balls	• Rs 200/kg

CHAPTER: 6

SWACHH BHARAT ABHIYAN (CLEAN INDIA)

6.1 SWACHHTA NEEDED IN YOUR VILLAGE EXPLAINING EXISTING SITUATION WITH PHOTOGRAPHS

In, Kimbuva village there is no facility for sweeper to take garbage for cleaning village. The area is cleaned by villagers own. The villagers clean their area which covered their houses. There is no proper collection of solid waste. People use to dump their waste near the Lake

Figure 42 Garbage dumped near Lake

Figure 43 Garbage dumped at empty space

- To Provide sweepers for clean village.
- To provide different color garbage bins for collection waste
  Green: - biodegradable waste
  Blue: - plastic& metal waste
- Provision for Public Toilets is required, as they are lacking in village

Figure 44 Dustbin

6.2 GUIDELINES FOR THE PROCESS OF THE IMPLEMENTATION IN YOUR VILLAGE WITH PHOTOGRAPHS

Why Swachhta Abhiyaan?

To accelerate the efforts to achieve universal sanitation coverage and to put focus on safe sanitation, the Prime Minister of India launched the Swachh Bharat Mission on 2nd October, 2014. The Mission Coordinator shall be Secretary, Ministry of Drinking Water and Sanitation with two Sub-Missions, the Swachh Bharat Mission (Garmin) and the Swachh Bharat Mission (Urban), which aims to achieve Swachh Bharat by 2019, as a fitting tribute to the 150th Birth Anniversary of Mahatma Gandhi, which in rural areas shall mean improving the levels of cleanliness in rural areas through Solid and Liquid Waste Management activities and making Gram Panchayats Open Defecation Free (ODF), clean and sanitized.

Guidelines: -

- Bring about an improvement in the general quality of life in the rural areas, by promoting cleanliness, hygiene and eliminating open defecation.
- Accelerate sanitation coverage in rural areas to achieve the vision of Swachh Bharat by 2nd October 2019.
- Motivate communities and Panchayati Raj Institutions to adopt sustainable sanitation practices and facilities through awareness creation and health education
- Encourage cost effective and appropriate technologies for ecologically safe and sustainable sanitation
- Develop, wherever required, community managed sanitation systems focusing on scientific Solid & Liquid Waste Management systems for overall cleanliness in the rural areas.
- Create significant positive impact on gender and promote social inclusion by improving sanitation especially in marginalized communities

6.3 ACTIVITIES DONE BY STUDENTS FOR ALLOCATED VILLAGE WITH PHOTOGRAPH

- While traveling doesn't throw any wrapper, paper or any dry waste on road. Keep it in your bag or pocket (as it is a dry waste you can keep them in your bag/pocket).
- Keep paper bags with yourself to store wet waste and throw them in dustbin only.
- Spitting on roads (as it can be the reason of viral disease).
- Avoid chewing Pan-Masala, Gutka and Tobacco.
- Avoid use of plastic bag.
- Follow government's rules and regulations.
- If someone is breaking the rule, then make them aware of it.
- Spread awareness to keep our village clean.
- Education start-ups can also partner with other schools for spreading awareness among the adults in rural areas. If the elderly populace of villages does not comprehend the value of education, they won’t allow their children to study.

CHAPTER: 7

VILLAGE CONDITION DUE TO COVID-19

7.1 TAKEN STEPS IN ALLOCATED VILLAGE RELATED TO EXISTING SITUATION WITH PHOTOGRAPHS:

- Village locals were informed by the sarpanch and talati about the pandemic situation and were also informed about the norms given by Government to fight this situation.
- They then sealed the village border to stop the movement of villagers and also to restrict entry of others.
- With help of Government officers, Sarpanch and other village people they sanitized the village streets and houses and other places.
- People also started using sanitizer and mask when they went out of home.

Figure 45 People maintaining physical distance.

- All the villagers were following Government norms of how to be safe from this situation and were also regularly taking account of updates by Government for this situation.

7.2 STEPS TAKEN BY STUDENTS WHILE VISITING THE VILLAGE:

- All the safety measures were taken by the students while visiting the allocated village.
- Mask was always on and we also washed our hands regularly.
- No litter was made while travelling.
- We kept social distance while interaction with everyone in the village be it the locals or the Sarpanch
- Follow government's rules and regulations.
- Sanitizing the hands frequently
- Aware the villagers regarding the COVID-19 guidelines, rules and regulations like wearing masks, frequent use of hand sanitizer, maintaining social distancing, etc.
- Every possible information was taken by means on electronic communication. Priority information were taken in person.

- **How to make your environment safer.**

1. **Avoid the 3Cs: spaces that are closed, crowded or involve close contact.**
    a. Outbreaks have been reported in restaurants, choir practices, fitness classes, nightclubs, offices and places of worship where people have gathered, often in crowded indoor settings where they talk loudly, shout, breathe heavily or sing.
    b. The risks of getting COVID-19 are higher in crowded and inadequately ventilated spaces where infected people spend long periods of time together in close proximity. These environments are where the virus appears to spread by respiratory droplets or aerosols more efficiently, so taking precautions is even more important.
2. **Meet people outside.** Outdoor gatherings are safer than indoor ones, particularly if indoor spaces are small and without outdoor air coming in.
3. **Avoid crowded or indoor settings** but if you can't, then take precautions:
    a. **Open a window.** Increase the amount of 'natural ventilation' when indoors.
    b. **Wear a mask**

Figure 46 COVID-19 Guidelines

CHAPTER 8

SUSTAINABLE DESIGN PLANNING PROPOSAL PART- I

8.1 DESIGN PROPOSALS

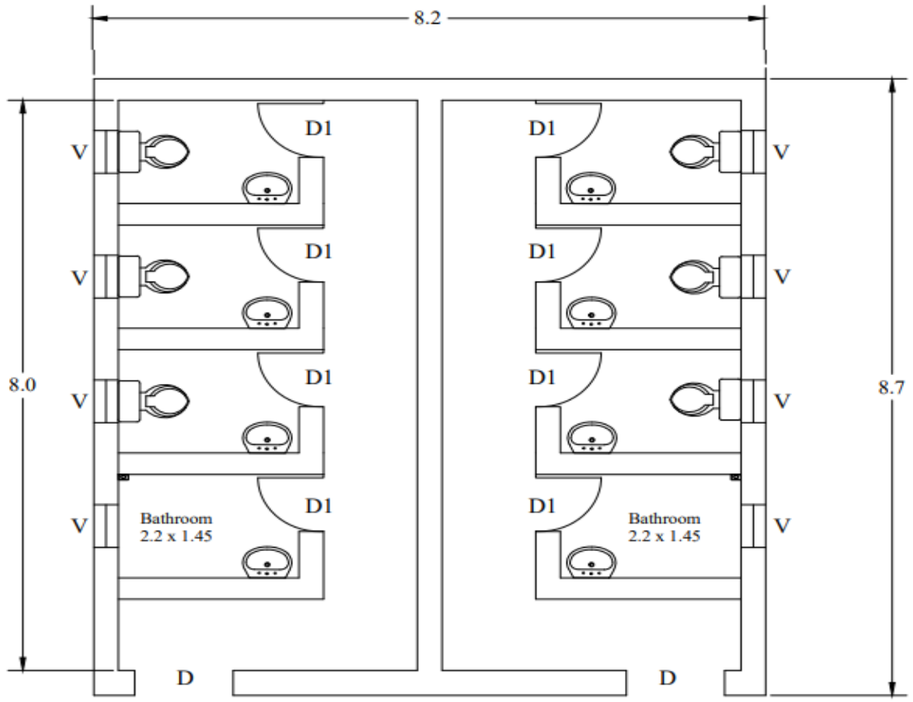
8.1.1 Physical Design – Public Toilet

PROP. CONSTRUCTION WORK OF PUBLIC TOILET							
AT KIMBUVA, TA:-SARASWATI DIST:- PATAN							
MEASUREMENT SHEET							
PUBLIC TOILET							
CENTER LINE = 75.18m							
ITEM	**DESCRIPTION**	**NO**	**L**	**B/W**	**H/D**	**QUANTITY**	**UNITS**
ITEM NO.:- 1							
	Excavation for Foundation	1	69.78	0.9	1.2	75.3624	Cum.
ITEM NO.:- 2							
	PCC work in foundation	1	69.78	0.9	0.2	12.5604	Cum.
ITEM NO.:- 3							
	Brick masonry work in Foundation						
	1st step	1	69.78	0.6	0.1	4.1868	Cum
	2nd step	1	70.68	0.5	0.1	3.534	Cum
	3rd step	1	71.58	0.4	0.1	2.8632	Cum
	4th step	1	72.48	0.3	0.7	15.2208	Cum
	Total Brick masonry work in foundation					25.8048	Cum.

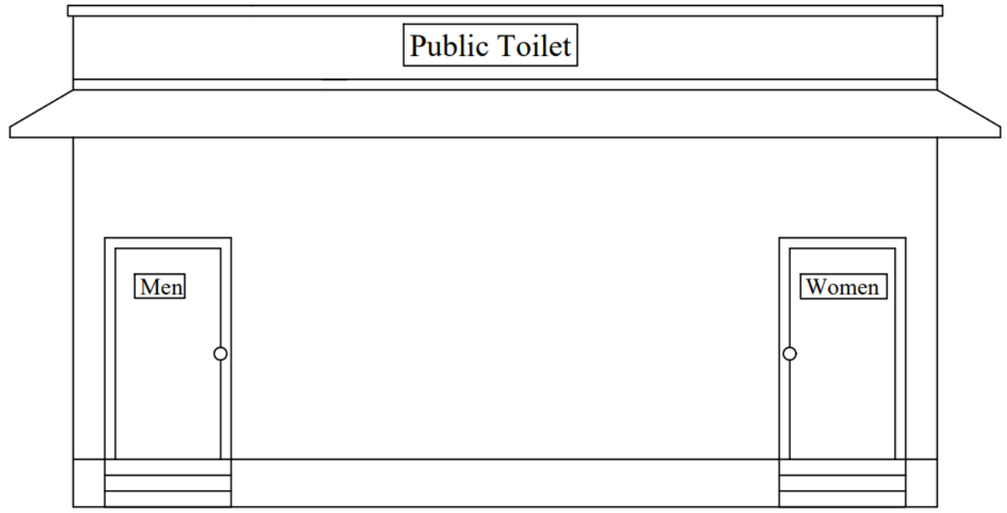
ITEM NO.:- 4							
	Super Structure						
		1	75.18	0.3	3.5	78.939	Cum.
	Door	2	1.2	0.3	2.1	1.512	Cum.
	Door 1	8	0.8	0.3	2.1	4.032	Cum.
	Ventilator – V	8	0.6	0.3	0.6	0.864	Cum.
						6.408	Cum.
	Total					85.347	Cum.
	Deduction for lintel						
	Door 1	2	1.2	0.3	0.1	0.072	Cum.
	Door 2	8	0.8	0.3	0.1	0.192	Cum.
	Ventilator – V	8	0.6	0.3	0.1	0.144	Cum.
						0.408	Cum.
						0.816	Cum.
	Total Brick masonry					84.531	Cum.
ITEM NO.:- 5							
	Brick masonry work in step						
	Step: 1	2	1.5	0.3	0.25	0.225	Cum.
	Step: 2	2	1.5	0.3	0.25	0.225	Cum.
					Total	0.45	Cum.
ITEM NO.:- 6							
	D.P.C						
		1	33.7	0.9	0.9	27.297	Sqm
ITEM NO 7							
	EARTH FILLING						
	Wide area	2	8.05	1.44	0.6	13.9104	Cum
	At Entrance	2	4	2.205	0.6	10.584	Cum
					TOTAL	24.4944	Cum
ITEM NO.:- 7							
	PLASTERING	16	2.85		3.5	159.6	Sqm
		6	8		3.5	168	Sqm
		4	7.9		3.5	110.6	Sqm
	TOTAL					438.2	Sqm
ITEM NO.:- 8							

WHITE WASH		16	2.85		3.5	159.6	Sqm
		6	8		3.5	168	Sqm
		4	7.9		3.5	110.6	Sqm
	TOTAL					438.2	Sqm
	RCC FOR SLAB	1	8.65	8.2	0.15	10.6395	Cum
	L=8.65						
	B=8.2						
	H=0.15						

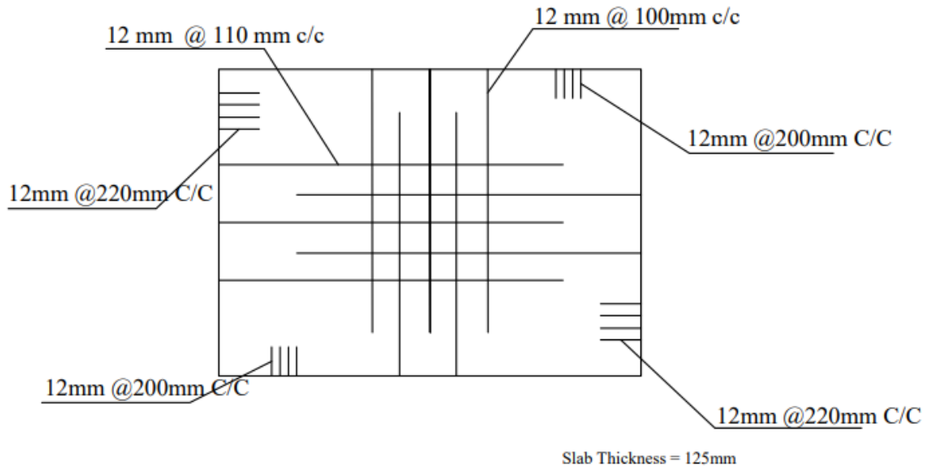
PROP. CONSTRUCTION WORK OF PUBLIC TOILET					
AT KIMBUVA, TAL:-SARASWATI DIST:- PATAN					
ABSTRACT SHEET					
PUBLIC TOILET					
Sr.	**Item description**	**Quantity**	**Rate**	**Per**	**Amount**
1	Excavation work	75.36	155	Cu.m.	11680.8
2	P C.C	12.56	3000	Cu.m.	37680
3	Brickwork in foundation	25.8	3200	Cu.m.	82560
4	Brickwork in superstructure	90.939	3500	Cu.m.	318286.5
5	Brickwork in steps	0.45	3200	Cu.m.	1440
6	D.P.C at plinth level	27.297	4900	Cu.m.	133755.3
7	Earth filling	24.49	50	Cu.m.	1224.5
8	Plastering	438.2	150	Sq.m.	65730
9	Whitewash	438.2	25	Sq.m.	10955
10	Rcc work for slab	10.64	8800	Cu.m.	93632
	Total Rupees				756944.1
	Contingency 5%				3784.7205
	10% contractor charges				75694.41
	2% water charges				15138.882
	Total Amount Rupees				851562.1125
	Say Rupees				**851562**



Plan

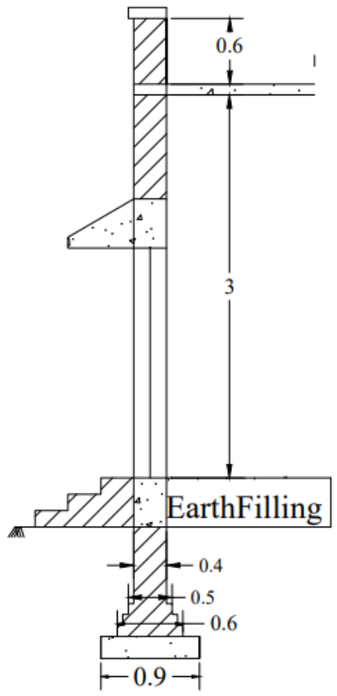


Elevation



Slab Thickness = 125mm

Reinforcement Detail



Section

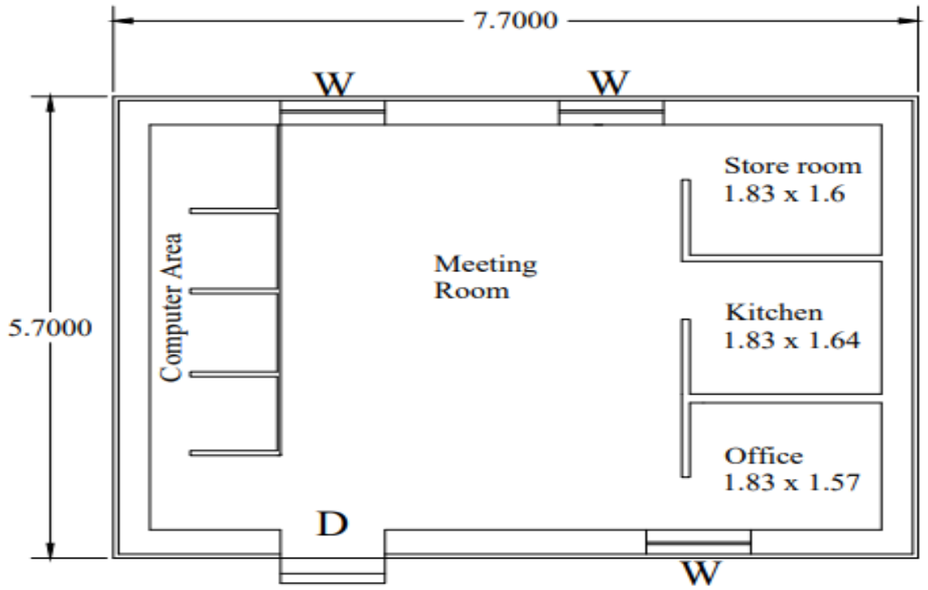
Door D	1.2 x 2.1	
Door D1	0.8 x 2.1	
Ventilator V	0.6 x 0.6	
All Dimension are in meters		
Vishwakarma Yojana Phase VIII		
Gujarat Power Engineering & Research Institute		
Village	Kimbuva Patan	
Students	Dharmik Patel, Pray Patel	
Design	Public Toilet	

8.1.2 Social design - Skill Development Centre

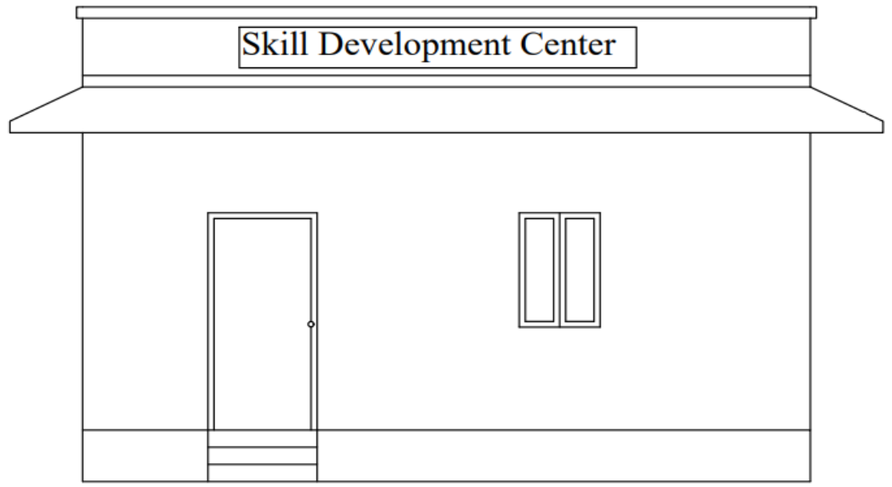
PROP. CONSTRUCTION WORK OF PUBLIC TOILET									
AT KIMBUVA, TA:-SARASWATI DIST:- PATAN									
MEASUREMENT SHEET									
SKILL DEVELOPMENT CENTER									
ITEM NO	**DESCRIPTION**	**NO**	**L**	**B**	**H**	**QUANTITY**	**TOTAL**	**UNIT**	
1	**Excavation for foundation**								
	Long wall	2	7.30m	0.90m	1.00m	13.8	23.49	Cum	
	Short wall	2	5.30m	0.90m	1.00m	9.54			
	Steps I front of door	1	1.30m	0.75m	0.15m	0.15			
2	**Cement concrete in foundation**								
	long wall	2	7.3	0.9	0.3	3.94	6.95	Cum	
	Short wall	2	5.3	0.9	0.3	2.86			
	Steps	1	1.3	0.75	0.15	0.15			
3	**Reinforced cement concrete lintels**								
	Door	1	1	0.3	2	0.6	9.156	Cum	
	Window	3	1	0.3	1.5	1.35			
	Door	1	1	0.36	0.15	0.054			
	Window	3	1	0.36	0.15	0.162			
	Room	1	7.9	5.9	0.15	6.99			
4	**Damp proof course**								
	long wall	2	7.3	0.35		5.11	5.295	Sqm	
	Short wall	2	5.3	0.35		0.185			
5	**Brick work for foundation and plinth**								
	long wall								
	1st step	2	7.3	0.6	0.2	1.75	8.46	Cum	
	2nd step	2	7.3	0.5	0.2	1.46			
	3rd step	2	7.3	0.4	0.9	5.25			
	Short wall								
	1st step	2	5.3	0.6	0.2	1.27	6.14	Cum	
	2nd step	2	5.3	0.5	0.2	1.06			
	3rd step	2	5.3	0.4	0.9	3.81			
	Steps in								
	Front of 1st step	2	1	0.6	0.2	0.24	0.36	Cum	
	The door 2nd step	2	1	0.3	0.2	0.12			
	Deduct D.P.C.	1	6.5	0.04		0.26	0.26	Sqm	

6	**Brick work in cement mortar in super structure**								
	Long wall	2	7.3	0.3	3.5	15.33	26.46	Cum	
	Short wall	2	5.3	0.3	3.5	11.13			
	Deduct								
	door	1	1	0.3	2	0.6	0.81	Cum	
	Window	3	1	0.3	1.5	1.35			
7	**Plastering**								
	Inside room	1	24		3.5	84	197.16	Sqm	
	outside room	1	27.6		4.1	113.16			
	Deduct								
	Door	1	1		2	2	6.5	Sqm	
	Window	3	1		1.5	4.5			

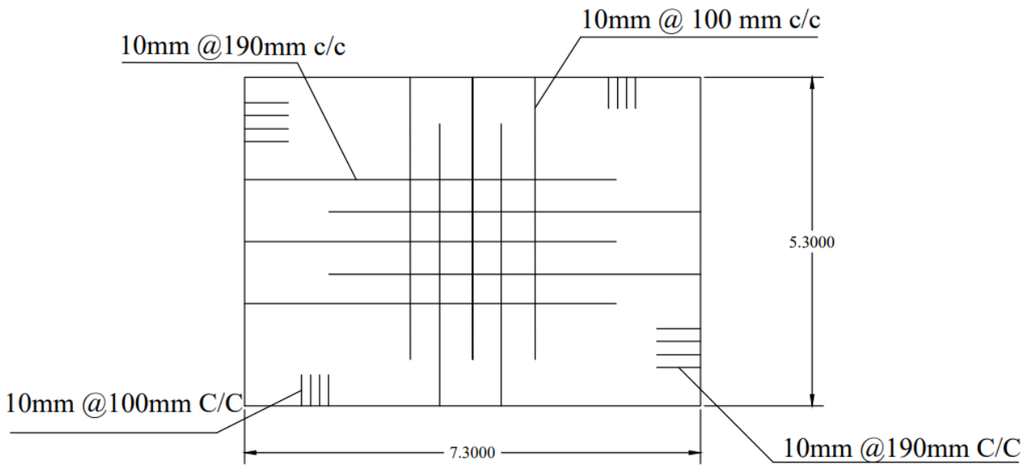
PROP. CONSTRUCTION WORK OF SKILL DEVELOPMENT CENTRE					
AT KIMBUVA, TA:- SARASWATI DIST:- PATAN					
ABSTRACT SHEET					
SKILL DEVELOPMENT CENTRE					
Sr. No	**Particular items**	**Quantity**	**Rate**	**Per**	**Amount**
1	Earth work	23.49	292	Cum	6859.08
2	Plain Cement Concrete	6.95	250	Cum	1737.5
3	Reinforced cement concrete	9.156	5000	Cum	45780
4	Damp proof course	5.295	340	Sqm.	1800.3
5	Brick Work for foundation	14.7	310	Cum	4557
6	Brick Work for super structure	25.65	320	Cum	8208
9	Plastering	190.66	100	Sqm.	19066
	Total construction Cost				88007.88
	10% Contractor Profit				8800.788
	5% Contingencies				4400.394
	2% water charges				1760.1576
	Overall Cost				102969.2196
	Say Rupees				**102969**



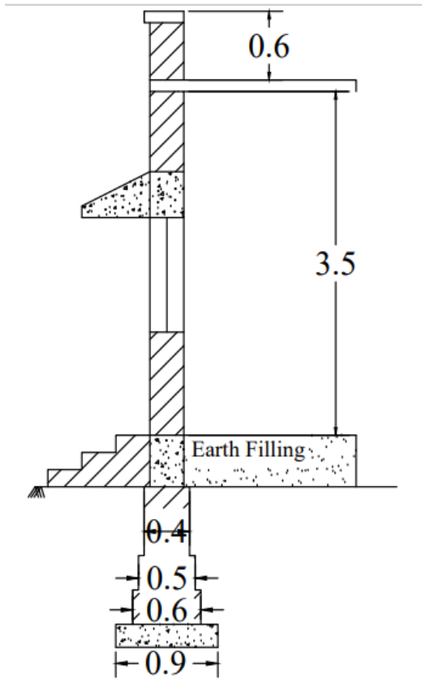
Plan



Elevation



Reinforcement Detail



Section

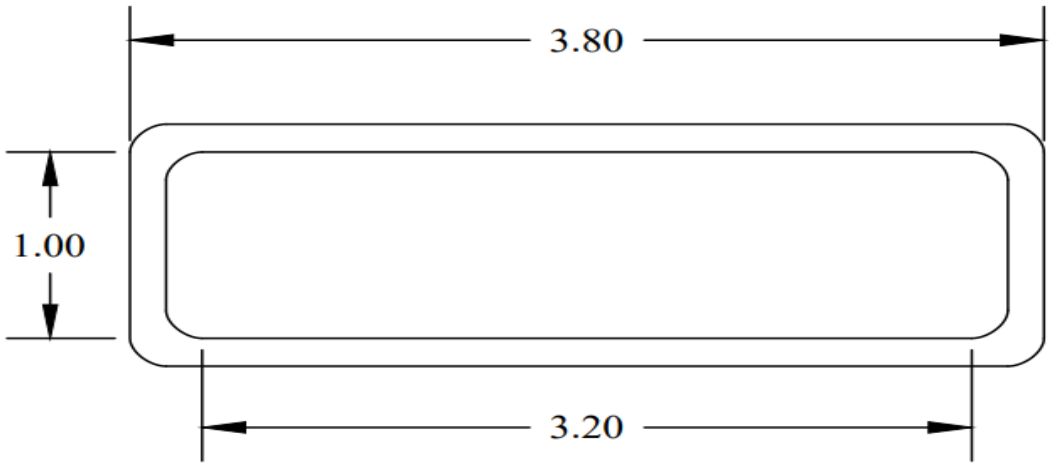
Door D	1.0 X 2.0	
Window W	1.0 x 1.5	
Wall Thickness 0.3m		
All Dimension are in meters		
Vishwakarma Yojana Phase VIII		
Gujarat Power Engineering & Research Institute		
Village	Kimbuva, Patan	
Students	Dharmik Patel, Pray Patel	
Design	Skill Development Center	

8.1.3 Socio-Culture design - Water Tank for Animals

PROP. CONSTRUCTION WORK OF WATER TANK FOR ANIMALS							
AT, KIMBUVA, TA:-SARASWATI, DIST:-PATAN							
MEASUREMENT SHEET							
CENTER LINE = 9.6 m							
ITEM	**DESCRIPTION**	**NO**	**L**	**B/W**	**H/D**	**QUANTIY**	**UNITS**
ITEM NO.:- 1							
	Excavation for Foundation						
	Area = 3.8 * 1	1	3.8	1	0.6	2.28	Cum.
ITEM NO.:- 2							
	B.B.C.C. work in foundation						
	Area = 3.5 * .7	1	3.5	0.7	0.15	0.3675	Cum.
ITEM NO.:- 3							
	Brick masonry work in foundation and superstructure						
		1	9.6	0.15	0.7625	1.098	Cum
ITEM NO.:- 4							
	Plaster						
	Exterior wall	1	9.6		0.1625	1.56	Cum.
	Interior wall	1	9.6		0.6125	5.88	Cum.
	Upon BBCC	1	3.5	0.7		2.45	Cum.
	Total					9.89	Cum.

PROP. CONSTRUCTION WORK OF WATER TANK FOR ANIMALS					
AT, KIMBUVA, TA:-SARASWATI, DIST:-PATAN					
ABSTRACT SHEET					
Sr. No.	**Item Description**	**Quantity**	**Rate**	**Per**	**Amount**
1	Excavation work	2.28	155	Cum.	353
3	BBCC foundation	0.3675	2000	Cum.	735

4	Brickwork in superstructure and foundation	1.098	3700	Cum.	4,063
8	Total plaster	9.89	70	Sqm.	692
	Total Rupees				5,843
	Conti……..05.00% Rupees				292.165
	2% water charges				116.866
	Total Amount Rupees				**6,252**

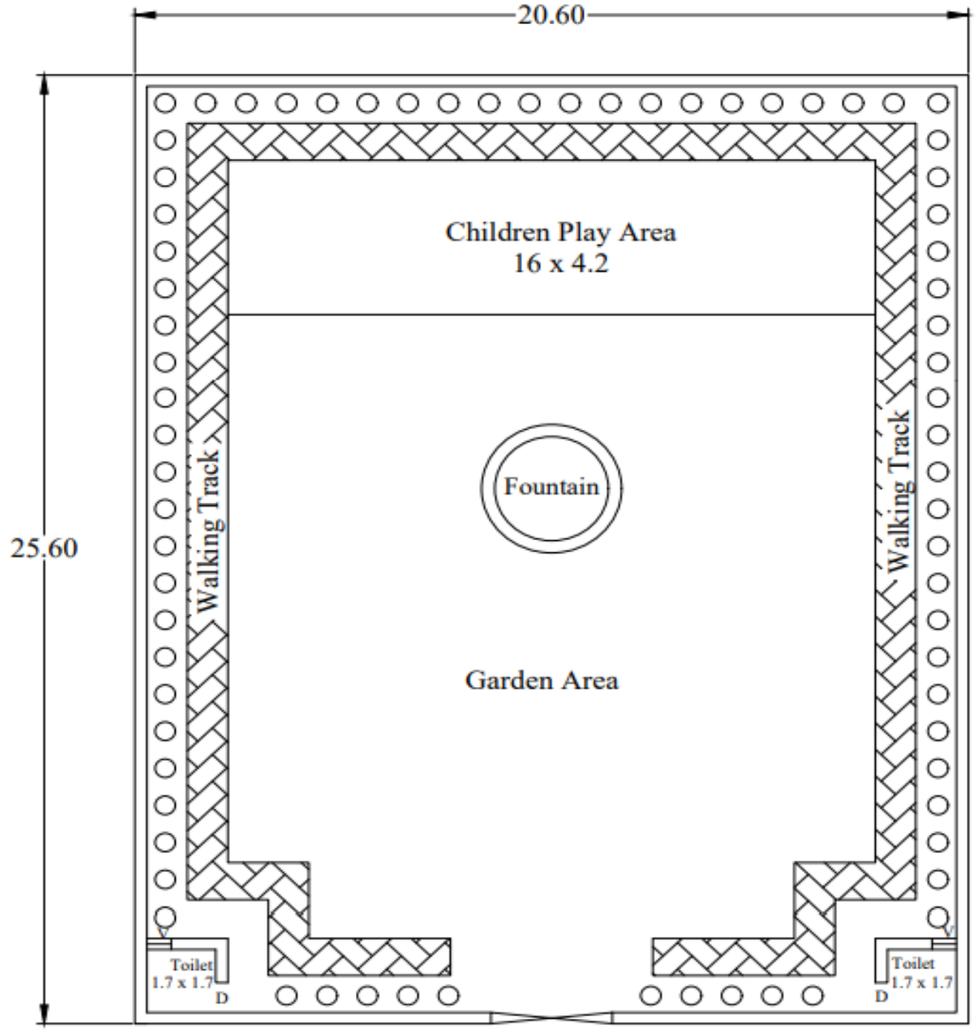


Wall Thickness = 0.15m	
All Dimension are in meters	
Vishwakarma Yojana Phase VIII	
Gujarat Power Engineering & Research Institute	
Village	Kimbuva Patan
Students	Dharmik Patel, Pray Patel
Design	Water Tank for Animals

8.1.4 Heritage Village design - Public Garden

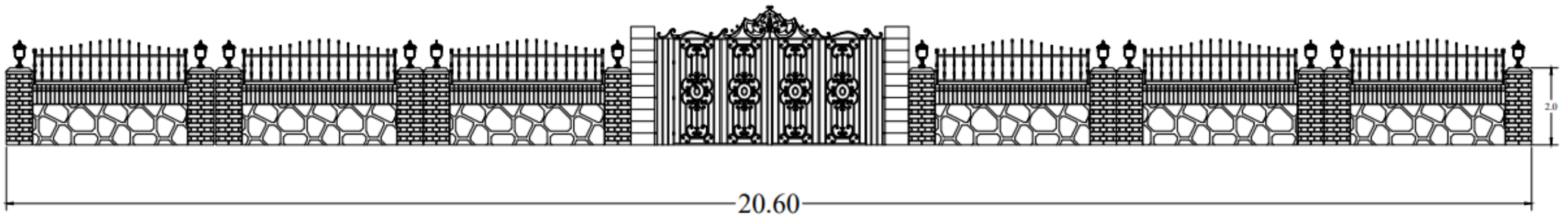
PROP. CONSTRUCTION WORK OF PUBLIC GARDEN							
AT KIMBUVA, TA: -SARASWATI DIST: PATAN							
PUBLIC GARDEN							
MEASUREMENT SHEET							
Item No.	**Description**	**No.**	**L**	**B**	**H**	**Quantity**	**Unit**
1							
	Excavation for Column	27	0.9	0.9	1.3	28.431	Cum
	L= (20 x21+ (24.4 x2)						
	= 88.8	1	88.8	0.3	0.15	3.996	Cum
						32.427	Cum
2	PCC						
	For column	27	0.9	0.9	0.3	6.561	Cum
	Below wall	1	88.8	0.3	0.15	3.996	Cum
						10.556	Cum
3	RCC COLUMN						
	Below ground	27	0.3	0.3	1	2.43	Cum
	Above ground	27	0.3	0.3	1	2.43	Cum
						4.85	Cum
4	EARTH FILLING						
	Q= 32.427-2.43-3.996 =26					26	Cum
5	MASONARY						
	L=88,8-(27X0.3)						
	= 80.7	1	80.7	0.3	0.5	12.105	Cum
6	STEEL RAILING						
	L=88,8-(27X0.3)						
	= 80.7	1	80.7		0.5	40.35	Sqm
7	PLASTER						
	For column	108	0.3		1	32.4	Sqm
	For Masonary	1	266.4		0.5	133.2	Sqm
8	LANDSCAPING						
	Area= 20x17 = 340					340	Sqm

PROP. CONSTRUCTION WORK OF PUBLIC GARDEN					
AT KIMBUVA, TA: -SARASWATI DIST:- PATAN					
MEASUREMENT SHEET					
PUBLIC GARDEN					
Item. No.	**Description**	**Quantity**	**Rate**	**Per Unit**	**Amount**
1	Excavation	32.5	151	Cum	4907.5
2	P.C.C	11	3300	Cum	36300
3	Rcc Column	4.9	8800	Cum	43120
4	Earth Filling	26	50	Cum	1300
5	Masonary	12.2	3500	Sqm	42700
6	Steel Railing	40.35	2590	Sqm	104506.5
7	Plaster				
	For column	32.5	150	Sqm	4875
	For Masonary	133.2	150	Sqm	19980
8	Landscaping	340	215	Sqm	73100
		Total			330789
		Contractor profit 10%			30334.9
		Contingencies = 5%			15168
		Total			**376291.9**



Plan

Door D	0.8 X 1.5		Tree
Ventilator V	0.6 X 0.6		Entrance Gate
Entrance Gate	3.0 x 2.0		Walking Path
All Dimension are in meters			
Vishwakarma Yojana Phase VIII			
Gujarat Power Engineering & Research Institute			
Village	Kimbuva, Patan		
Students	Dharmik Patel, Pray Patel		
Design	Public Garden		



Elevation

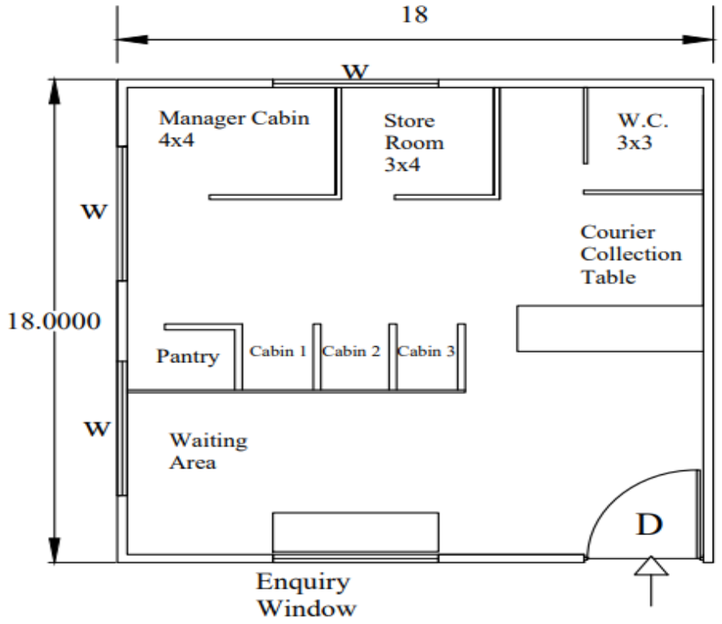
8.1.5 Sustainable design -Post Office

PROP. CONSTRUCTION WORK OF POST OFFICE							
AT, KIMBUVA, TA:-SARASWATI DIST:- PATAN							
MEASUREMENT SHEET							
POST OFFICE							
CENTER LINE = 70.80m							
ITEM	**DESCRIPTION**	**NO**	**L**	**B/W**	**H/D**	**QUANTIY**	**UNITS**
ITEM NO.:- 1	Excavation for						
	Foundation						
	L=70.80	1	69.9	0.9	1.1	69.201	Cum.
ITEM NO.:- 2	C.C. work in foundation						
	L=70.80	1	69.9	0.9	0.2	12.582	Cum.
ITEM NO.:- 3	Brick masonry work in foundation						
	1st step						
	L=70.8-2*0.6/2	1	70.2	0.6	0.3	12.636	Cum
	2nd step						
	L=70.8-2*(0.5/2)	1	70.3	0.5	0.3	10.545	Cum
	3rd step						
	L=70.8-2*(0.4/2)	1	70.3	0.4	0.9	25.308	Cum
	Total Brick masonry work in foundation					48.489	Cum
ITEM NO.: - 4	Brick masonry work in						
	super structure						
	Outer wall	1	70.5	0.3	3.7	78.255	Cum
	Partition wall	2	7	0.3	3	12.6	
	Deduction for door & Windows						
	Door D	2	1.2	0.3	2.1	1.512	Cum

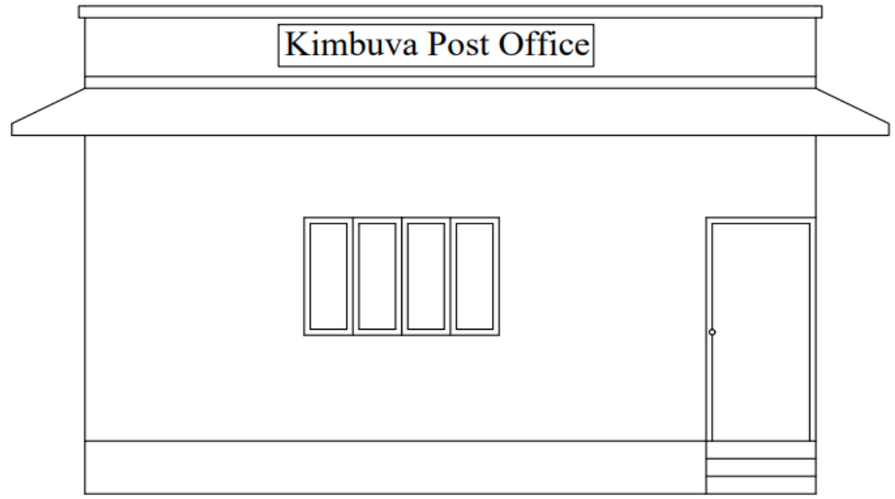
	Windows W	1	2	0.3	1.5	0.9	
	Windows W1	3	1	0.3	1.5	1.35	Cum
	Total					3.762	Cum
	Deduction for lintel						
	Door D	2	1.2	0.3	0.1	0.072	Cum
	Windows W	1	2	0.3	0.1	0.06	Cum
	Windows W1	3	1	0.3	0.1	0.09	Cum
	Total					0.222	Cum
	Total Brick masonry					86.871	Cum
	Work						
ITEM NO.:- 5	Brick masonry work in step						
	Step: 1	1	1.5	0.3	0.15	0.225	Cum
	Step: 2	1	1.5	0.3	0.15	0.225	Cum
					Total	0.45	Cum
ITEM NO.:- 6	D.P.C at plinth level						
	For 300mm thick wall	1	70.5	0.3	0.05	1.0575	Sqm
ITEM NO 7	Earth filling						
			17.4	17.4	0.6	181.656	Cum
ITEM NO.:- 8	Plastering	4	17.4		3	52.2	Sqm
		2	7		3	21	Sqm
		1	17.4	17.4		302.76	
	TOTAL					375.96	Sqm
	Deduction for door & Windows						
	Door D	2	1.2		2.1	5.04	Sqm
	Windows W	1	2		1.5	3	Sqm
	Windows W1	3	1		1.5	4.5	Sqm
	Total					12.54	Sqm
	Total Plastering					363.42	Sqm

ITEM NO.:- 9	White wash					363.42	Sqm
	(Same as Plastering)						
ITEM NO 10	RCC Work for	1	18	18	0.15	48.6	Cum
	Slab						

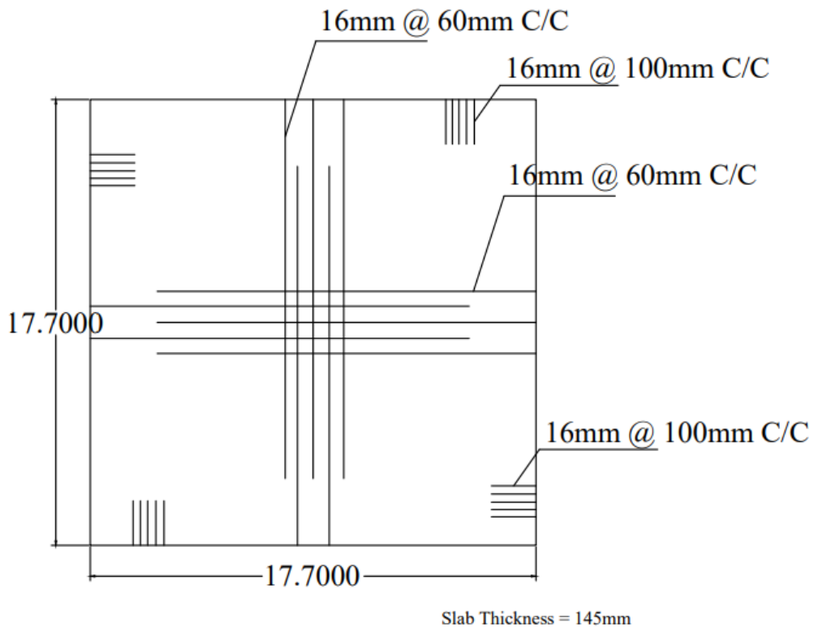
PROP. CONSTRUCTION WORK OF POST OFFICE					
AT,KIMBUVA , TAL:-SARASWATI DIST:- PATAN					
ABSTRACT SHEET					
POST OFFICE					
Sr. No.	**Item description**	**Quantity**	**Rate**	**Per**	**Amount**
1	Excavation work	69.201	155	Cum.	10726.155
2	P C.C	12.582	3000	Cum.	37746
3	Brickwork in foundation	48.489	3200	Cum.	155164.8
4	Brickwork in superstructure	86.871	3500	Cum.	304048.5
5	Brickwork in steps	0.45	3200	Cum.	1440
6	D.P.C at plinth level	1.0575	4900	Cum.	5181.75
7	Earth filling	181.656	50	Cum.	9082.8
8	Plastering	363.42	150	Sqm.	54513
9	Whitewash	363.42	25	Sqm.	9085.5
10	Rcc work for slab	48.6	8800	Cum.	427680
	Total Rupees				1014668.51
	Contingency 05.00%				50733.4253
	10% contractor charges				101466.851
	2% water charges				20293.3701
	Total Amount Rupees				1187162.15
	Say Rupees				**1187162**



Plan

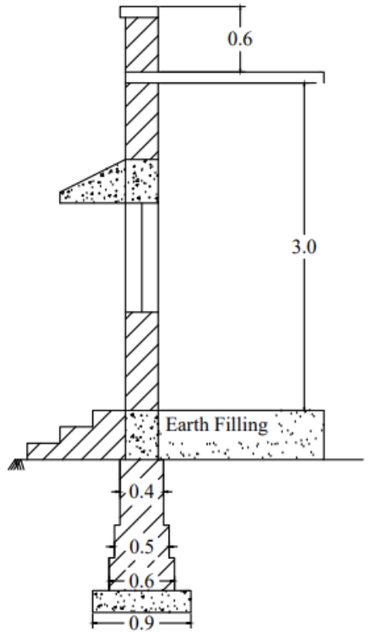


Elevation



Slab Thickness = 145mm

Reinforcement Detail



Section

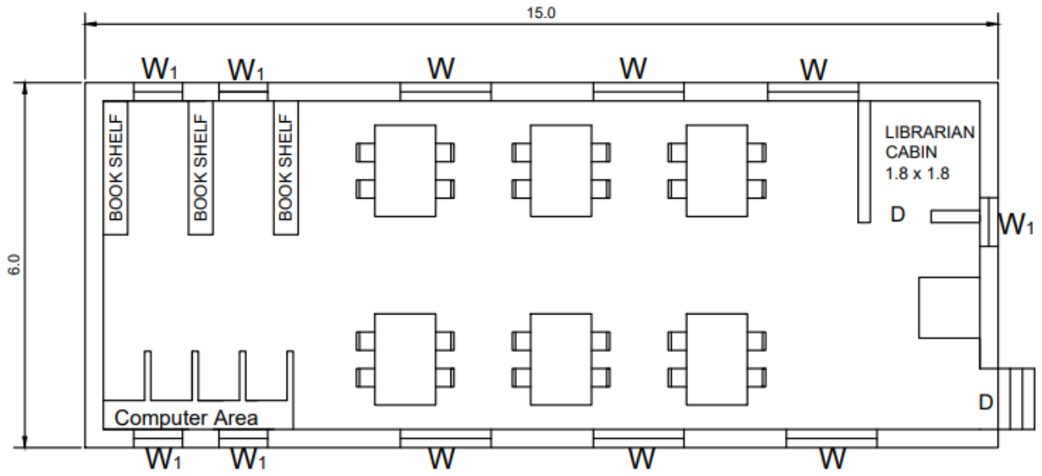
Door D	3.6 X 7.0	
Door D1	3.0 X 7.0	
Window W	5.0 x 4.0	
All Dimension are in meters		
Vishwakarma Yojana Phase VIII		
Gujarat Power Engineering & Research Institute		
Village	Kimbuva, Patan	
Students	Dharmik Patel, Pray Patel	
Design	Post Office	

8.1.6 Smart Village design –Library

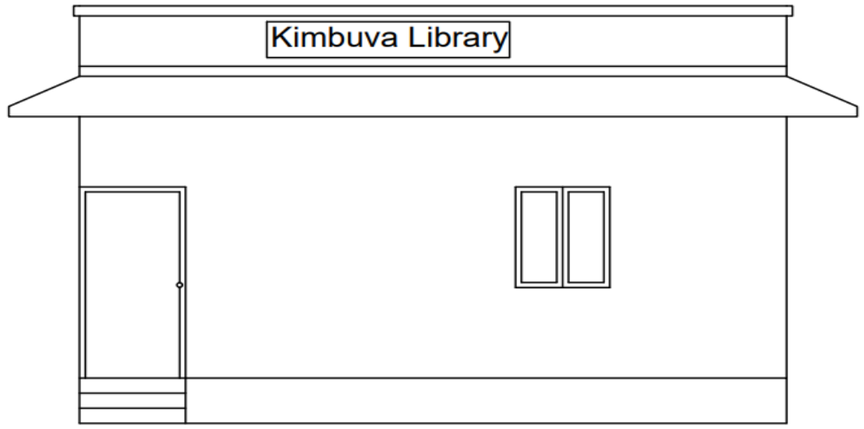
PROP. CONSTRUCTION WORK OF PUBLIC LIBRARY							
AT, KIMBUVA , TA:-SARASWATI DIST:- PATAN							
MEASUREMENT SHEET							
PUBLIC LIBRARY							
CENTER LINE = 40.80m							
ITEM	**DESCRIPTION**	**NO**	**L**	**B/W**	**H/D**	**QUANTIY**	**UNITS**
ITEM NO.:- 1	Excavation for Foundation						
		1	39.9	0.9	1.1	39.501	Cum
	L=40.80						
ITEM NO.:- 2	C.C. work in foundation						
		1	39.9	0.9	0.2	7.182	Cum
	L=40.80						
ITEM NO.:- 3	Brick masonry work in foundation						
	1st step						
	L=40.8-2*0.6/2	1	40.2	0.6	0.3	7.236	Cum
	2nd step						
	L=40.8-2*(0.5/2)	1	40.3	0.5	0.3	6.045	Cum
	3rd step						
	L=40.8-2*(0.4/2)	1	40.4	0.4	0.9	14.544	Cum
	Total Brick masonry					27.825	Cum
	work in foundation						
ITEM NO.:- 4	Brick masonry work in Superstructure	1	40.5	0.3	3.7	44.955	Cum
	Deduction for door & Windows						
	Door	1	1.2	0.3	2.1	0.756	Cum
	Windows W	6	1.5	0.3	1.4		
	Windows W1	4	0.8	0.3	1.4	1.344	Cum
	Total					2.1	Cum

ITEM NO.:- 4	Deduction for lintel						
	Door 1	1	1.2	0.3	0.1	0.036	Cum
	Windows W	6	1.5	0.3	0.1	0.27	Cum
	Windows W1	4	0.8	0.3	0.1	0.096	Cum
	Total					0.402	Cum
	Total Brick masonry					42.453	Cum
	Work						
ITEM NO.:- 5	Brick masonry work in step						
	Step: 1	1	1.5	0.3	0.15	0.225	Cum
	Step: 2	1	1.5	0.3	0.15	0.225	Cum
					Total	0.45	Cum
ITEM NO.:- 6	D.P.C at plinth level						
	For 300mm thick wall	1	40.5	0.3	0.05	0.6075	Cum
ITEM NO 7	Earth filling		14.4	5.4	0.6	46.656	Cum
ITEM NO.:- 8	Plastering	1	14.4		3	43.2	Sqm
		1	5.4		3	16.2	Sqm
		1	14.4	5.4		77.76	
	TOTAL					137.16	Sqm
	Deduction for door & Windows						
	Door	1	1.2		2.1	2.52	Sqm
	Windows W	6	1.5		1.4	12.6	Sqm
	Windows W1	4	0.8		1.4	4.48	Sqm
	Total					7	Sqm
	Total Plastering					130.16	
ITEM NO.:- 9							
	White wash (Same as Plastering)					130.16	Sqm
ITEM NO.:-10	RCC Work for Slab	1	15	6	0.15	13.5	Cum

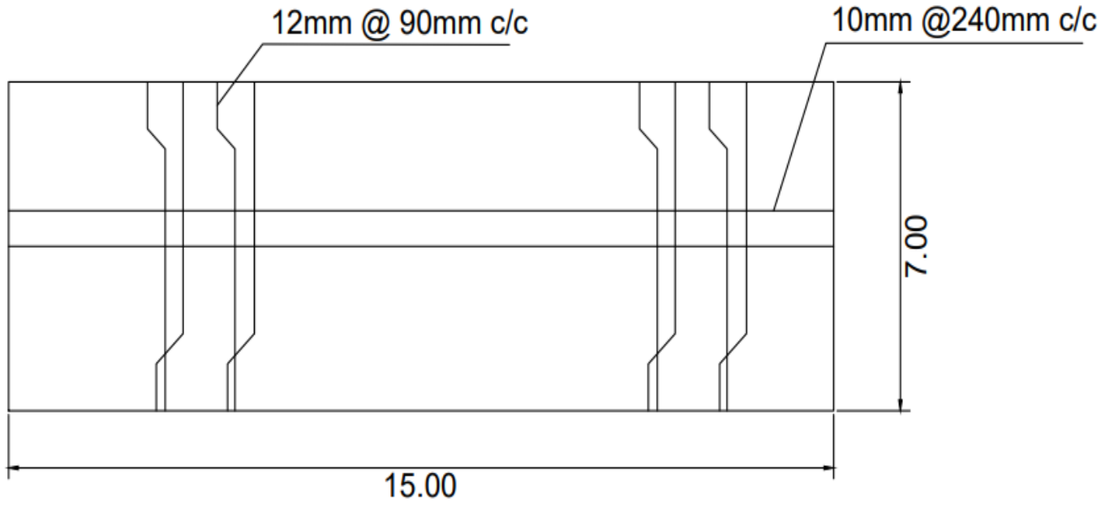
PROP. CONSTRUCTION WORK OF PUBLIC LIBRARY					
AT, KIMBUVA , TA:-SARASWATI DIST:- PATAN					
ABSTRACT SHEET					
PUBLIC LIBRARY					
Sr. No.	**Description**	**Quantity**	**Rate**	**Per**	**Amount**
1	Excavation work	39.501	155	Cum	6122.655
2	P C.C	7.182	3000	Cum	21546
3	Brickwork in foundation	27.825	3200	Cum	89040
4	Brickwork in superstructure	42.453	3500	Cum	148585.5
5	Brickwork in steps	0.45	3200	Cum	1440
6	D.P.C at plinth level	0.6075	4900	Cum	2976.75
7	Earth filling	46.656	50	Cum	2332.8
8	Plastering	130.16	150	Sqm	19524
9	Whitewash	438.2	25	Sqm	10955
10	Rcc work for slab	13.5	8800	Cum	118800
	Total Rupees				421322.705
	Contingency 05.00%				21066.1353
	10% contractor charges				42132.2705
	2% water charges				8426.4541
	Total Amount Rupees				492947.565
	Say Rupees				**492948**



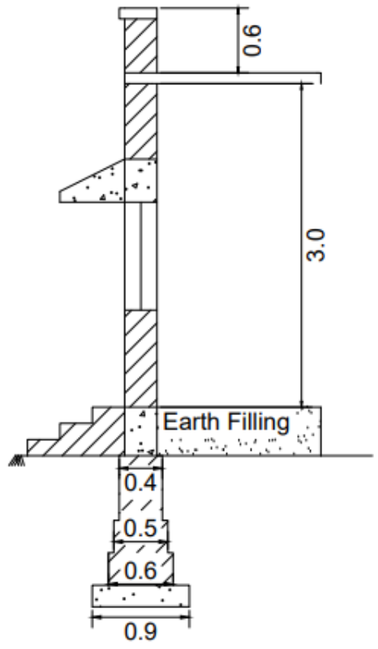
Plan



Elevation



Reinforcement Detail



Section

Door D	1.0 X 1.5	
Window W1	0.8 X 1.4	
Window W	1.5 x 1.4	
All Dimension are in meters		
Vishwakarma Yojana Phase VIII		
Gujarat Power Engineering & Research Institute		
Village	Kimbuva, Patan	
Students	Dharmik Patel, Pray Patel	
Design	Public Library	

8.2 Reason for Students Recommending this Design

Primary surveys were conducted at allocated, ideal & smart village. After analyzing and comparing various infrastructural facilities of villages, above design were proposed (refer 8.1 of chapter 8). Many factors were taken into consideration while proposing the designs. Infrastructural facilities which were not available or not in good condition were been proposed. After availability of below mentioned facilities, villagers will get huge benefits.

Reasons of proposal of designs in allocated village are given in table 8.1 which include the problem in village and their optimum solution available. Table 8.2 shows the benefits to villagers after availability of proposed facilities.

Table 8.1 Problems and solutions for proposed designs

Problem	Solution
Improper Sanitation Facilities	Public Toilet
Poor quality of labour skills, less productivity.	Skill Development Center
Lack of Public Library	Library
Existing structure was rented and in poor condition	Post Office
Lack of Recreational facility	Public Garden
Lack of clean water for animals	Water Tank for Animal

8.3. About designs Suggestions / Benefit of the villagers

Table 8.2 Benefits of proposed designs

Benefits	Proposed Design
Better Sanitation facility	Public Toilet
Personal and industrial growth	Skill Development Center
Better village education	Library
New infrastructure	Post Office
Improve mental health & promote relaxation	Public Garden
Source of clean water for animals	Avaalo

CHAPTER 9.

PROPOSING DESIGNS FOR FUTURE DEVELOPMENT OF THE VILLAGE FOR THE PART-II DESIGN

In this phase preliminary survey were done and according to the need different design were proposed. On these available data the following work is expected to be carried out in upcoming semester: -

- The system of solid waste management should be properly developed.
- Improving Financial Infrastructural
- To improve health care facilities
- To improve Sanitation facility.
- Use of Renewable Source of Energy
- To Propose Recreational Facility

Village was lacking in following infrastructure

1. Post Office
2. Public Library
3. Public Garden
4. Community Hall
5. Skill Development Centre
6. Water Tank for Animals (Avaalo)

Following facilities were not in good condition

1. Village pond
2. Banks

Above infrastructure facilities can be considered for future development.

CHAPTER 10

CONCLUSION OF THE ENTIRE VILLAGE ACTIVITIES OF THE PROJECT

With view to enhance the existing infrastructural facilities and develop the new technologies for Kimbuva village allocated under Vishwakarma Yojana, several visits were made to the targeted sites. To develop the perceptions and rationales, smart village and ideal village where been visited too and reviewed for existing facilities and infrastructure of these villages. For collecting the geographical features and socio-economic conditions of people, demographic patterns, etc., village people where been interviewed and relevant data were collected and analyzed. Based on Gap analysis carried out as per URDPFI guidelines, public toilets and skill development Centre design, measurement sheets and estimates were proposed. Basic facilities where been considered as first priority. All the design kept economical and sustainable to an extent.

After visiting ideal and smart village, several facilities were being analyzed and were proposed in allocated village. Allocated village was given the facilities which were already present in smart and ideal village. The gap between the smart/ideal and allocated village was tried to filled.

CHAPTER 11.

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CHAPTER 12.

ANNEXURE ATTACHMENT

12.1 SURVEY FORM OF IDEAL VILLAGE SCANNED COPY ATTACHMENT IN THE REPORT FOR PART-I

Gujarat Technological University, Ahmedabad, Gujarat — Vishwakarma Yojana: Phase VIII Techno Economic Survey

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

Name of Village:	Mokhrapura
Name of Taluka:	Unjha
Name of District:	Mehsana
Name of Institute:	GIPERI
Nodal Officer Name & Contact Detail:	Dr. Pranav Bhangaokar
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Sarpanch - Patel Madhuban Mafatlal
Date of Survey:	

1. **Demographical Detail:**

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001				
ii)	2011	5197	2670	2527	1124

2. **Geographical Detail:**

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	1253
	Forest Area (In hect.)	—
	Agricultural Land Area (In hect.)	1072
	Residential Area (In hect.)	—
	Other Area (In hect.)	
	Water bodies	
	Nearest Town with Distance:	

3. **Occupational Details:**

Name of Three Major Occupation groups in Village	1. Agriculture
	2. Business
	3. Animal Husbandary.

4. **Physical Infrastructure Facilities:**

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated) • RO Water • Well (Covered/ Uncovered) • Hand pumps • Tube well/ Borehole • River/ Canal/ Spring/ Lake/ Pond	Treated Tap water Covered well Hand pump	yes yes yes		good good good
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank 2 Nos	Capacity: 50,000	yes		good
	Underground Sump	Capacity: 1 lakh	yes		good
Suggestions if any:					
C.	**Drainage Facility**				
	Available (Yes/ No)	Covered	yes		good
Suggestions if any:					
D.	**Type of Drainage**				
	Closed/ Open	Closed			good
	If Open than Pucca / Kutchcha				
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	yes			
Suggestions if any:					

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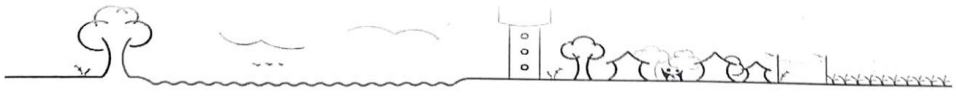
Vishwakarma Yojana: Phase VIII
Techno Economic Survey

E.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	500m	yes		
	Main road	500m	yes		
	Internal streets	43 Nos.	yes		
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH (500m)	yes		
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO (7 Km)			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	NO (7 Km)			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto / Jeep chakda Available	yes		Good
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	UGVCL (24 hr)	yes		Good
	Power supply for Domestic Use	24 hr			Good
	Power supply for Agricultural Use	8 hrs			Good
	Power supply for Commercial Use	24 hrs			Good
	Road/ Street Lights	yes			Good



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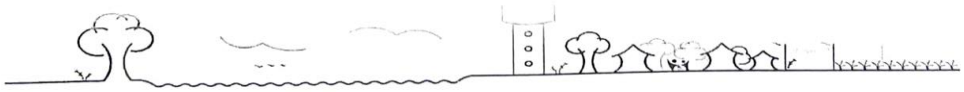
Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Electrification in Government Buildings/ Schools/ Hospitals				
	Renewable Energy Source Facilities (Y/ N)	Solar Power in houses	yes		good
	LED Facilities	yes	yes		good
Suggestions if any:					
H.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	2			Good
	Location Condition	Bus stand Temple	yes		good
	Community Toilet (With bath/ without bath facilities)				
	Solid & liquid waste Disposal system available	Land fill	yes		good
	Any facility for Waste collection from road	Tractor Dustbin	yes		good
Suggestions if any:					
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	Canal Tube Well	yes		good
Suggestions if any:					
J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Pucca - 80% Kuccha - 20%			

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks



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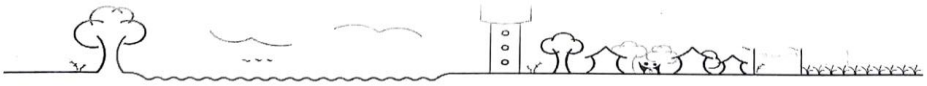
Vishwakarma Yojana: Phase VIII
Techno Economic Survey

K.	Health Facilities:				
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	Ayurvedic hospital	yes		good
	Private Clinic/Private Hospital/ Nursing Home	one	yes		good
	If any of the above Facility is not available in village than approx. distance from village: 5.....kms.				
Suggestions if any:					

L.	Education Facilities:				
	Aaganwadi/ Play group	6			
	Primary School	2			
	Secondary school	1			
	Higher sec. School				
	ITI college/ vocational Training Center				
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	Science college			
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					

M.	Socio- Culture Facilities				
	Community Hall (With or without TV) Location:				



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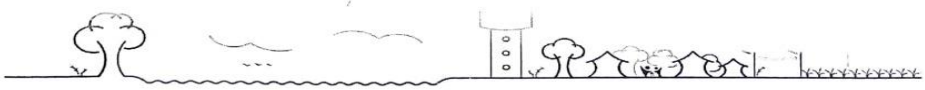
	Condition:				
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	Public Library Near Bustand Good	yes		good
	Public Garden Location: Condition:	Jalav good	yes		good
	Village Pond Location: Condition:	Jalav good	yes		good
	Recreation Center Location: Condition:				
	Cinema/ Video Hall Location: Condition:				
	Assembly Polling Station Location: Condition:	School good	yes		good
	Birth & Death Registration Office Location: Condition:	Gram Panchayat good	yes		good
If any of the above Facility is not available in village than approx. distance from village: .1.....kms.					
Suggestions if any:					
N.	**Other Facilities**				
	Post-office	Post office	yes		good
	Telecommunication Network/ STD booth	STD booth	yes		good



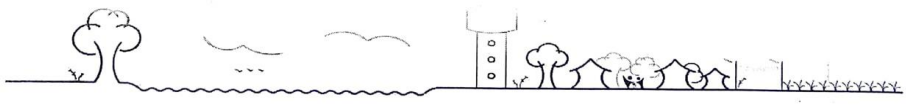
	General Market	Shooping			
	Shops (Public Distribution System)				
	Panchayat Building	Yes.			Bad condition
	Pharmacy/Medical Shop				
	Bank & ATM Facility	Mehsan cob. Syndicate			
	Agriculture Co-operative Society				
	Milk Co-operative Soc.	Dudh Sarita			Good
	Small Scale Industries				
	Internet Cafes/ Common Service Center/Wi Fi				
	Other Facility				
Suggestions if any:					

6. Sustainable /Green Infrastructure Facilities:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
O.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	Solar Panels in houses	yes		Good
P.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System				
Q.	Any Other				

7. Data Collection From Village

Village Base Map Available: Hard Copy/Soft Copy	



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Vishwakarma Yojana: Phase VI
Techno Economic Survey

Recent Projects going on for Development of Village	Village Road
Any NGO working for village development	

8. Additional Information/ Requirement:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities(School Building, Health Center, Panchayat Building, Public Toilets & any other)	Panchayat Building Renovation	Need Renovation
2.	Additional Information/ Requirement		

9. Smart Village Proposal Design

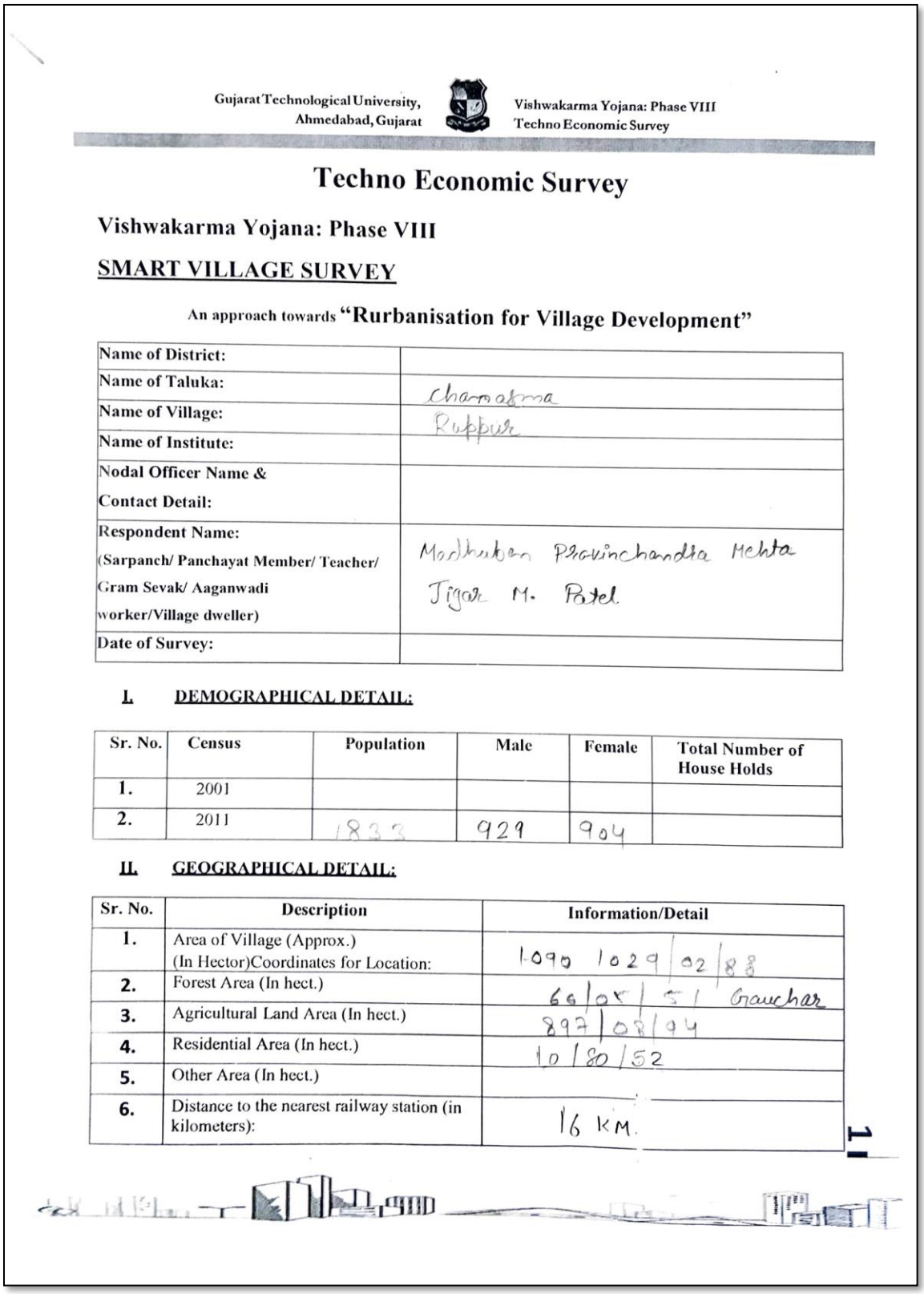
Sr. No.	Descriptions	Information/ Detail	Remarks
1.			

Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Administration queries/ Difficulties:
GTU VY Section:
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

સરપંચ
મકતુપુર ગ્રામ પંચાયત
તા. ઊંઝા

12.2 SURVEY FORM OF SMART VILLAGE SCANNED COPY ATTACHMENT IN THE REPORT FOR PART-I



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Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

An approach towards **"Rurbanisation for Village Development"**

Name of District:	
Name of Taluka:	Chamasma
Name of Village:	Ruppur
Name of Institute:	
Nodal Officer Name & Contact Detail:	
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Madhuben Pravinchandra Mehta Jigar M. Patel
Date of Survey:	

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	1833	929	904	

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1090 1029 02 88
2.	Forest Area (In hect.)	66 08 51 Gauchar
3.	Agricultural Land Area (In hect.)	897 08 94
4.	Residential Area (In hect.)	10 80 52
5.	Other Area (In hect.)	
6.	Distance to the nearest railway station (in kilometers):	16 KM.

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7.	Name of Nearest Town with Distance:	Patan (16 KM)
8.	Distance to the nearest bus station (in kilometers):	16 KM
9.	Whether village is connected to all road for the any facility or town or City?	Yes

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1.	Farming
	2.	Job
	3.	business
Major crops grown in the village:	1.	mustard
	2.	Cotton
	3.	Castard

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER** Piped Into Dwelling Piped To Yard/Plot Public Tap/Standpipe Tube Well Or Bore Well	Everyday	yes		
2.	**DUG WELL** Protected Well Un Protected Well				
3.	**WATER FROM SPRING** Protected Spring Unprotected Spring Rainwater Tanker Truck Cart With Small Tank	Facility available	yes		
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/** Irrigation Channel Bottled Water Hand Pump Other(Specify)**Lake/ Pond**	Pond	yes yes		Good Condition

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Techno Economic Survey

Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity: 50,000	yes		Good condition
	Underground Sump	Capacity: -	-	-	-
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1 2 B. OPEN WITH OUTLET C. OPEN WITHOUT OUTLET	yes (closed)	yes		V. good condition
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	300 m	yes		All weather
	Main road	300 m	yes		All weather
	Internal streets	23	yes		All weather
	Nearest NH/SH/MDR/ODR Dist. in kms.	300 m	yes		All weather
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO (16 Km)	-	-	-
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	NO (4 Km)			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Jeep/Auto/ Chakda	yes.		Connecting near vehicle
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Govt (GUVCL)	yes		24x7 Availability

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	Power supply for Domestic Use	24 hrs	yes		
	Power supply for Agricultural Use	8 hrs	yes		
	Power supply for Commercial Use	24 hr	yes		
	Road/ Street Lights	12 hr	yes		
	Electrification in Government Buildings/ Schools/ Hospitals	24 hrs	yes		
	Renewable Energy Source Facilities (Y/ N)	-No-			
	LED Facilities	yes	yes		
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	1	yes		good condition
	Location Condition	Good			
	Community Toilet (With bath/ without bath facilities)	1 (Without Bath)			
	Solid & liquid waste Disposal system available	NO			
	Any facility for Waste collection from road	yes			
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND	Pond	yes		good condition
	STREAM/RIVER				
	CANAL				
	WELL	well	yes		Proper
	TUBE WELL.				
	OTHER (SPECIFY)				
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Most of houses were Pucca			

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	3	yes		Available
	Sub-Centre				
	PHC	1	yes		good condition
	BLOCK PHC	1	yes		
	CHC/RH	–			
	District/ Govt. Hospital	–			
	Govt. Dispensary	1	yes		Good Cond.
	Private Clinic	–			
	Private Hospital/	–			
	Nursing Home	–			
	AYUSH Health Facility	–			
	sonography /ultrasound facility	–			
	If any of the above Facility is not available in village than approx. distance from village: 16 ...kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	3	yes		
	Primary School	1	yes		
	Secondary school	–			
	Higher sec. School	–			
	ITI college/ vocational Training Center	ITI college	yes		Good cond.
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	Art, commerce college	yes		Good condition
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				

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Suggestions if any:

L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	–	–	–	–
	Public Library (With daily newspaper supply: Y/N)	–	–	–	–
	Public Garden	V. Good.	Adjacent	yes	
	Village Pond	V. good	Adjacent	yes	
	Recreation Center	–			
	Cinema/ Video Hall	–			
	Assembly Polling Station	yes	Primary School	yes	
	Birth & Death Registration	good	Pachayat	yes	

If any of the above Facility is not available in village than approx. distance from village: .....kms.

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office	good	village	yes	
	Telecommunication Network/ STD booth				
	General Market	–			
	Shops (Public Distribution System)	good	village	yes	
	Panchayat Building	good	village	yes	
	Pharmacy/Medical Shop				
	Bank & ATM Facility	good	village	yes	
	Agriculture Co-operative Society				
	Milk Co-operative Soc.	good	village	yes	
	Small Scale Industries	good	village	yes	
	Internet Cafes/ Common Service Center/Wi Fi				
	Youth Club				
	Mahila Mandal				

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	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries	Milk cooperative society. good	village	yes	
	Other Facility				

Suggestions if any:

N.	Other Facilities	Condition		Available (YES)	Available (NO)
	1. Have these programme implemented the village?				
	2. Are there any beneficiaries in the village from the following programme?				
	3. Janani Suraksha Yojana				
	4. Kishori Shakti Yojana				
	5. Balika Samriddhi Yojana				
	6. Mid-day Meal Programme	good		yes	
	7. Intergrated Child Development Scheme (ICDS)	good		yes	
	8. Mahila Mandal Protsahan Yojana (MMPY)	good		yes	
	9. National Food for work Programme (NFFWP)				
	10. National Social Assistance Programme	good		yes	
	11. Sanitation Programme (SP)	good		yes	
	12. Rajiv Gandhi National Drinking Water Mission				
	13. Swarnjayanti Gram Swarozgar Yojana				
	14. Minimum Needs Programme (MNP)				
	15. National Rural Employment Programme				
	16. Employee Guarantee Scheme (EGS)				
	17. Prime Minister Rojgar Yojana (PMRY)				
	18. Jawahar Rozgar Yojana (JRY)	Good		yes.	
	19. Indira Awas Yaojna (IAY)				
	20. Samagra Awas Yojana (SAY)				
	21. Sanjay Gandhi Niradhar Yojana (SGNY)				
	22. Jawahar Gram Samridhi Yojana (JGSY)				
	23. Other (SPECIFY)				

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources				
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	∝ Street lights	yes		V. good. condition
3.	Any Other				

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	illage Base Map Available: Hard Copy/Soft Copy				
2.	Recent Projects going on for Development of Village	Govelnment Road	yes		good
3.	Any NGO working for village development				
4.	Any natural calamity in the village during the last one year: EARTHQUAKES FLOODS CYCLONE DROUGHT LANDSLIDES AVALANCHE OTHER (SPECIFY)				

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks

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1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other	No	
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING ....Daily..... FOGGING..... Drive was undertaken in the village?		

IX. Smart Village / Heritage Details

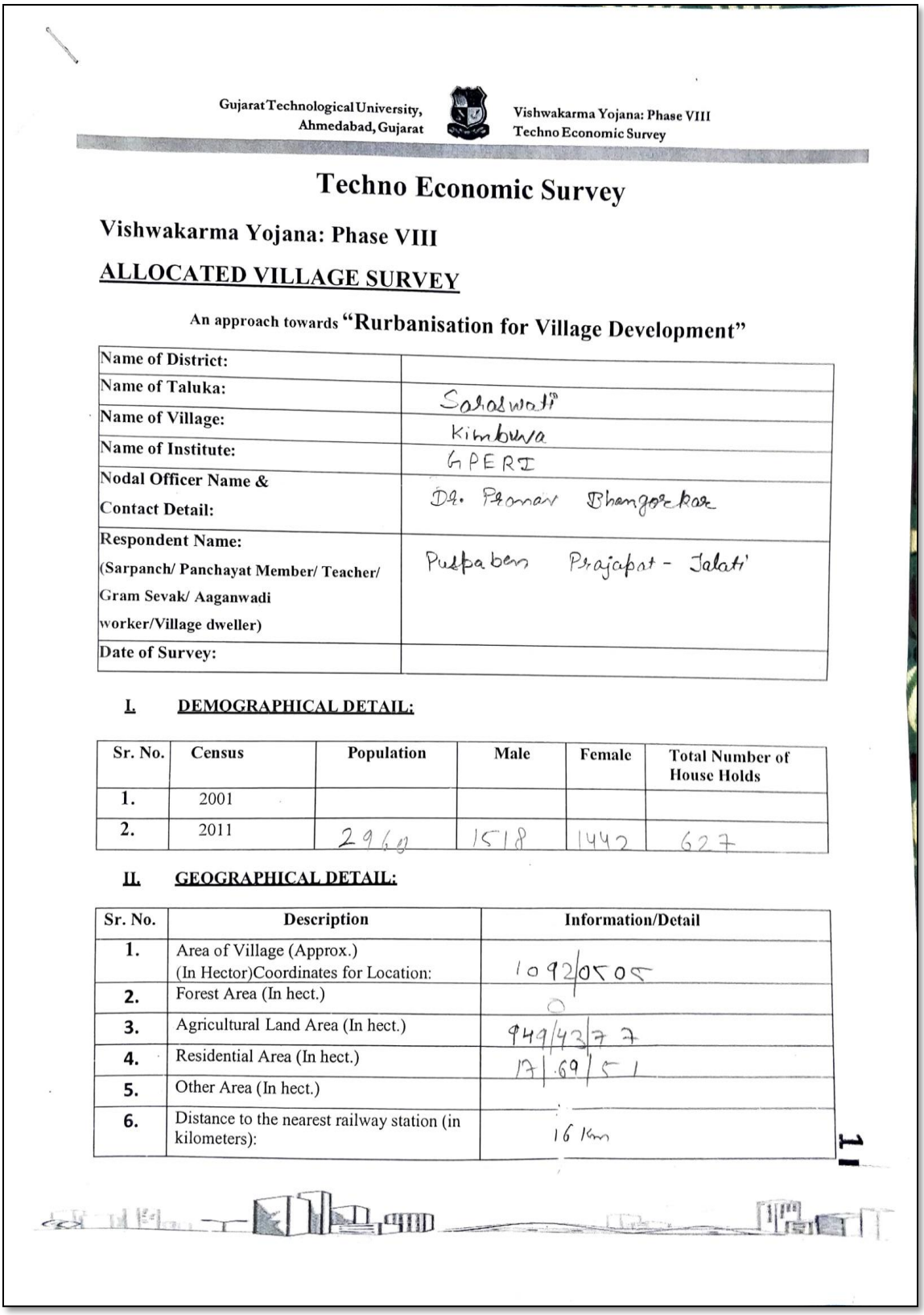
Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?		

Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

મધુબેન. જી. પટેલ,
સરપંચ
રૂપપુર ગ્રામ પંચાયત
તા. ચાણસ્મા, જિ. પાટણ

12.3 SURVEY FORM OF ALLOCATED VILLAGE SCANNED COPY ATTACHMENT IN THE REPORT FOR PART-I



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Vishwakarma Yojana: Phase VIII
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Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards **"Rurbanisation for Village Development"**

Name of District:	
Name of Taluka:	Sahaswati
Name of Village:	Kimbuva
Name of Institute:	GPERI
Nodal Officer Name & Contact Detail:	Dr. Pranav Bhangaokar
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Pushpaben Prajapat - Talati
Date of Survey:	

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	2960	1518	1442	627

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	1092.505
2.	Forest Area (In hect.)	0
3.	Agricultural Land Area (In hect.)	949.437 7
4.	Residential Area (In hect.)	17.69.51
5.	Other Area (In hect.)	
6.	Distance to the nearest railway station (in kilometers):	16 Km

7.	Name of Nearest Town with Distance:	Patan (16 km)
8.	Distance to the nearest bus station (in kilometers):	16 (km)
9.	Whether village is connected to all road for the any facility or town or City?	yes.

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1. Farm worker - 498
	2. Farmer - 330
	3. House hold industries - 6
	Total — 1354

Major crops grown in the village:	1. Mustard
	2. Castrod
	3. Wheat

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER** Piped Into Dwelling Piped To Yard/Plot Public Tap/Standpipe Tube Well Or Bore Well	Everyday	yes		Moderate
2.	**DUG WELL** Protected Well Un Protected Well				
3.	**WATER FROM SPRING** Protected Spring Unprotected Spring Rainwater Tanker Truck Cart With Small Tank	Facility available	yes		
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/** Irrigation Channel Bottled Water Hand Pump	Sujalam Sufalam Canal Hand Pump	yes		Good

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Techno Economic Survey

	Other(Specify)**Lake/ Pond**	Pond	NO		Bad condition
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity: 1 Lakh	yes		Good
	Underground Sump	Capacity: 1 2Lakh	yes		Good
Suggestions if any:					
C.	**The Type of Drainage Facility**				
✓	A. UNDERGROUND DRAINAGE 1	Underground	yes		Moderate
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	Single Lane	yes		Good condition
	Main road	Single Lane	yes		Good condition
	Internal streets	RCC	yes		Moderate
	Nearest NH/SH/MDR/ODR Dist. in kms.	SH	yes		2 Km from village
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO (16 Km)			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	NO (16 Km)			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto / Jeep Chakda	yes		good.
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	24 hrs availability	yes		Good

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	Power supply for Domestic Use	24 hr	yes		Good
	Power supply for Agricultural Use	8 hr	yes		Good
	Power supply for Commercial Use	24 hr	yes		Good
	Road/ Street Lights	10 hr	yes		Good
	Electrification in Government Buildings/ Schools/ Hospitals	yes			
	Renewable Energy Source Facilities (Y/ N)	—			
	LED Facilities	yes	yes		Moderate
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	-Na-			
	Location Condition				
	Community Toilet (With bath/ without bath facilities)	1	No		Good
	Solid & liquid waste Disposal system available	No			
	Any facility for Waste collection from road	Yes	No		
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND	Pond	No		Bad Condition
	STREAM/RIVER				
	CANAL	Canal (Sujlam Suflam)	yes		Good Condition
	WELL				
	TUBE WELL.	Tube well			Good
	OTHER (SPECIFY)				
Suggestions if any:					
I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	Pucca 70%. Kuccha 30%.	yes		

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V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	4	yes		Good Condition
	Sub-Centre	1	yes		Good Condition
	PHC				
	BLOCK PHC				
	CHC/RH				
	District/ Govt. Hospital				
	Govt. Dispensary				
	Private Clinic	2	No		Good Condition
	Private Hospital/				
	Nursing Home				
	AYUSH Health Facility				
	sonography /ultrasound facility				
	If any of the above Facility is not available in village than approx. distance from village: ..16.....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	4	yes		good
	Primary School	1	yes		good
	Secondary school	1	yes		good
	Higher sec. School	1	yes		good
	ITI college/ vocational Training Center				
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities				

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	If any of the above Facility is not available in village than approx. distance from village: .....kms.
Suggestions if any:	

L.	**Socio- Culture Facilities**	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)				
	Public Library (With daily newspaper supply: Y/N)				
	Public Garden				
	Village Pond				
	Recreation Center				
	Cinema/ Video Hall				
	Assembly Polling Station	2 booths	Village	yes	
	Birth & Death Registration Office	Panchayat	Panchayat	yes	

If any of the above Facility is not available in village than approx. distance from village: .....kms.

Suggestions if any:

M.	**Other Facilities**	Condition	Location	Available (YES)	Available (NO)
	Post-office	Poor	village	yes	
	Telecommunication Network/ STD booth				
	General Market				
	Shops (Public Distribution System)	Moderate	village	yes	
	Panchayat Building	Good	village	yes	
	Pharmacy/Medical Shop				
	Bank & ATM Facility	Bank	village	yes	
	Agriculture Co-operative Society				
	Milk Co-operative Soc.	Dudh Sagar			
	Small Scale Industries	yes			
	Internet Cafes/ Common Service Center/Wi Fi				
	Youth Club				
	Mahila Mandal	Available			

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries	Milk Coope-rative Society.	Village		Good. Condition
	Other Facility				

Suggestions if any:

N.	Other Facilities	Condition		Available (YES)	Available (NO)
	1. Have these programme implemented the village?				
	2. Are there any beneficiaries in the village from the following programme?				
	3. Janani Suraksha Yojana	Good		yes	
	4. Kishori Shakti Yojana				
	5. Balika Samriddhi Yojana				
	6. Mid-day Meal Programme	Moderate		yes	
	7. Intergrated Child Development Scheme (ICDS)				
	8. Mahila Mandal Protsahan Yojana (MMPY)	Good		yes	
	9. National Food for work Programme (NFFWP)				
	10. National Social Assistance Programme				
	11. Sanitation Programme (SP)				
	12. Rajiv Gandhi National Drinking Water Mission				
	13. Swarnjayanti Gram Swarozgar Yojana	Good		yes	
	14. Minimum Needs Programme (MNP)				
	15. National Rural Employment Programme				
	16. Employee Guarantee Scheme (EGS)				
	17. Prime Minister Rojgar Yojana (PMRY)	Good		yes	
	18. Jawahar Rozgar Yojana (JRY)				
	19. Indira Awas Yaojna (IAY)				
	20. Samagra Awas Yojana (SAY)				
	21. Sanjay Gandhi Niradhar Yojana (SGNY)				
	22. Jawahar Gram Samridhi Yojana (JGSY)				
	23. Other (SPECIFY)				

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VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources				
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System				
3.	Any Other				

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	illage Base Map Available: Hard Copy/Soft Copy				
2.	Recent Projects going on for Development of Village	NO			
3.	Any NGO working for village development	NO			
4.	Any natural calamity in the village during the last one year: EARTHQUAKES FLOODS CYCLONE DROUGHT LANDSLIDES AVALANCHE OTHER (SPECIFY)				

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other		
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?		

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?		

Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

એસ.બી.પટેલ
સરપંચ
કિમ્બુવા ગ્રામ પંચાયત
તા. સરસ્વતી, જિ. પાટણ

12.4 GAP ANALYSIS OF THE ALLOCATED VILLAGE

Table 12.1 Gap Analysis of Kimbuva Village

Village Gap Analysis					
Village Facilities	**Planning Commission/UDPFI**	**Village Name: Kimbuva**			
		Population: 2960			
	Norms	Existing	Require as per Norms	Future Project Design	**GAP**
Social Infrastructure Facilities					
Education					
Anganwadi	Each of per 2500 population	4	2	-	**2**
Primary School	Each Per 2500 population	1	1	-	**0**
Secondary School	Per 7,500 population	1	0	-	**1**
Higher Secondary School	Per 15,000 Population	1	0	-	**1**
College	Per 125,000 Population	0	0	-	-
Tech. Training Institute	Per 100000 Population	0	0	-	-
Agriculture Research Centre	Per 100000 Population	0	0	-	-
Skill Development Center	Per 100000 Population	**0**	**0**	-	-
Health Facility					
Govt/Panchayat Dispensary or Sub PHC or Health Centre	Each Village	1	1		**0**
Primary Health & Child Health Center	Per 20,000 population	-	1	-	-
Child Welfare and Maternity Home	Per 10,000 population	-	**0**	-	-

Multispecialty Hospital	Per 100000 Population	-	-	-	-
Public Latrines	1 for 50 families (if toilet is not there in home,	0	2		**-2**
Physical Infrastructure Facilities					
Pucca Village Approach Road	Each village	adequate	-	-	-
Bus/Auto Stand provision	ST/Auto Rickshaw	adequate	2	1	**1**
Drinking Water (Mini. 70 LPCD		adequate	-	-	-
Over Head Tank	1 /3 of Total Demand	adequate		-	-
U/G Sump		**adequate**	-	-	-
Drainage Network - covered		adequate	-	-	-
Drainage		adequate	-	-	-
Waste Management System		**Inadequate**	**-**	**-**	**-**
Drainage Network - covered		adequate	-	-	-
Drainage		adequate	-	-	-
Socio- Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	**0**	**1**	**-**	**-1**
Community hall and Public Library	Per 15000 Population	**0**	**1**	**-**	**-1**
Cremation Ground	Per 20,000 population	**0**	**1**	**-**	**-1**
Post Office	Per 10,000 population	**1**	**1**	**-**	**0**
Gram Panchayat Building	Each individual/group	**1**	**1**	**-**	**0**
APMC	Per 100000 Population	**0**	**0**	**-**	**0**
Fire Station	Per 100000 Population	**0**	**0**	**-**	**0**
Public Garden	Per village	**0**	**1**	**-**	**-1**
Police post	Per 40,000Population	**0**	**1**	**-**	**-1**
Shopping Mall	Shops are available	**no**	**-**	**-**	**-**
Electrical design					
Electricity Network	UGVCL	Adequate	66 KV Substation		

12.5 SUMMARY DETAILS OF ALL THE VILLAGE DESIGN IN TABLE FORM

Table 12.2 Summary detail of village

Sr. No.	Village Name	Branch	Part-I Designs	Part-II Designs
1	Kimbuva	Civil Engineering	• Public Toilet • Skill Development Center • Public Garden • Water Tank for Animals • Post Office • Public Library	• Bank • Primary Healthcare Center • Septic tank • Community hall • Bio gas plant • Rain water Harvesting
2	Jaska	Civil Engineering	• Public Library • Public Toilet • Skill Development Center • Public Garden • Public Healthcare Center • Anganvadi	• Compost pit • Bank • Chabootra • ATM • Bus stop • Post office
3	Taleti	Civil Engineering	• Public Toilet • Bus Stand • Public Health • Center • Community Hall • Rain water Harvesting System • Public Garden	• Higher secondary school • Skill development center • Dudh mandali • Bio gas plant • Public library • Women's club

12.7 SUMMARY OF GOOD PHOTOGRAPHS IN TABLE FORMAT (VILLAGE VISITS, IDEAL, SMART VILLAGE OR ANY OTHER)

1. Allocated Village (Kimbuva)

Health Center

Gram Panchayat

Dudh Mandli (Dairy)

Pavement

Pond

Bus Stand

ESR

Bank

Higher Secondary school

Water Distribution system

Artificial Insemination Centre

Drinking Water Taps

Figure 47 Photograph of Allocated village Kimbuva

2. Ideal Village (Maktupur)

Community Center

Garden Entrance Gate

Roads in Garden

ESR

Science College

Village Entrance Gate

Pigeon Tower

Gram Panchayat

Primary School

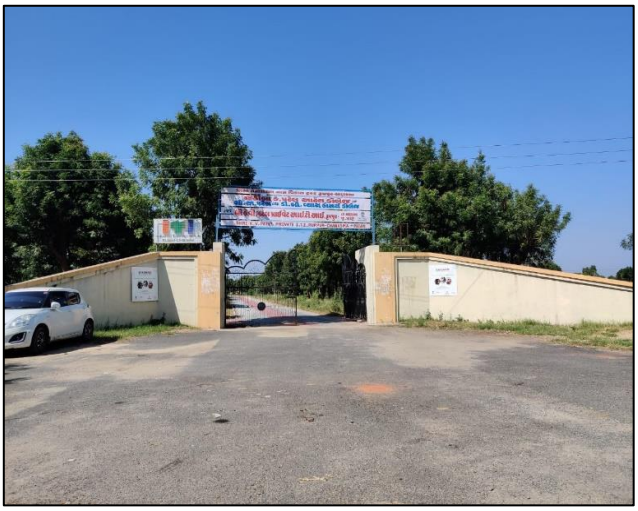
Paver Blocks

Garden

Garden

Figure 48 Photograph of Ideal village Maktupur

3. Smart Village (Ruppur)



Arts, Commerce and ITI College

Harshidh Lake

Village Panchayat

Health and Wellness Center

Paver Block in whole Village

Community Hall

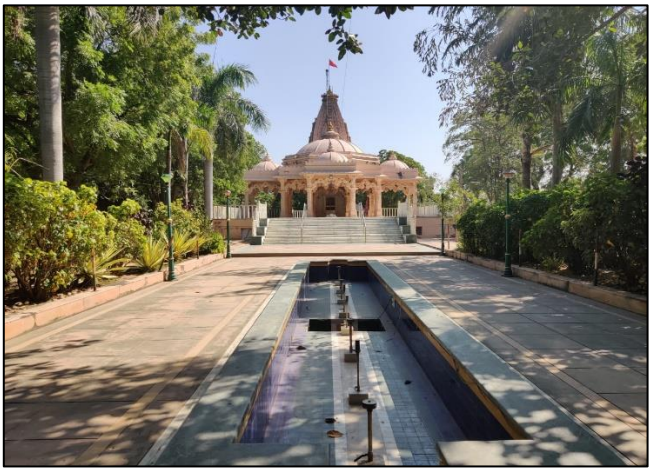
Dudh Sarita

Park

Proper Drainage Facility

Bank

Garden near Lake



Harshidh Mata Temple

Post Office

Primary School

Elevated Service Reservoir

Dust Bin

Public Urinals

Drinking Water Facilities

Figure 49 Photograph of Smart village Ruppur

12.8 VILLAGE INTERACTION WITH SARPANCH WITH THE PHOTOGRAPH

Figure 50 Photo with Sarpanch

12.9 SARPANCH LETTER GIVING INFORMATION ABOUT THE VILLAGE DEVELOPMENT

Vishwakarma Yojana Phase VIII

Village: Kimbuva

District: Patan

Subject: Approval of proposed design for your village

Name: Patel Dharmik (171040106010)

Patel Pray (171040106027)

College: Gujarat Power Engineering and Research Institute

Respected authority,

Under the Vishwakarma Yojana, we have surveyed some of the villages, under it we saw that there is not enough facility in your village and basic facilities are not available to the people of the village, then we sent the facility to the development of your village and the people of the village. We have prepared 6 designs for that, because you will get help in the development of your village. Then we want you to support us in our work and approve our design

- Public Toilet
- Library
- Skill Development Center
- Avalo
- Public Garden
- Post Office

Signature

શ્રી ડી. પટેલ
સરપંચ
કિમ્બુવા ગ્રામ પંચાયત
તા. સરસ્વતી, જિ. પાટણ

Figure 51 Letter for approval of design

12.10 COMPREHENSIVE REPORT PREPARATION AS PER FORMAT

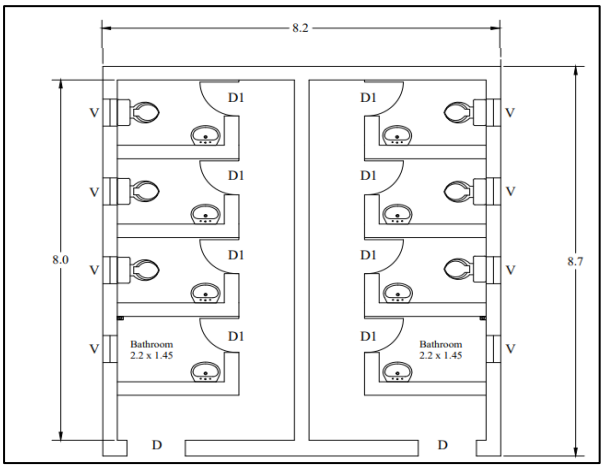
Kimbuva village is been selected as an allocated village for this project. Kimbuva village is located in Saraswati Taluka of Patan district. It is around 17 km away from Patan City. The population of this village is 2960 and 124 km from State capital Gandhinagar. The population of village is 2960 with the area of approximately 11 km^2. Villagers are engaged with Agricultural, House hold industries, government jobs, etc. Many facilities are available in this village like Primary and Secondary School, Sub Center, Drinking water facilities like ESR and Sump, access to irrigation water, Internal Streets, etc.

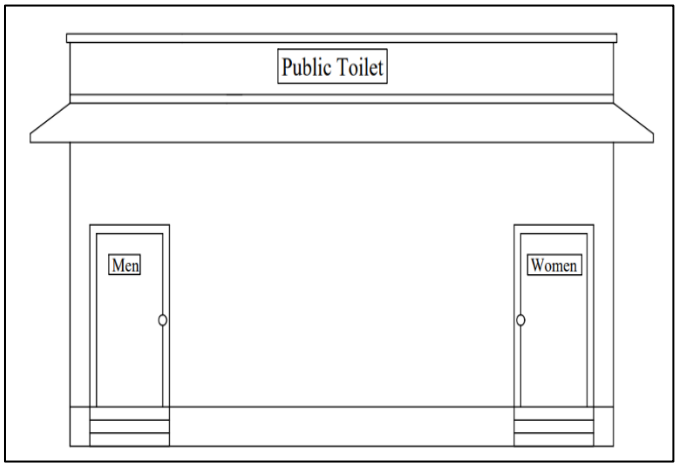
With view to enhance the existing infrastructural facilities and develop the new technologies for Kimbuva village allocated under Vishwakarma Yojana, several visits were made to the targeted sites. To develop the perceptions and rationales, smart village and ideal village where been visited too and reviewed for existing facilities and infrastructure of these villages. For collecting the geographical features and socio-economic conditions of people, demographic patterns, etc., village people where been interviewed and relevant data were collected and analyzed. Based on Gap analysis carried out as per URDPFI guidelines, public toilets and skill development Centre design, measurement sheets and estimates were proposed. Basic facilities where been considered as first priority. All the design kept economical and sustainable to an extent. The allocated village Kimbuva was surveyed and studied thoroughly and various techno-economic surveys were done. Techno- Economic survey gave an idea about the existing scenario of village. After visiting the Ideal and Smart village, several field visits were been carried out for Allocated village, analyzing Survey Details, a clear gap was found to be fulfilled in terms of Infrastructural Facilities. In this concern, several facilities were being planned, designed and estimated for Allocated Village Kimbuva. The efforts are made to propose these facilities for village Kimbuva for betterment of socio-economic perspective of village. With fulfillment of these facilities, gap between Allocated and Smart/Ideal village can be filled.
Total 6 Designs were proposed after analyzing and doing the gap analysis. Designs were such proposed that it fulfills the gap and village gets the required infrastructural facility. The Designs which were proposed area as follows:

1. **Public Toilet**
2. **Skill Development Centre**
3. **Water Tank for Animals**
4. **Public Garden**
5. **Post Office**
6. **Public Library**

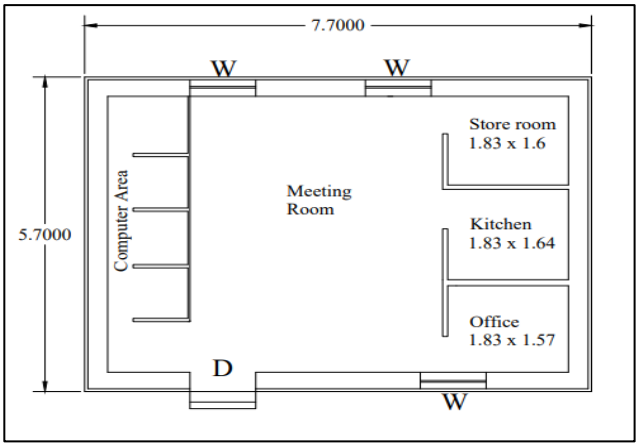
- After the addition of these facilities, villagers will be benefited in many ways. Public toilet will help in maintaining proper sanitation in village.
- Skill development Center and Public Library will boost the education and Skill, which are essential part of nation building.
- Post Office in the village was in very poor condition, and so it was proposed. New post office will enhance the postal as well as financial services of the village. Nearly every facilities will be made available to the villager and will not have to travel to city for getting the service.
- Animals and Livestock are earning tools for the villagers as most of them are engaged with animal husbandry. Water Tank for Animals will helpful to those animals.
- In the village there was no such place for amusement. People use to find peace and relaxation after work. Constructing a Garden will help to solve this problem.

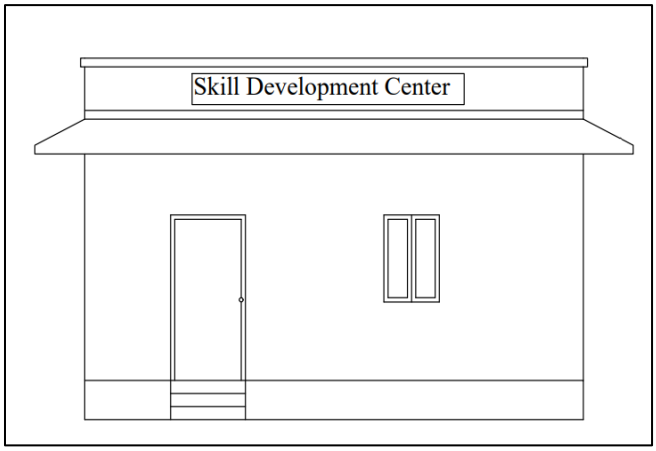
1. Public Toilet



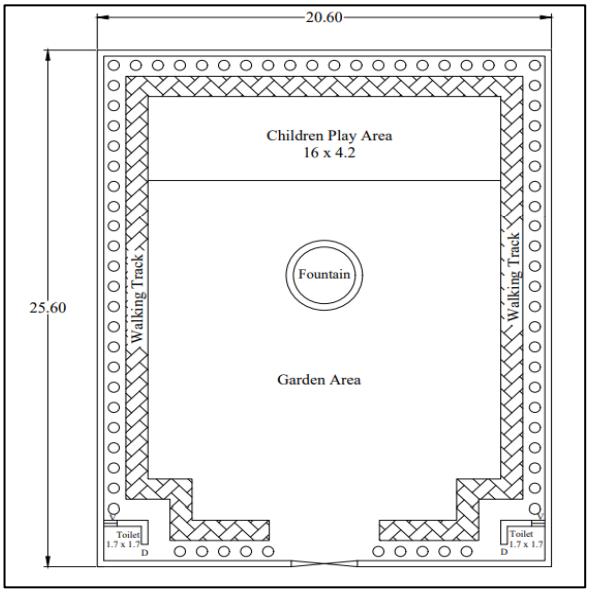


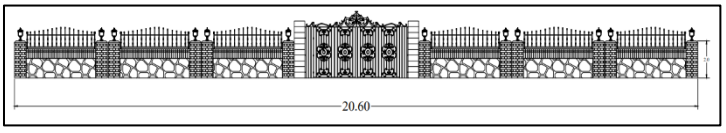
2. Skill Development Center



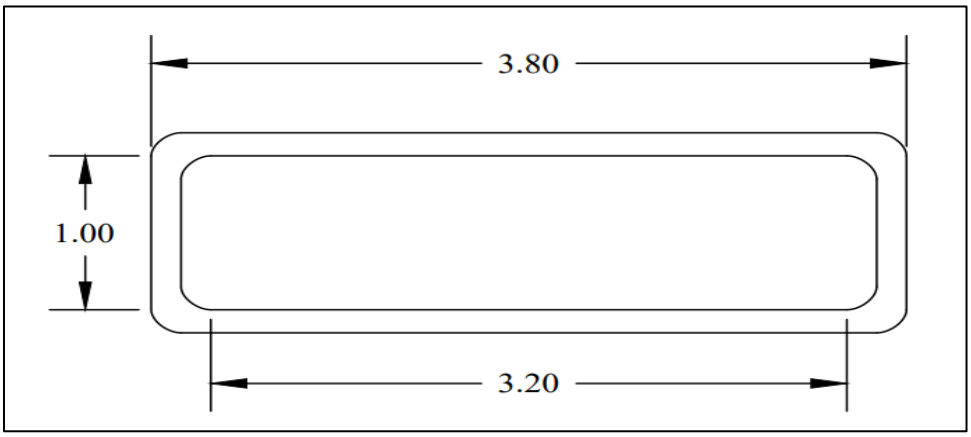


3. Public Garden

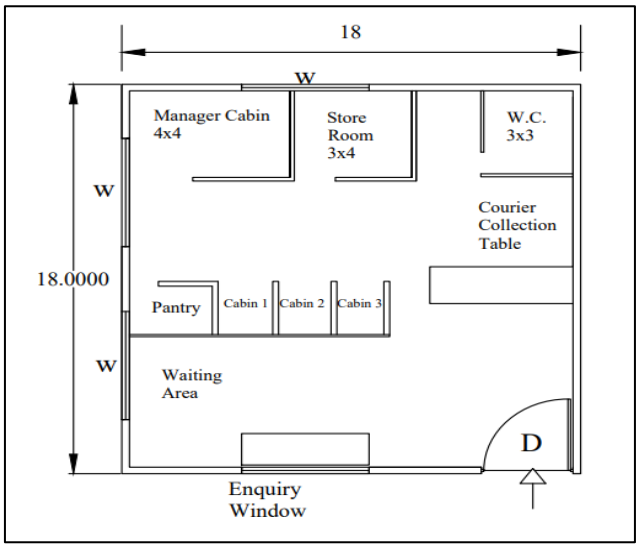


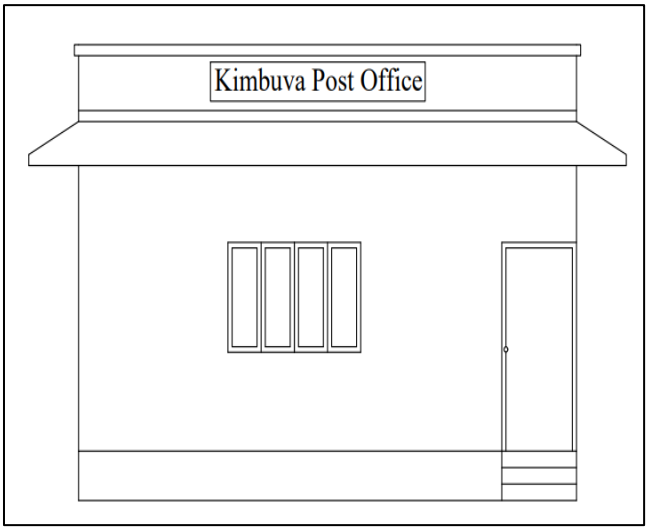


4. Water Tank for Animals

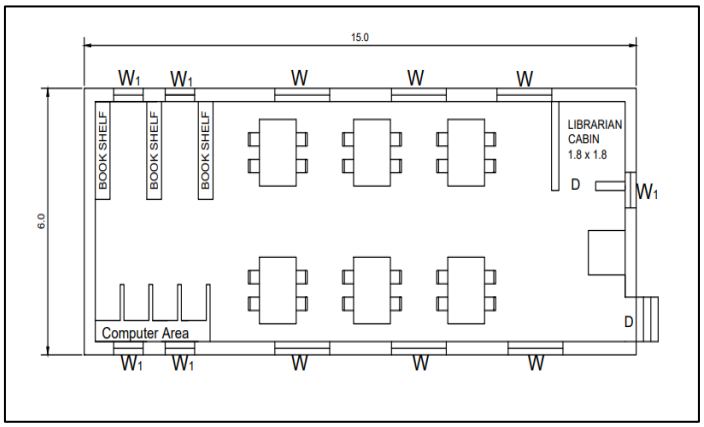


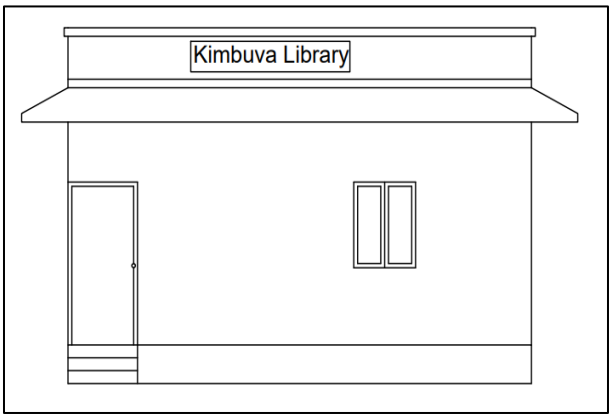
5. Post Office





6. Public Library





CHAPTER 13.

FROM THE CHAPTER- 9 FUTURE DESIGNS OF THE ASPECTS (FEASIBILITY, CONSTRUCTION, OPERATION AND MAINTENANCE OF VARIOUS DESIGN OPTIONS IN RURAL AREAS ALONG WITH COST WITH AUTOCAD DESIGNS / PLANNING WITH ANY SOFTWARE)

13.1 DESIGN PROPOSALS

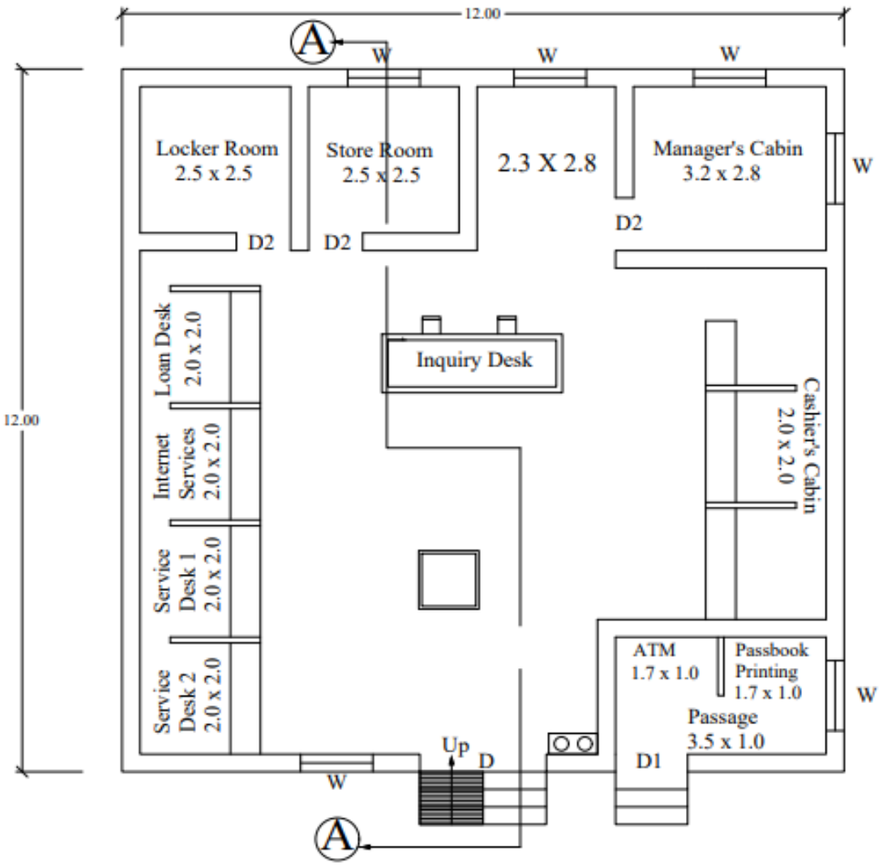
13.1.1 Civil Design 1: Bank

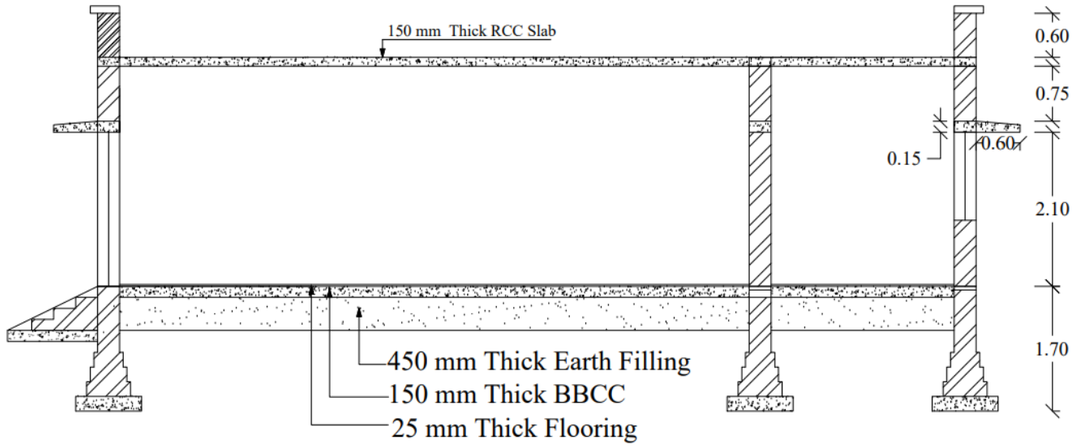
PROP. CONSTRUCTION WORK OF BANK							
AT KIMBUVA, TA:-SARASWATI DIST:- PATAN							
MEASUREMENT SHEET							
BANK							
CENTER LINE = 73.3m							
ITEM	**DESCRIPTION**	**NO**	**L**	**B/W**	**H/D**	**QUANTITY**	**UNITS**
ITEM NO-1	Excavation for Foundation						
		1	68.8	0.9	1.1	68.112	Cum
ITEM NO- 2	PCC work in foundation						
		1	68.8	0.9	0.2	12.384	Cum
ITEM NO- 3	Brick masonry work in Foundation						
	1st step	1	70.3	0.6	0.2	8.436	Cum
	2nd step	1	70.8	0.5	0.2	7.08	Cum
	3rd step	1	71.3	0.4	0.2	5.704	Cum
	4th step	1	71.8	0.3	0.9	19.386	Cum
	Total Brick masonry					40.606	Cum
ITEM NO- 4	Brick Work in Super Structure						
		1	71.8	0.3	3	64.62	Cum
	Deduction						
	Door D	1	2.1	0.3	2.1	1.323	Cum
	Door 1	1	1.2	0.3	2.1	0.756	Cum
	Door 2	3	0.9	0.3	2.1	1.701	Cum
	WindowW	6	1.2	0.3	1.2	2.592	Cum
	Total					6.372	Cum
	Total Brick masonry					58.248	Cum

	Brick masonry work in step at door D						
	Step: 1	1	1.1	0.2	0.9	0.198	Cum
	Step: 2	1	1.1	0.2	0.6	0.132	Cum
	Step: 3	1	1.1	0.2	0.3	0.066	Cum
	Total					0.396	Cum
	Brick masonry work in step at door D1						
	Step: 1	1	1.2	0.2	0.9	0.216	Cum
	Step: 2	1	1.2	0.2	0.6	0.144	Cum
	Step: 3	1	1.2	0.2	0.3	0.072	Cum
	Total					0.432	Cum
	Total Brick Masonry					59.076	
ITEM NO- 6	D.P.C						
		1	71.8	0.3		21.54	Sqm
ITEM NO- 7	Earth Filling						
	Main Area	1	11.4	8.6	0.45	44.118	Cum
	In Rooms	1	10.5	2.8	0.45	13.23	Cum
					TOTAL	57.348	Cum
ITEM NO- 8	Plastering						
	Inside	8	2.5		3	60	Sqm
		2	2.8		3	16.8	Sqm
		2	8.6		3	51.6	Sqm
		2	3.2		3	19.2	Sqm
		2	2.8		3	16.8	Sqm
		2	11.4		3	68.4	Sqm
		2	3.5		3	21	Sqm
		2	2		3	12	Sqm
	Outside	4	12		4.6	220.8	Sqm
	Ceiling	1	12	12		144	Sqm
	Parapet Inside	4	11.4		0.7	31.92	Sqm
	Total					662.52	Sqm
	Deduct						
	D 1x2	2	2.1		2.1	8.82	Sqm
	D2 3x2	6	0.9		2.1	11.34	Sqm
	D1 1x2	2	1.2		2.1	5.04	Sqm
	Window W 6x2	12	1.2		1.2	17.28	Sqm
	Total					42.48	Sqm
	Net Total					620.04	Sqm

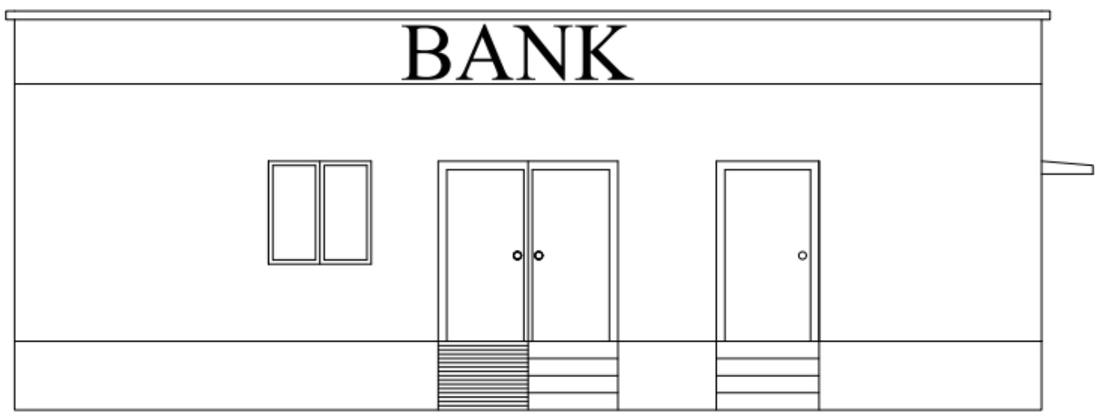
ITEM NO- 9	WHITE WASH same as plastering					620.04	Sqm
ITEM NO- 10	RCC & BBCC						
	RCC FOR SLAB	1	12	12	0.2	21.6	Cum
	RCC FOR Lintel	1	71.83	0.3	0.2	4.3098	Cum
	Total					25.9098	Cum
	BBCC below flooring	1	12	12	0.2	21.6	Cum
	BBCC below Steps	2	1.2	1.2	0.2	0.216	Cum
	Total					21.816	Cum

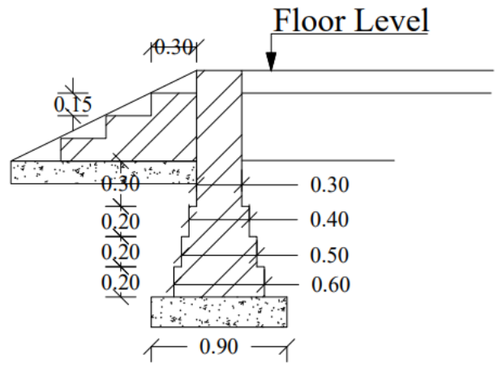
PROP. CONSTRUCTION WORK OF BANK					
AT KIMBUVA, TA:-SARASWATI DIST:- PATAN					
ABSTRACT SHEET					
BANK					
Sr. No.	**Item Description**	**Quantity**	**Rate**	**Per**	**Amount**
1	Excavation work	68.112	155	Cum	10557.36
2	P C.C	12.384	3000	Cum	37152
3	Brickwork in foundation	40.606	3200	Cum	129939.2
4	Brickwork in superstructure	59.076	3500	Cum	206766
6	D.P.C at plinth level	21.54	4900	Cum	105546
7	Earth filling	57.348	50	Cum	2867.4
8	Plastering	620.04	150	Sqm	93006
9	Whitewash	620.04	25	Sqm	15501
10	Rcc work for slab and Lintel	25.9098	8800	Cum	228006.24
11	BBCC	21.816	2000	Cum	43632
	Total Rupees				872973.2
	Contigency 5%				43648.66
	10% contractor charges				87297.32
	2% water charges				17459.464
	Total Amount Rupees				1021378.644
	Say Rupees				**1021379**





Section A-A





Door D	2.1 x 2.1
Door D1	1.2 x 2.1
Door D2	0.9 x 2.1
Window W	1.2 X 1.2
Wall Thickness 0.3m	
All Dimension are in meters	
Vishwakarma Yojana Phase VIII	
Gujarat Power Engineering & Research Institute	
Village	Kimbuva, Patan
Students	Dharmik Patel, Pray Patel
Design	Bank

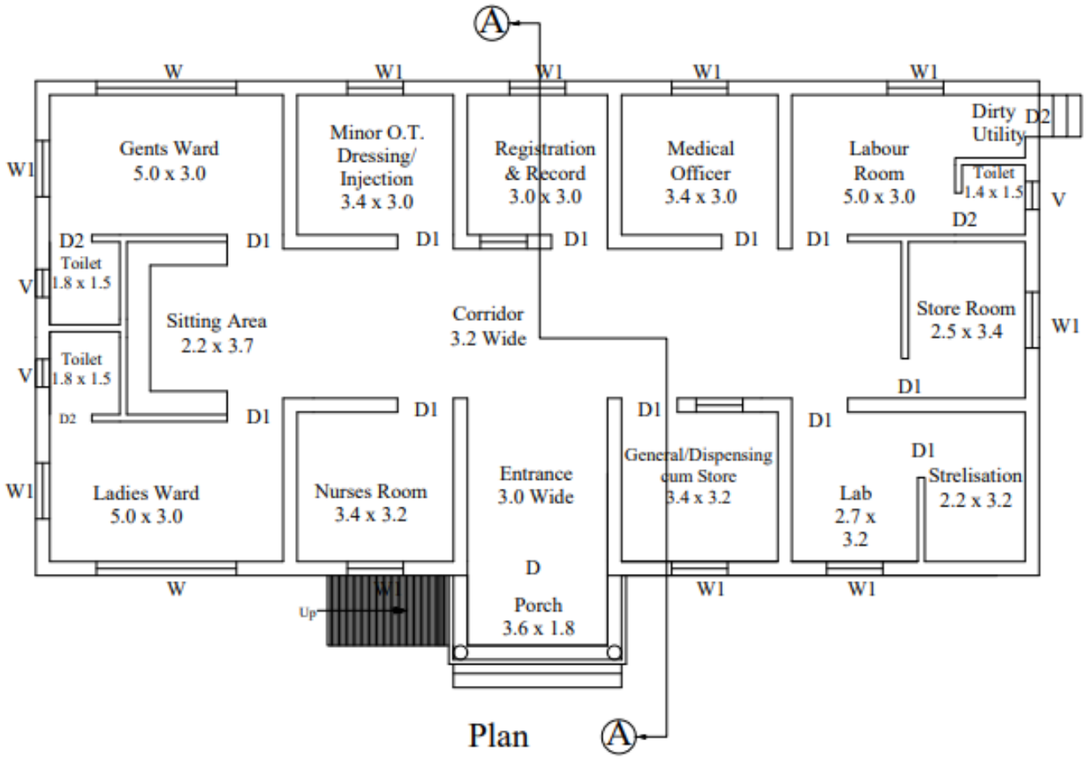
13.1.2 Civil Design 2: Primary Health Care Center (PHC)

PROP. CONSTRUCTION WORK OF PHC							
AT KIMBUVA, TA:-SARASWATI DIST:- PATAN							
MEASUREMENT SHEET							
PHC							
CENTER LINE = 107m							
ITEM	**DESCRIPTION**	**NO**	**L**	**B/W**	**H/D**	**QUANTITY**	**UNITS**
ITEM NO-1	Excavation for Foundation						
		1	101.6	0.9	1.1	100.584	Cum
ITEM NO- 2	PCC work in foundation						
		1	101.6	0.9	0.2	18.288	Cum
ITEM NO- 3	Brick masonry work in Foundation						
	1st step	1	103.4	0.6	0.2	12.408	Cum
	2nd step	1	104	0.5	0.2	10.4	Cum
	3rd step	1	104.6	0.4	0.2	8.368	Cum
	4th step	1	105.2	0.3	0.9	28.404	Cum
	Total Brick masonry					59.58	Cum
ITEM NO- 4	Brick Work in Super Structure						
		1	105.2	0.3	3.5	110.46	Cum
	Deduction						
	Door D	1	3	0.3	2.1	1.89	Cum
	Door 1	11	1.2	0.3	2.1	8.316	Cum
	Door 2	4	0.9	0.3	2.1	2.268	Cum
	Window W	2	3	0.3	1.2	2.16	Cum
	Window W1	10	1.2	0.3	1.2	4.32	
	Ventilator V	3	0.6	0.3	0.6	0.324	
	Total					19.278	Cum
	Total Brick masonry					91.182	Cum
	Brick masonry work in step at door D						
	Step: 1	1	3.6	0.2	2.4	1.728	Cum
	Step: 2	1	3.6	0.2	2.1	1.512	Cum
	Step: 3	1	3.6	0.2	1.8	1.296	Cum
	Step: 4	1	3.6	0.3	1.5	1.62	Cum
	Total					6.156	Cum
	Brick masonry work in step at door D1						

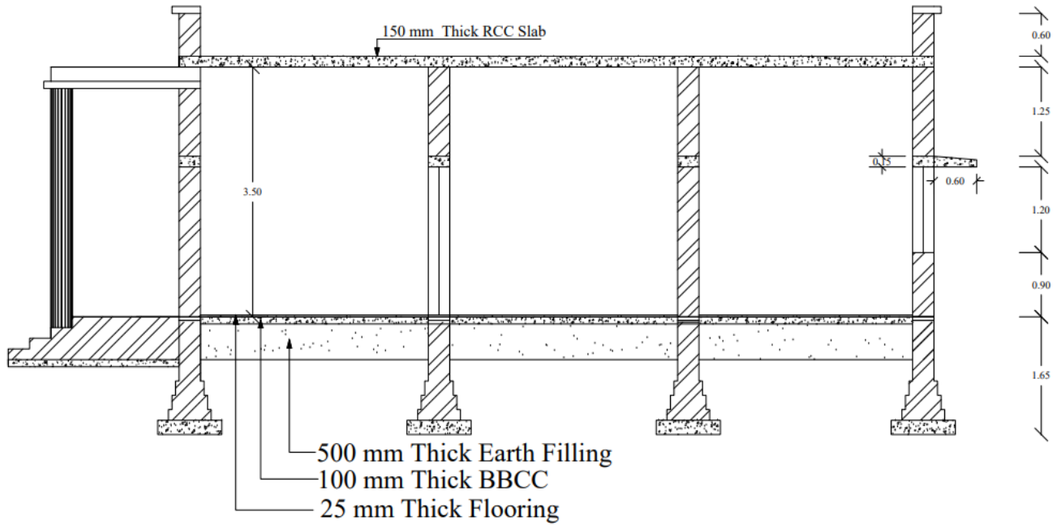
	Step: 1	1	0.9	0.2	0.9	0.162	Cum
	Step: 2	1	0.9	0.2	0.6	0.108	Cum
	Step: 3	1	0.9	0.2	0.3	0.054	Cum
	Total					0.324	Cum
	Brick masonry in Parapet	1	63.6	0.3	0.6	11.448	Cum
	Partition Wall	1	3.7	0.15	3.5	1.9425	Cum
		3	1.5	0.15	4.5	3.0375	Cum
		2	3.8	0.15	5.5	6.27	Cum
		1	3.35	0.15	6.5	3.26625	Cum
		1	3.2	0.15	7.5	3.6	Cum
	Deduct						
	D1	2	1.2	0.15	2.1	0.756	Cum
	D2	3	0.9	0.15	2.1	0.8505	Cum
	total					1.6065	Cum
	Total Brick Masonry						
						125.61975	Cum
ITEM NO- 6	D.P.C						
		1	105.2	0.3		31.56	Sqm
ITEM NO- 7	Earth Filling						
		1	21.5	10.6	0.5	113.95	Cum
ITEM NO- 8	Plastering						
	Inside	8	5		3.5	140	Sqm
		14	3		3.5	147	Sqm
		11	3.4		3.5	130.9	Sqm
		8	3.2		3.5	89.6	Sqm
		2	2.5		3.5	17.5	Sqm
		2	16.6		3.5	116.2	Sqm
		4	1.8		3.5	25.2	Sqm
		6	1.5		3.5	31.5	Sqm
		2	1.4		3.5	9.8	Sqm
		2	3.8		3.5	26.6	Sqm
		2	3.7		3.5	25.9	Sqm
	Outside	2	21.5		4.9	210.7	Sqm
		2	10.6		5.9	125.08	Sqm
	Ceiling	1	21.2	10		212	Sqm
	Parapet Inside	2	21.2		0.7	29.68	Sqm
		2	10		1.7	34	Sqm
	Pillars	2		0.942478	3.35	6.31	Sqm
	Total					1377.97	Sqm
	Deduct						
	D 1x2	2	3		2.1	12.6	Sqm
	D1 11x2	22	1.2		2.1	55.44	Sqm
	D2 4x2	8	0.9		2.1	15.12	Sqm

	Window W 2x2	4	3		1.2	14.4	Sqm
	Window W1 10x2	20	1.2		2.2	52.8	Sqm
	Ventilator V 3x2	6	0.6		0.6	2.16	Sqm
	Total					152.52	Sqm
	Net Total					1225.45	Sqm
ITEM NO- 9	White Wash same as plastering					1225.45	Sqm
ITEM NO- 10	RCC & BBCC						
	RCC for Slab	1	21.5	10.6	0.15	34.185	Cum
	RCC for Lintel	1	105.2	0.3	0.15	4.734	Cum
	RCC for Pillar	2	0.07		3.35	0.469	Cu.m.
	Total					39.388	Cum
	BBCC below flooring	1	21.2	10	0.1	21.2	Cum
	BBCC below Steps	1	3.6	2.4	0.1	0.864	Cum
	Total					22.064	Cum

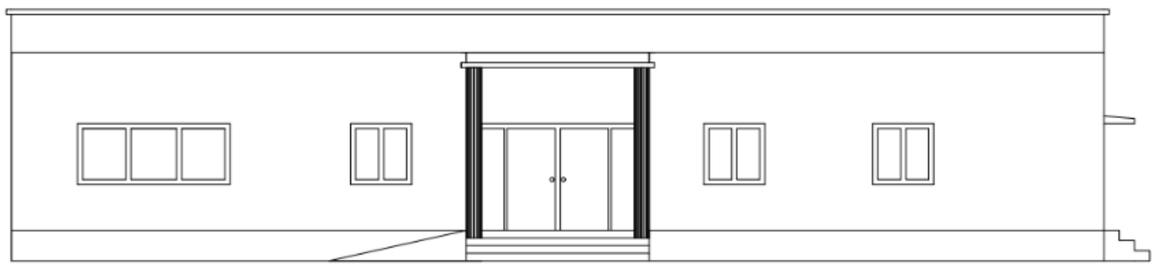
PROP. CONSTRUCTION WORK OF PHC					
AT KIMBUVA, TA:-SARASWATI DIST:- PATAN					
ABSTRACT SHEET					
PHC					
Sr. No.	**Item Description**	**Quantity**	**Rate**	**Per**	**Amount**
1	Excavation work	100.584	155	Cum	15590.52
2	P C.C	18.288	3000	Cum	54864
3	Brickwork in foundation	59.58	3200	Cum	190656
4	Brickwork in superstructure	125.61975	3500	Cum	439669.125
6	D.P.C at plinth level	31.56	4900	Cum	154644
7	Earth filling	113.95	50	Cum	5697.5
8	Plastering	1225.45	150	Sqm	183817.5
9	Whitewash	1225.45	25	Sqm	30636.25
10	Rcc work for slab and Lintel	39.388	8800	Cum	346614.4
11	BBCC	22.064	2000	Cum	44128
	Total Rupees				1466317.295
	Contigency 5%				73315.86475
	10% contractor charges				146631.7295
	2% water charges				29326.3459
	Total Amount Rupees				1715591.235
	Say Rupees				**1715591**



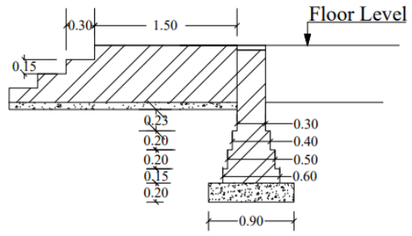
Plan



Section A-A



Elevation



Stairs and Footing Detail

Door D	3.0 x 2.1
Door D1	1.2 x 2.1
Door D2	0.9 x 2.1
Window W	3.0 x 1.2
Window W1	1.2 X 1.2
Ventilator V	0.6 x 0.6
Wall Thickness 0.30m and 0.20m for Partition Wall	
All Dimension are in meters	
Vishwakarma Yojana Phase VIII	
Gujarat Power Engineering & Research Institute	
Village	Kimbuva, Patan
Students	Dharmik Patel, Pray Patel
Design	Primary Health Care Center

13.1.3 Civil Design 3: Septic Tank

❖ **Design of Septic Tank:**

While designing the septic tank, various assumptions are made. Such Assumptions are
No of Houses = 100 Nos
Water supply=200lit/per/day
No of persons per House = 5 Nos
Sewage generation = 80% of water supply
Detention period = 18 hours
Cleaning period = Once in a year
L/B = 4:1 & Depth of Storage of water = 2.0m
Sludge deposit = 30 lit/person/year
Min Free Board required = 40cm (Rec= 50cm)

❖ **Calculations:**

Total Waste water coming to septic tank = 100*5*200*80/100 = 80000 lit/day
Detention period = 18 hours
Capacity of tank required = 80000*18/24 = 60000 lit
Capacity req for sludge accumulation = 30*5*100 = 15000 lit / year
Total capacity req = 60000 + 15000 = 75000lit = **75 m^3**
Plan area of the Septic tank = 75/2 = 37.50 m^2
L:B taken as 4:1, 4B*B= 37.50,
B = $(37.50/4)^{1/2}$ B = 3.06m. Take **B = 3.3 m**
L = 3.30* 4 = 13.20 m. Take **L = 13 m**
Total depth of Septic tank D = 2.0 + 0.4, **D = 2.40 m**

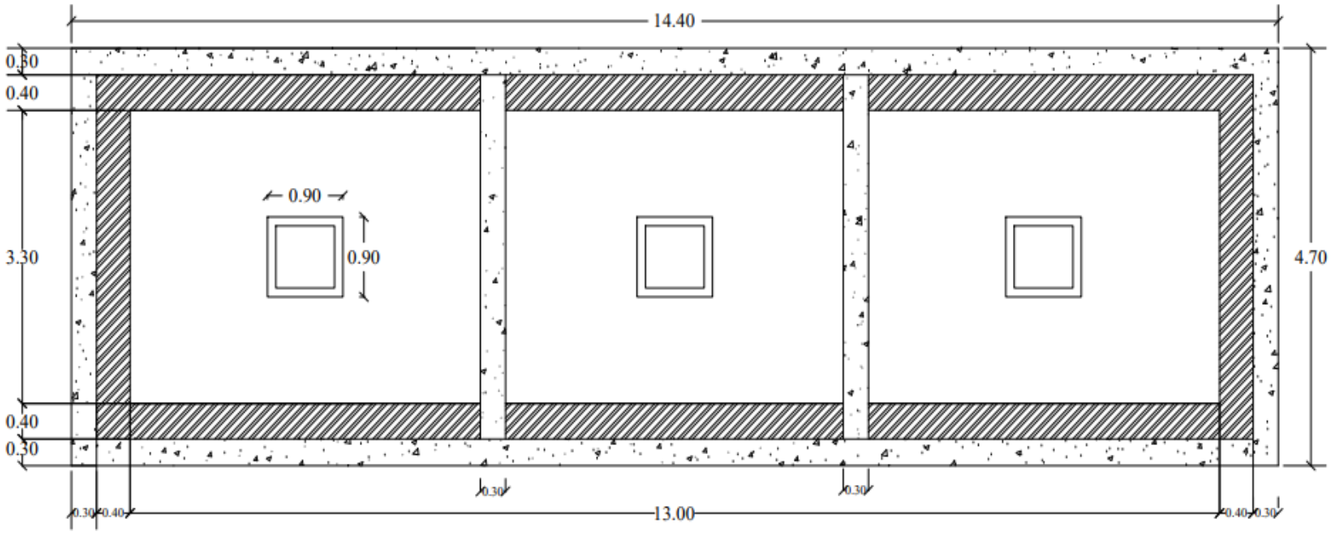
❖ **Design of Soak Pit:**

Waste water coming out from septic tank = 80000 lit/day
Percolation rate = 1500 lit /m^3/ day
Volume of filter media = 80000/1500 = **53 m^3**
Depth taken **H = 3.5 m**
Area of soak pit = 53/3.5 = 15.14 m^2
Dia of Soak well req= 21.2*4/π = 4.4 m, Take **D = 5.2 m**

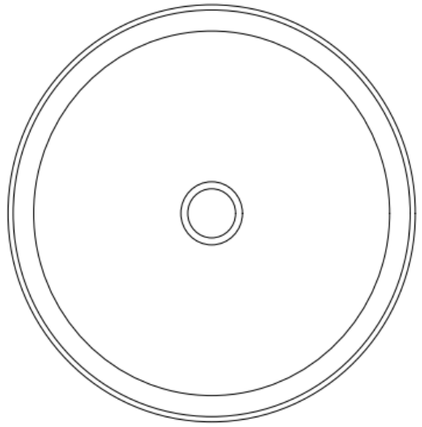
PROP. CONSTRUCTION WORK OF SEPTIC TANK							
AT KIMBUVA, TAL:-SARASWATI DIST:- PATAN							
MEASUREMENT SHEET							
SEPTIC TANK							
CENTER LINE = 73.3m							
ITEM	**DESCRIPTION**	**NO**	**L**	**B/W**	**H/D**	**QUANTITY**	**UNITS**
ITEM NO-1	Excavation for Tank	1	14.4	4.7	3	203.04	Cum
	Excavation for Soak Pit	1	28.27		3.7	104.599	Cum
	Total					307.639	Cum

ITEM NO- 2	PCC work in foundation for Tank	1	14.4	4.7	0.15	10.152	Cum
ITEM NO- 3	Brick masonry work for Tank						
	1st step	1	34.2	0.4	0.5	6.84	Cum
	2nd step	1	33.8	0.3	1.2	12.168	Cum
	3rd step	1	33.4	0.2	0.7	4.676	Cum
	Brick masonry work for Pit	1	5.18		3.5	18.13	Cum
	Total					41.814	Cum
ITEM NO- 4	RCC work for Tank	1	14.4	4.7	0.3	20.304	Cum
		2	4.1	0.3	1.6	3.936	Cum
		2	4.1	0.3	0.3	0.738	Cum
		1	13.4	4.1	0.2	10.988	Cum
	Deduct	3	0.9	0.9	0.2	0.486	Cum
	Total					35.48	Cum
	RCC work for Pit	1	26.42		0.15	3.963	Cum
	Total					39.443	Cum
ITEM NO- 5	Lining of Aggregate	1	1.48		2.6	3.848	Cum

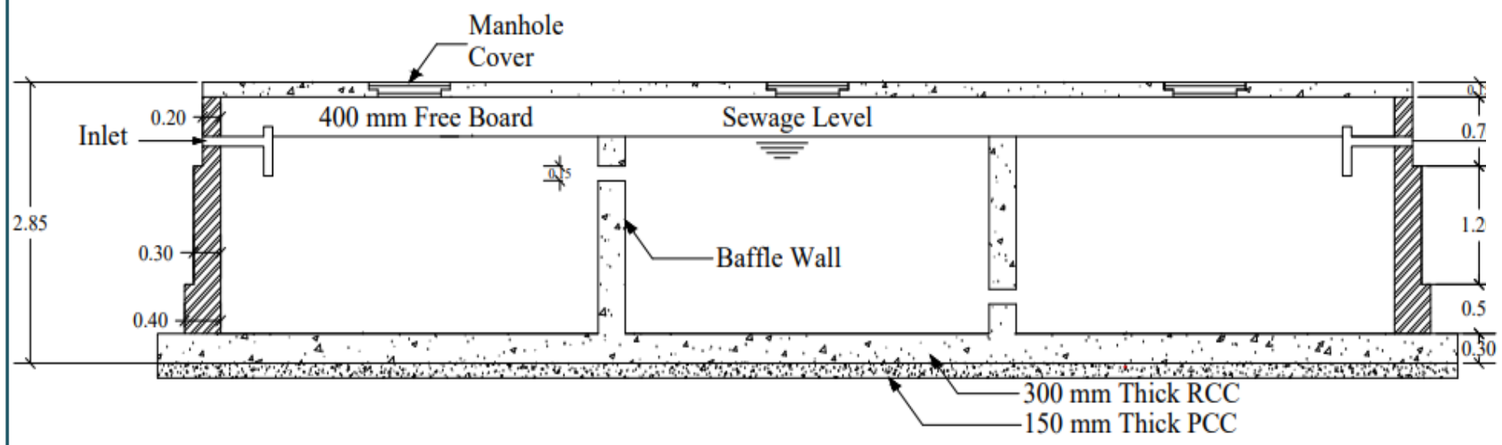
PROP. CONSTRUCTION WORK OF SEPTIC TANK					
AT KIMBUVA, TAL:-SARASWATI DIST:- PATAN					
ABSTRACT SHEET					
SEPTIC TANK					
Sr. No.	**Item Description**	**Quantity**	**Rate**	**Per**	**Amount**
1	Excavation work	307.639	155	Cum	47684.045
2	P C.C	10.152	3000	Cum	30456
3	Brick masonry work	41.814	3200	Cum	133804.8
4	RCC work	39.443	8800	Cum	347098.4
5	Lining of Aggregate	3.848	650	Cum	2501.2
	Total Rupees				561544.44
	Contigency 5%				28077.22
	10% contractor charges				56154.44
	2% water charges				11230.89
	Total Amount Rupees				657007.00
	Say Rupees				**657007**



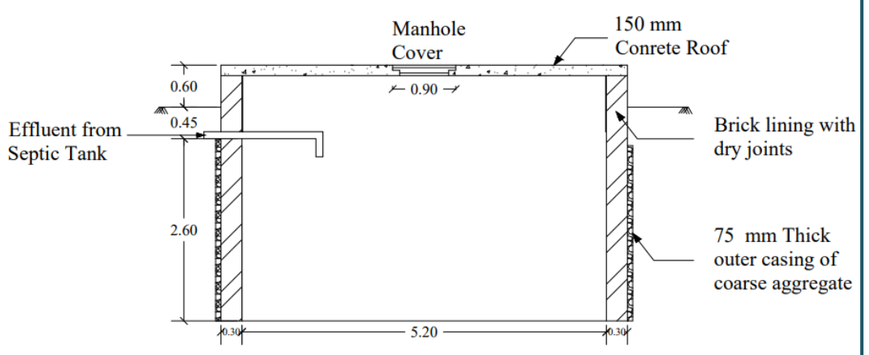
Plan



Plan of Soak Pit



Elevation



Elevation of Soak Pit

All Dimension are in meters	
Vishwakarma Yojana Phase VIII	
Gujarat Power Engineering & Research Institute	
Village	Kimbuva, Patan
Students	Dharmik Patel, Pray Patel
Design	Septic Tank

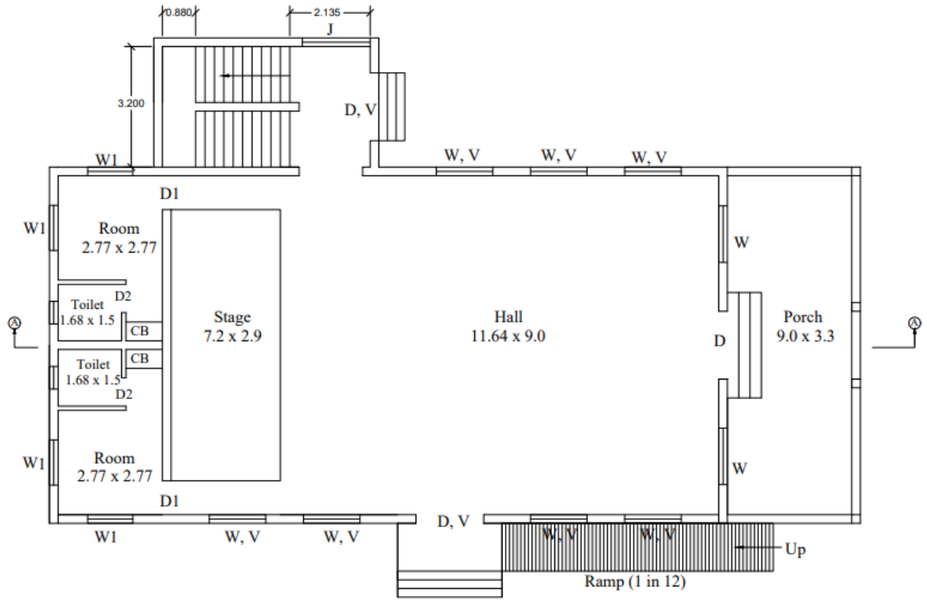
13.1.4 Civil Design 4: Community Hall

PROP. CONSTRUCTION WORK OF COMMUNITY HALL							
AT KIMBUVA, TAL:-SARASWATI DIST:- PATAN							
MEASUREMENT SHEET							
COMMUNITY HALL							
ITEM	**DESCRIPTION**	**NO**	**L**	**B/W**	**H/D**	**QUANTITY**	**UNITS**
ITEM NO-1	Excavation for Foundation						
		1	75.235	1.2	1.675	151.22	Cum
ITEM NO- 2	PCC work in foundation						
		1	75.235	1.2	0.3	27.08	Cum
ITEM NO- 3	Brick masonry work in Foundation						
	1st step	1	76.135	0.9	0.2	13.7	Cum
	2nd step	1	77.035	0.6	0.2	9.24	Cum
	3rd step	1	77.635	0.4	0.2	6.21	Cum
	4th step	1	78.145	0.23	1.4	25.16	Cum
	Total Brick masonry					54.31	Cum
ITEM NO- 4	Brick Work in Super Structure						
		1	78.145	0.23	3.3	59.31	Cum
		1	84.26	0.23	3.3	63.95	Cum
	Total					123.26	Cum
	Deduction						
	Door D	3	1.8	0.23	2.1	2.61	Cum
	Door D1	3	0.9	0.23	2.1	1.3	Cum
	Door D2	2	0.75	0.23	2.1	0.72	Cum
	Door D3	2	1.2	0.23	3.1	1.71	Cum
	Window W	20	1.5	0.23	1.3	8.97	Cum
	Window W1	8	1.2	0.23	1.3	2.87	Cum
	Ventilator V	21	0.9	0.23	0.45	1.96	Cum
	Concrete Jolly J	3	1.8	0.23	1.3	1.61	Cum
	Total					21.75	Cum
	Brick masonry work in step at door D						
	Step: 1	1	2.8	2.17	0.15	0.91	Cum
	Step: 2	1	2.8	1.87	0.15	0.79	Cum
	Step: 3	1	2.8	1.57	0.15	0.66	Cum
	Step: 4	1	3.6	1.27	0.15	0.69	Cum
	Total					3.05	Cum
	Brick masonry work in step at door D1						
	Step: 1	1	2.8	0.9	0.15	0.38	Cum
	Step: 2	1	2.8	0.6	0.15	0.25	Cum

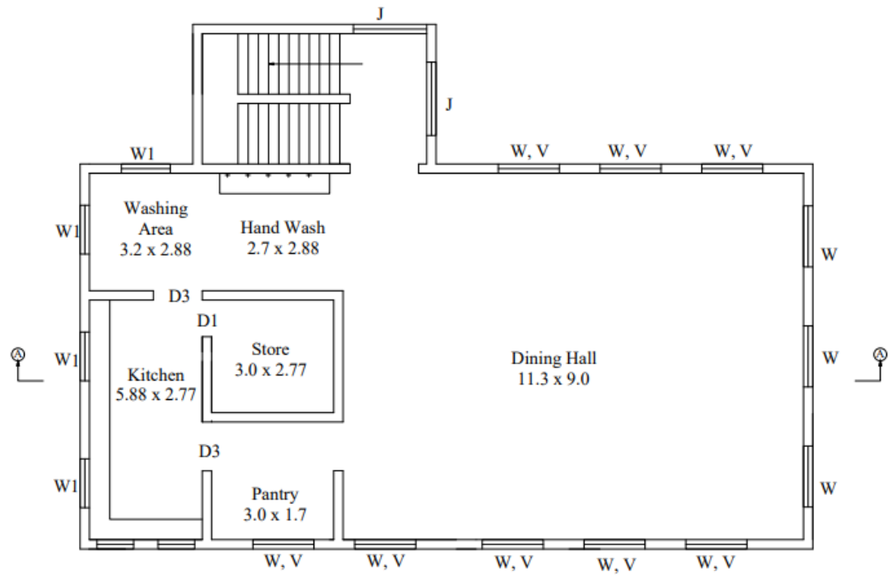
	Step: 3	1	2.8	0.3	0.15	0.13	Cum
	Total					0.76	Cum
	Brick masonry work in step at door D1						
	Step: 1	1	1.8	0.9	0.15	0.24	Cum
	Step: 2	1	1.8	0.6	0.15	0.16	Cum
	Step: 3	1	1.8	0.3	0.15	0.08	Cum
	Total					0.48	Cum
	Brick masonry in Parapet	2	1.5	0.115	3.3	1.14	Cum
	Partition Wall	2	1.68	0.115	3.3	1.28	Cum
	Total Brick Masonry						
						108.22	Cum
ITEM NO- 6	D.P.C						
		1	78.145	0.23		17.97	Sqm
ITEM NO- 7	Earth Filling						
		1	17.54	9	0.5	78.93	Cum
		1	5.515	3.2	0.5	8.82	Cum
	Total					87.75	Cum
ITEM NO- 8	Plastering						
	Inside	4	17.54		3.3	231.53	Sqm
		6	9		3.3	178.2	Sqm
		4	3.2		3.3	42.24	Sqm
		4	5.515		3.3	72.8	Sqm
		6	1.68		3.3	33.26	Sqm
		4	1.5		3.3	19.8	Sqm
		2	2.77		3.3	18.28	Sqm
		4	2.77		3.3	36.56	Sqm
		4	3		3.3	39.6	Sqm
		4	1.7		3.3	22.44	Sqm
	Outside	2	18		8	288	Sqm
		2	12.89		8	206.24	Sqm
	Ceiling	2	17.54	9		315.72	Sqm
		2	5.515	3.2		35.3	Sqm
	Parapet Inside	1	47.565		0.7	33.3	Sqm
	Pillars	16		0.23	3.9	0	Sqm
	Total					1573.27	Sqm
	Deduct						
	Door D 3x2	6	1.8		2.1	22.68	Sqm
	Door D1 3x2	6	0.9		2.1	11.34	Sqm
	Door D2 2x2	4	0.75		2.1	6.3	Sqm
	Door D3 2x2	4	1.2		3.1	14.88	Sqm
	Window W 20x2	40	1.5		1.3	78	Sqm
	Window W1 8x2	16	1.2		1.3	24.96	Sqm
	Ventilator V 21x2	42	0.9		0.45	17.01	Sqm
	Concrete Jolly J 3x2	6	1.8		1.3	14.04	Sqm
	Total					189.21	Sqm

	Net Total					1384.06	Sqm
ITEM NO- 9	White Wash same as plastering					1384.06	Sqm
ITEM NO- 10	RCC & PCC						
	RCC for Slab	2	17.54	9	0.1	31.57	Cum
		2	5.515	3.2	0.1	3.53	Cum
	RCC in Lintel	1	78.145	0.23	0.1	1.8	Cum
		1	84.26	0.23	0.1	1.94	Cum
	RCC in Porch	1	3.53	9.462	0.1	3.34	Cum
	Total					42.18	Cum
	PCC below Flooring	1	17.54	9	0.1	15.79	Cum
		1	5.515	3.2	0.1	1.76	Cum
	PCC below Stairs	1	3.53	9.462	0.1	3.34	Cum
	Total					20.89	Cum

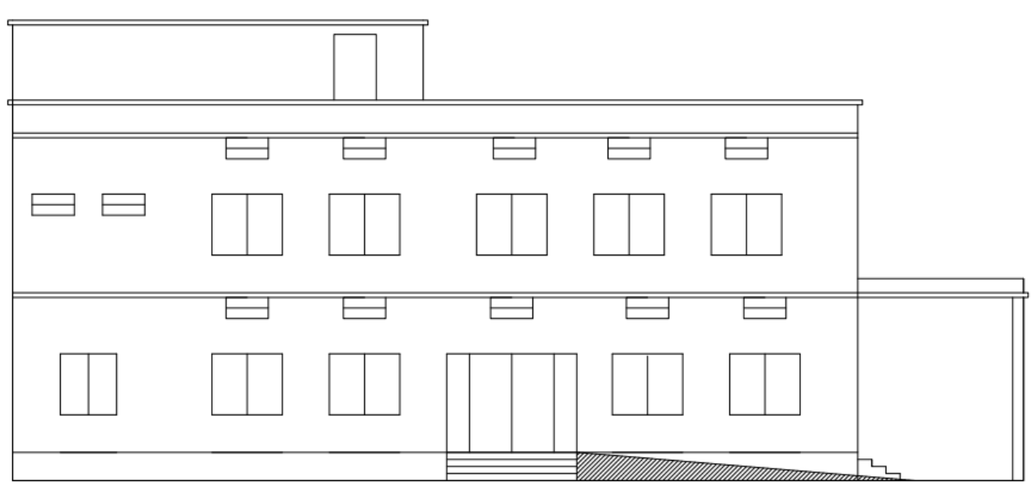
PROP. CONSTRUCTION WORK OF COMMUNITY HALL					
AT KIMBUVA, TAL:-SARASWATI DIST:- PATAN					
ABSTRACT SHEET					
COMMUNITY HALL					
Sr. No.	**Item Description**	**Quantity**	**Rate**	**Per**	**Amount**
1	Excavation work	151.22	155	Cum	23439.1
2	P C.C	27.08	3000	Cum	81240
3	Brickwork in foundation	54.31	3200	Cum	173792
4	Brickwork in superstructure	108.22	3500	Cum	378770
6	D.P.C at plinth level	17.97	4900	Cum	88053
7	Earth filling	87.75	50	Cum	4387.5
8	Plastering	1384.06	150	Sqm	207609
9	Whitewash	1384.06	25	Sqm	34601.5
10	Rcc work for slab and Lintel	42.18	8800	Cum	371184
11	PCC	20.89	3000	Cum	62670
	Total Rupees				1425746.1
	Contigency 5%				71287.305
	10% contractor charges				142574.61
	2% water charges				28514.922
	Total Amount Rupees				1668122.937
	Say Rupees				**1668123**



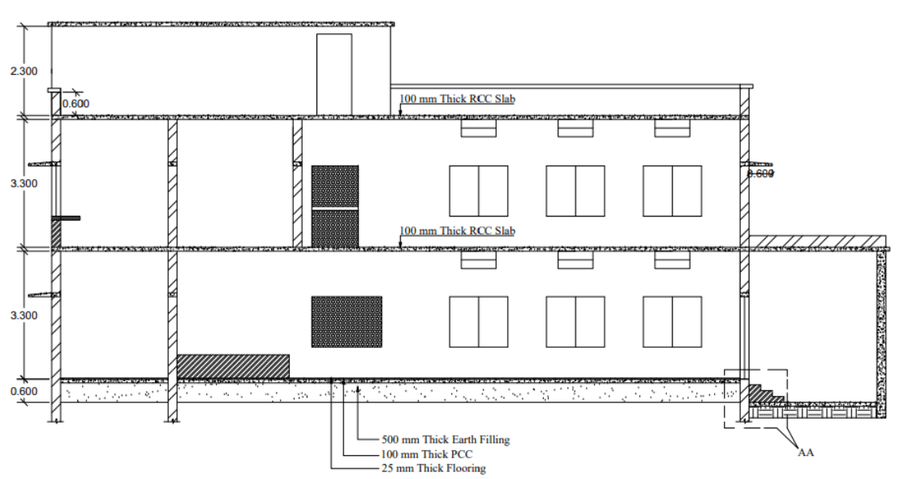
Ground Floor Plan



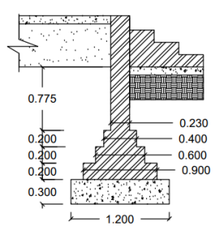
First Floor Plan



Elevation



Section A-A



Detail AA

Door D	1.8 x 2.1
Door D1	0.9 x 2.1
Door D2	0.75 x 2.1
Door D3	1.2 x 2.1
Window W	1.5 x 1.3
Window W1	1.2 x 1.3
Ventilator V	0.9 x 0.45
Concrete Jolly J	1.8 x 1.3
Wall Thickness is 0.23m and Partiton Wall is 0.115m	
All Dimensions are in meters	
Vishwakarma Yojana Phase VIII	
Gujarat Power Engineering and Research Institute	
Village	Kimbuva
Students	Dharmik Patel, Pray Patel
Design	Community Hall

13.1.5 Civil Design 5: Bio Gas Plant

❖ **Introduction**

Biogas is the mixture of gases produced by the breakdown of organic matter in the absence of oxygen (anaerobically), primarily consisting of methane and carbon dioxide. Biogas can be produced from raw materials such as agricultural waste, manure, municipal waste, plant material, sewage, green waste or food waste. Biogas is a renewable energy source.

Biogas is produced by anaerobic digestion with methanogen or anaerobic organisms, which digest material inside a closed system, or fermentation of biodegradable materials. This closed system is called an anaerobic digester, biodigester or a bioreactor.
Biogas is primarily methane (CH_4) and carbon dioxide (CO_2) and may have small amounts of hydrogen sulfide (H_2S), moisture and siloxanes. The gases methane, hydrogen, and carbon monoxide (CO) can be combusted or oxidized with oxygen. This energy release allows biogas to be used as a fuel; it can be used for any heating purpose, such as cooking. It can also be used in a gas engine to convert the energy in the gas into electricity and heat.

Table 13.1 Typical Composition of Biogas

Compound	Formula	Percentage by volume
Methane	CH_4	50–75
Carbon dioxide	CO_2	25–50
Nitrogen	N_2	0–10
Hydrogen	H_2	0–1
Hydrogen sulfide	H_2S	0.1 –0.5
Oxygen	O_2	0–0.5

❖ **DESIGN AND DIMENSIONS CALCULATIONS**

Total number of cows = 50.
However, cow produces about 10 kg of dung per day.
The amount of dung to be used for the design therefore 10 x 50 = 500 kg per day.

Plant capacity For the purpose of this project, the fixed dome type biogas plant was preferred.)

Digester volume is given by the formula: Vd = Vf Tr ……. (1)

Where Vd = digester volume,
Vf = volume of the fluid (slurry) in the digester
Tr, = hydraulic retention time.

But also, Vf = M/ρ …… (2)

Where, M = mass of dry input
ρ = density of dry material in the fluid.

Density of dry dung in the fluid is given by: ρ = 50Kg/m^3.

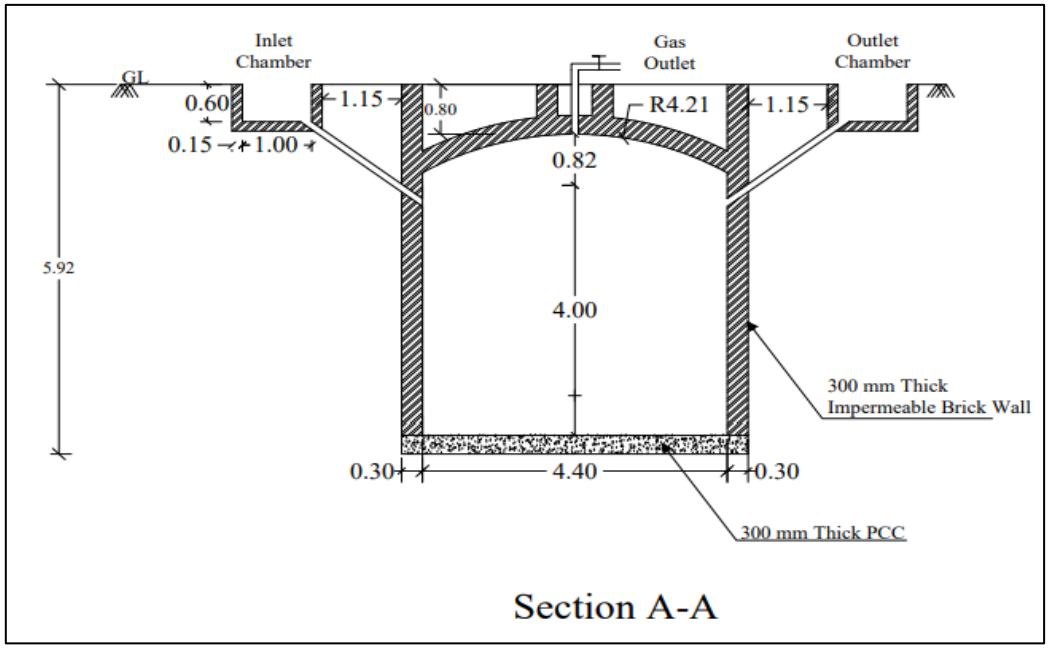
Using equation (2), Volume of daily slurry charge, Vf = Mass/Density
1 Kg of fresh cow dung = 0.18Kg of dry dung (measured from the field).

Therefore, 2500Kg = 500 x 0.18 = 90 Kg of dry weight of dung per day.
Wet dung contains about 82% water. Volume of fluid, Vf = 90/50 = 1.8 m^3/ day.

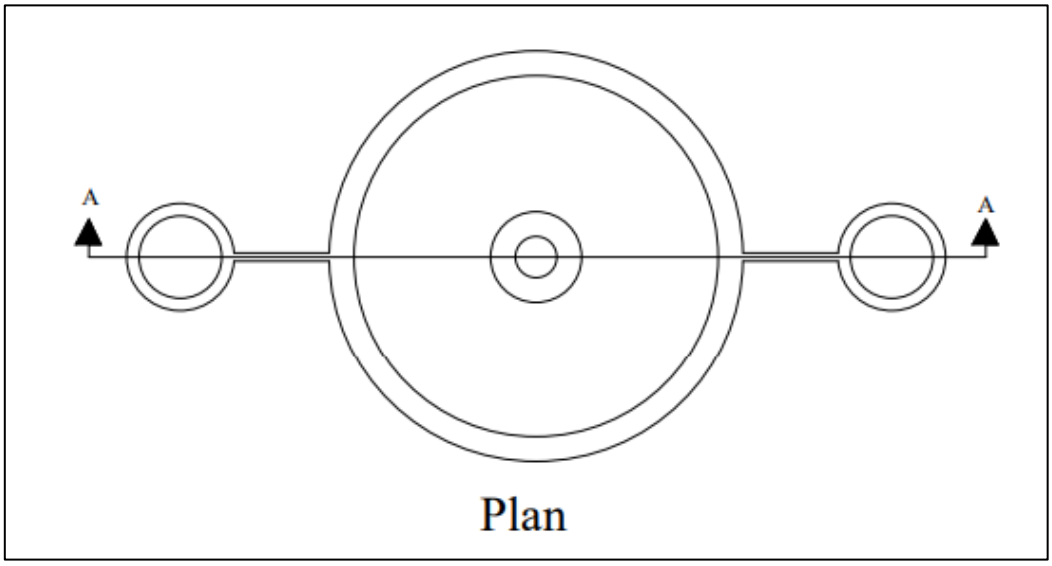
Let Hydraulic Retention time be 30 days
From equation (1), volume, Vd, = 1.8*30 = 54 m^3.
Actual digester volume = 1.I Vd (10% more to provide allowance for disengagement of gas)
Actual volume of digester therefore = 1.1x54 = 59.4 m^3, use 60 m^3

Digester Dimensions:

Height: Diameter ratio = 0.9.
H/D = 0.9, H = 0.9D
But V = $0.785D^2H$
60 = $0.785x0.9D^3$
D = 4.4
Therefore, **H = 4.0 m**



Section A-A



Plan

PROP. CONSTRUCTION WORK OF BIO GAS PLANT						
AT KIMBUVA, TA:-SARASWATI DIST:- PATAN						
MEASUREMENT SHEET						
BIO GAS PLANT						
ITEM	**DESCRIPTION**	**NO**	**Area**	**H/D**	**QUANTITY**	**UNITS**
ITEM NO-1	Excavation for Digester	1	19.635	5.92	116.2392	Cum
	Excavation for Chambers	2	1.33	0.75	0.9975	Cum
	Total				117.2367	Cum
ITEM NO- 2	PCC work in foundation for Digester	1	19.635	0.3	5.8905	Cum
ITEM NO- 3	Brick masonry work for Tank					
	Brick masonry for Digestor	1	4.43	5.92	26.2256	Cum
						Cum
	Brick masonry for Chamber	2	0.54	0.75	0.81	Cum
						Cum
	Brick Work in dome	1			5.54	Cum
	Total				32.5756	Cum

PROP. CONSTRUCTION WORK OF BIO GAS PLANT					
AT KIMBUVA, TA:-SARASWATI DIST:- PATAN					
ABSTRACT SHEET					
BIO GAS PLANT					
Sr. No.	**Item Description**	**Quantity**	**Rate**	**Per**	**Amount**
1	Excavation work	117.2367	155	Cum	18171.6885
2	P C.C	5.8905	3000	Cum	17671.5
3	Brick masonry work	32.5756	3200	Cum	104241.92
	Total Rupees				140085.1085
	Contigency 5%				7004.255425
	10% contractor charges				14008.51085
	2% water charges				2801.70217
	Total Amount Rupees				163899.5769
	Say Rupees				**163900**

13.1.6 Civil Design 6: Rain Water Harvesting

❖ **Introduction:**

Rainwater harvesting (RWH) is the collection and storage of rain, rather than allowing it to run off. Rainwater is collected from a roof-like surface and redirected to a tank, cistern, deep pit (well, shaft, or borehole), aquifer, or a reservoir with percolation, so that it seeps down and restores the ground water. Below are the methods of Rain water Harvesting.

1. **Surface runoff harvesting methods**

- Recharge Pit
- Recharge Trench
- Tubewell
- Recharge Well

2. **Groundwater recharge**

- Gully Plug
- Contour Bund
- Dugwell Recharge
- Percolation Tank
- Check Dam/Cement Plug/Nala Bund
- Recharge Shaft

Note: From above methods, we have selected Recharge Shaft

❖ **Calculation:**

Consider this Rain Water Harvesting by Artificial Recharging be done on Primary Health Care Center (PHC) of Kimbuva Village.

Roof top Area (A)= 21 x 9.45 m = 198.45 m^2

Annual Rainfall in Patan District (R) = 575.7 mm

Total availability of Rain Water = A x R

= 198.45 x 575.7 /1000

= **114.25 m^3 or 1.14 Lakh Liter**

Expected Recharge Potential = A x R x C, C = Runoff Coefficient = 0.8 (for Pucca Roof)

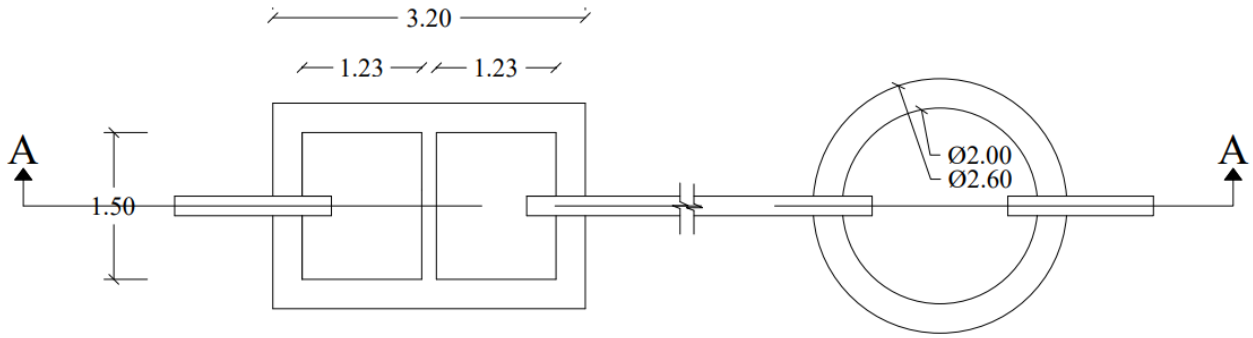
= 198.45 x 0.5757 x 0.8

= **91.4 m^3 or 91400 Liter**

PROP. CONSTRUCTION WORK OF RAIN WATER HARVESTING							
AT KIMBUVA, TA:-SARASWATI DIST:- PATAN							
MEASUREMENT SHEET							
RAIN WATER HARVESTING							
ITEM	**DESCRIPTION**	**NO**	**L**	**B/W**	**H/D**	**QUANTITY**	**UNITS**
ITEM NO-1	Excavation Desilting Tank	1	4	3	2.1	25.2	Cum
	Excavation for Well	1	7.99		5.1	40.749	Cum
	Total					65.949	Cum

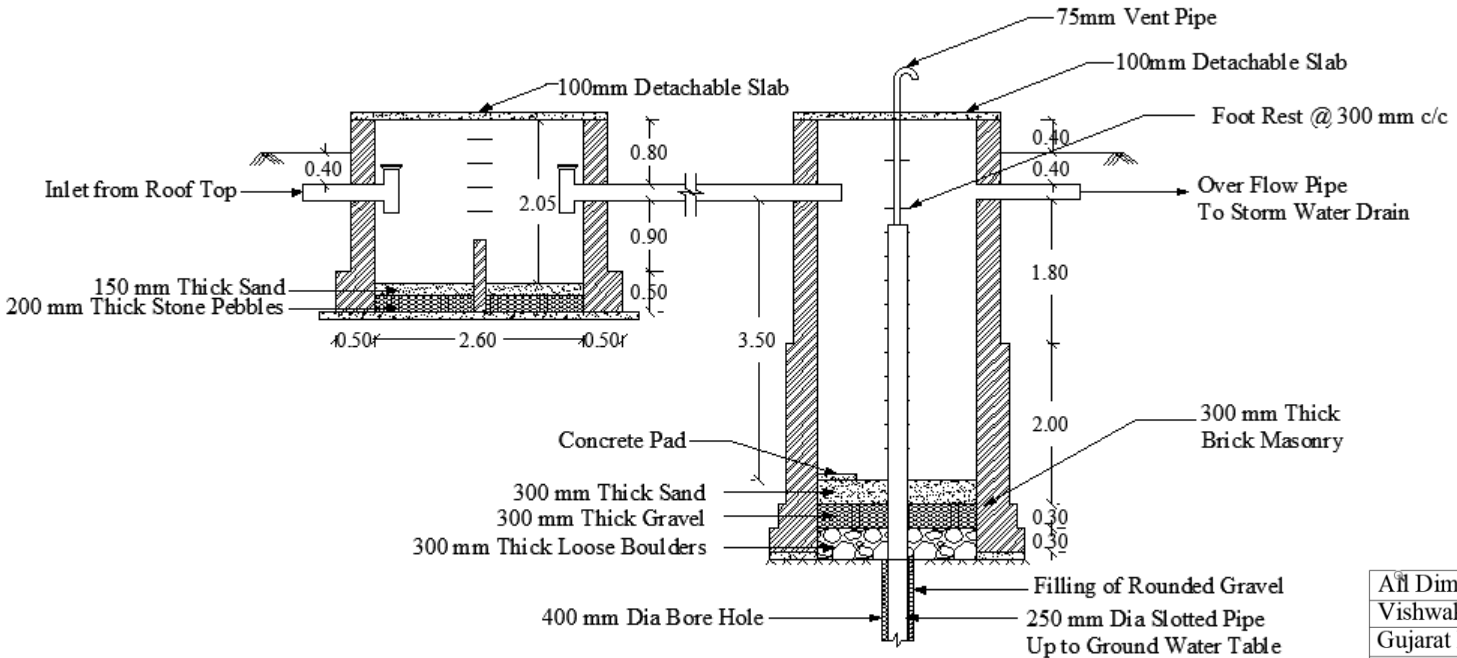
ITEM NO-2	PCC work for Tank	1	4	3	0.1	1.2	Cum
	PCC work for Well	1	4.86		0.1	0.486	Cum
	Total					1.686	Cum
ITEM NO-3	Brick masonry work for Tank						
	1st step	1	10.2	0.5	0.5	2.55	Cum
	2nd step	1	9.4	0.3	1.9	5.358	Cum
	Baffle wall	1	1.5	0.15	0.9	0.2025	Cum
	Brick masonry work for Well						
	1st step	1	4.86		0.3	1.458	Cum
	2nd step	1	3.9		0.3	1.17	Cum
	3rd step	1	2.99		2	5.98	Cum
	4th step	1	2.15		2.8	6.02	Cum
	Total					22.7385	Cum
ITEM NO-4	Sand in well	1	3.14		0.3	0.942	Cum
	Sand in Tank	1	2.6	1.5	0.15	0.585	Cum
	Gravel in well	1	3.14		0.3	0.942	Cum
	Gravel in Tank	1	2.6	1.5	0.15	0.585	Cum
	Coarse Aggregate	1	3.14		0.3	0.942	Cum

PROP. CONSTRUCTION WORK OF RAIN WATER HARVESTING					
AT KIMBUVA, TA:-SARASWATI DIST:- PATAN					
ABSTRACT SHEET					
RAIN WATER HARVESTING					
Sr. No.	**Item Description**	**Quantity**	**Rate**	**Per**	**Amount**
1	Excavation work	65.949	155	Cum	10222.095
2	P C.C	1.686	3000	Cum	5058
3	Brick masonry work	22.7385	3200	Cum	72763.2
6	Sand	1.527	1800	Cum	2748.6
7	Gravel	1.527	1800	Cum	2748.6
8	Coarse Aggregate	0.942	2200	Cum	2072.4
	Total Rupees				95612.895
	Contigency 5%				4780.64475
	10% contractor charges				9561.2895
	2% water charges				1912.2579
	Total Amount Rupees				111867.0872
	Say Rupees				**111867**



Desilting Chamber Recharging Structure

Plan



Section A-A

All Dimensions are in meters	
Vishwakarma Yojana Phase VIII	
Gujarat Power Engineering and Research Institute	
Village	Kimbuva
Students	Dharmik Patel, Pray Patel
Design	Rain Water Harvesting

13.2 REASON FOR STUDENTS RECOMMENDING THIS DESIGN

1. **Bank**: Existing structure of Bank was not in good condition and the services provided by bank were not according to current scenario of banking.
2. **Primary Health Care Center (PHC)**: There was no PHC in the village which fulfill the medical and health requirements of the villagers. Sometimes, for even minor health issue, villagers need to approach nearby city for the treatment.
3. **Septic Tank**: The sewage generated from houses is disposed directly into a pit. This can cause mosquito and fly nuisance into the area. Also it pollutes the soil strata.
4. **Community Hall**: In the allocated village there was no facility where public gathering and function can be done.
5. **Bio Gas Plant**: Many of the villagers were associated with animal husbandry. Cow dung produced from that was thrown away. This dung can be used to generate gas.
6. **Rain Water Harvesting System :** Rainfall in the region on allocated village is significant. Using a sustainable technique for water storage will reduce the water shortage.

13.3 ABOUT DESIGNS SUGGESTIONS/BENEFIT OF THE VILLAGERS

1. **Bank**: Villagers need to travel to city for availing major services provided by Bank. Setting up a bank in village itself will reduce to hassle for villagers to travel to city.
2. **Primary Health Care Center (PHC):** As surveyed in the allocated village, there was only a sub center which does not fulfill the need of villagers in terms of health. A PHC in the village shall fulfill the gap which was existing in terms of health.
3. **Septic Tank**: Due to Septic Tank, fly nuisance and disease causing mosquitoes will get eliminated as the whole tank is covered. Pollution due to disposal of sewage directly into soil will also be reduced. Sludge produced from soak pit shall be used as manure to the fields
4. **Community Hall**: Public gathering and events, ceremony and marriage function can done in village itself.
5. **Bio Gas Plant**: Bio gas Plant act as a renewable source of energy. Gas produce can be used for domestic purpose.
6. **Rain water Harvesting System**: This facility act as a sustainable infrastructure. Rain water harvesting can reduce the outflow of water from roof tops and finally reduce the surface runoff. Using the rain water for domestic as well as irrigation purpose shall reduce the water charges.

CHAPTER 14

TECHNICAL OPTIONS WITH CASE STUDIES

14.1 CIVIL ENGINEERING

14.1.1 Advanced Earthquake Resistant

Earthquake resistant design of buildings depends upon providing the building with strength, stiffness and inelastic deformation capacity which are great enough to withstand a given level of earthquake-generated force. This is generally accomplished through the selection of an appropriate structural configuration and the careful detailing of structural members, such as beams and columns, and the connections between them. But more advanced techniques for earthquake resistance is not to strengthen the building, but to **reduce the earthquake-generated forces acting upon it.**

Earthquake Resistant Design Techniques for Buildings and Structures:

Among the most important advanced techniques of earthquake resistant design and construction are:

- Base Isolation
- Energy Dissipation Devices

Base Isolation Method

A base isolated structure is supported by a series of bearing pads which are placed between the building and the building's foundation. (See Figure 1.) A variety of different types of base isolation bearing pads have now been developed. The bearing is very stiff and strong in the vertical direction, but flexible in the horizontal direction.

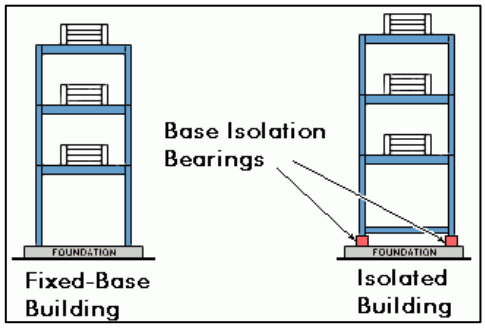


Figure 52 Base-Isolated and Fixed-Base Buildings

To get a basic idea of how base isolation works, examine **Figure**. This shows an earthquake acting on both a base-isolated building and a conventional, **fixed-base,** building. As a result of an earthquake, the ground beneath each building begins to move. In Figure 2, it is shown moving to the left. Each building responds with movement which tends toward the right. The building undergoes **displacement** towards the right. The building's displacement in the direction opposite the ground motion is actually due to **inertia.** The inertial forces acting on a building are the most important of all those generated during an earthquake. It is important to know that the inertial forces which the building undergoes are proportional to the building's **acceleration** during ground motion. It is also important to realize that buildings don't actually shift in only one direction. Because of the complex nature of earthquake ground motion, the building actually tends to **vibrate** back and forth in varying directions.

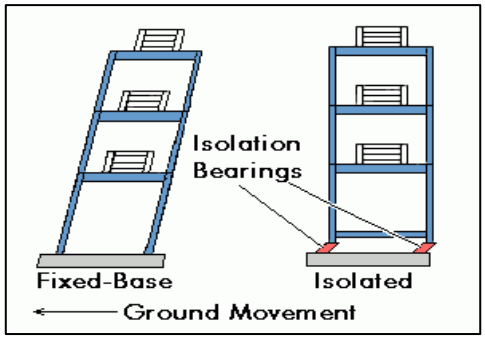


Figure 53 Base-Isolated and Fixed-Base Buildings

Energy Dissipation Devices

The second of the major new techniques for improving the earthquake resistant of building also relies upon damping and energy dissipation, but it greatly extends the damping and energy dissipation provided by lead-rubber bearings. As we've said, a certain amount of vibration energy is transferred to the building by earthquake ground motion. Buildings themselves do possess an inherent ability to dissipate, or damp, this energy. However, the capacity of buildings to dissipate energy before they begin to suffer deformation and damage is quite limited. The building will dissipate energy either by undergoing large scale movement or

sustaining increased internal strains in elements such as the building's columns and beams. Both of these eventually result in varying degrees of damage. So, by equipping a building with additional devices which have high damping capacity, we can greatly decrease the seismic energy entering the building, and thus decrease building damage. Accordingly, a wide range of **energy dissipation devices** have been developed and are now being installed in real buildings. Energy dissipation devices are also often called **damping devices.**

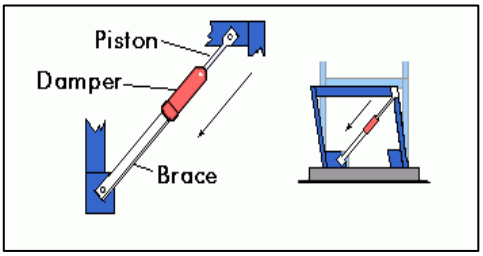


Figure 54 Damping Device Installed with Brace

The large number of damping devices that have been developed can be grouped into three broad categories:

- **Friction Dampers**: these utilize frictional forces to dissipate energy
- **Metallic Dampers:** utilize the deformation of metal elements within the damper
- **Viscoelastic Dampers:** utilize the controlled shearing of solids
- **Viscous Dampers**: utilized the forced movement (orificing) of fluids within the damper

14.1.2 Seismic Retrofitting of Buildings

Definition: It is the modification of existing structures to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes. The retrofit techniques are also applicable for other natural hazards such as tropical cyclones, tornadoes, and severe winds from thunderstorms.

- Earthquake creates great devastation in terms of life, money and failures of structures.
- Upgrading of certain building systems (existing structures) to make them more resistant to seismic activity (earthquake resistance) is really of more importance.
- Structures can be (a) Earthquake damaged, (b) Earthquake vulnerable
- Retrofitting proves to be a better economic consideration and immediate shelter to problems rather than replacement of building.

Need for Seismic Retrofitting:

- To ensure the safety and security of a building, employees, structure functionality, machinery and inventory
- Essential to reduce hazard and losses from non-structural elements.
- predominantly concerned with structural improvement to reduce seismic hazard.
- Important buildings must be strengthened whose services are assumed to be essential just after an earthquake like hospitals.

Classification of Retrofitting Techniques

Table 14.1 Types of Retrofitting Techniques

Retrofitting Techniques	
Global	**Local**
Adding of Shear Wall	Jacketing of Beam
Adding of Infill Wall	Jacketing of Column
Adding of Bracing	Jacketing of Beam-Column Joints
Adding of Wing Wall/Buttresses	Strengthening of Individual Footing
Wall Thickening	
Mass Reduction	
Supplemental Damping and Base Isolation	

Figure 55 External Bracing of an Existing Structure

Figure 56 Infill Shear Truss

14.1.3 Advance Practices in Construction field in Modern Material, Techniques and Equipment's

1. Modern Material: Transparent Concrete or Light Transmitting Concrete

- **What is Transparent Concrete or Light Transmitting Concrete?**

Transparent concrete also called as translucent concrete or light transmitting concrete is achieved by replacing aggregates with transparent alternate materials. The bonding material in transparent concrete may be able to transmit light by using clear resins the concrete mix. Use of optical fibers and fine concrete also used as transparent concrete. Transparent concrete was originally developed in 2001 by a Hungarian architect Aronlosonzi by using glass fibers. Transparent concrete is produced by mixing 4% to 5% (by volume) optical fibers in the concrete mixture. This concrete has less weight compared to original concrete

Transparent concrete is manufactured by using combination of fiber optics and fine concrete. These fibers blend into the concrete like any other aggregates. These optical fibers can transmit light from natural and artificial sources into spaces enclosed by the translucent concrete panels. The main reason for using optical fiber in concrete is that it can transmit light even an incident angle greater than 60^0. Optical fiber consists of three layers called as core, cladding and buffer coating or jacket. The light is transmitted through the core of the optical fiber. Transparent concrete is manufactured using fine materials only. It does not contain coarse aggregates. This concrete can have the compressive strength of that of high strength concrete around 70 MPa (10,000 psi).

Figure 57 Light Transmitting Concrete

2. Construction Technique: Cell-filled concrete pavement

Cell-filled concrete pavement is the technology developed by IIT Kharagpur, which has proved to be a very promising solution for overloaded vehicles, inadequate drainage facilities, and waterlogging problems. Cell-filled concrete pavement consists of formwork of plastic cells over the compacted subgrade/sub-base, filled with concrete or stones.

- **Components of Cell filled Concrete Pavement**

i) Plastic Cells

The plastic cells act as both the form and reinforcement for the pavement. The plastic cells are made from reclaimed high-density polyethylene (HDPE) sheets of thickness 0.22 mm to about 0.25mm. These plastic cells can be supplied as rolls of strips 50mm to 100mm wide, depending upon the depth requirement. The strips can be heat-welded or stitched to form cells.

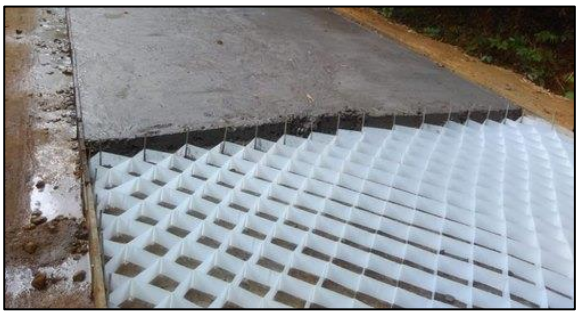


Figure 58 Plastic Cells filled Pavement

A pair of strips can be welded at 300 mm intervals. The third strip is welded to the first pair at 300 mm intervals so that the stitch lies at the center of the previous stitching. The third and the fourth ones are again welded like the first two.

Figure 59 Plastic Cells

ii) Subgrade

The subgrade forms the top 300 mm thick portion of the embankment. The embankment subgrade is compacted in two layers, usually to a higher standard than the embankment. If the embankment soil is poor, the top 300mm of the subgrade may consist of good quality material from borrow pits with CBR exceeding five. The subgrade shall be compacted to at least 100 percent of Maximum Dry Density per IS:2729 (Part 7). The expansive black cotton soil (BCS) should be compacted to a minimum of 95% of the maximum dry density with moisture content 2% higher than the optimum.

The subgrade soil of existing roads is expected to have attained the required stability due to traffic, and the CBR test should be done at in situ dry density and moisture content after four days of soaking. A dynamic cone penetration test is carried out to determine CBR values of subgrade quickly, and CBR values corresponding to soaked condition can be obtained from records of similar soils.

iii) Subbase

The subbase consists of laterite boulder consolidation, water-bound macadam, wet mix macadam, crusher run macadam, lime-fly ash-aggregate mixtures, lime stabilized soil, cement stabilized soil, and others with proprietary stabilizers. Locally available aggregates such as murrum and kankar mixed with lime fly ash may also be used. The locally available materials such as natural gravel/soil aggregate or blended with suitable aggregate fractions of stone, gravel, moorum, sand, or a combination of these materials depending on the grading required.

If the number of commercial vehicles is more than fifty per day, 150mm of cementitious sub base with a minimum 7-day strength of 1.5 MPa is recommended. The subbase should be provided with stone/concrete block, or Brick on edge should be laid on either side of the carriageway projecting 50 to 100 mm above the subgrade/subbase for the confinement and protection. Stone/ concrete block or Brick on end edge

should be laid on either side of the carriageway projecting 50 to 100 mm above the subgrade/subbase for confinement and protection.

iv) Concrete

Conventional pavement concrete with 28-day strength of 30 MPa with a slump of about 30 to 50mm can fill up the cell. Super-plasticiser should be used to reduce water requirements for the desired slump. The Roller Compacted Concrete (RCC), as specified in clause 1502 of Specifications for Rural Roads, can also be used for filling up the plastic cells and compacted with a roller.

v) Curing

As the camber of 3 to 3.5 % is given for rural roads- wet jute/coir mats and wet paddy straw shall provide better water curing option and light traffic to move on the surface. Water accumulates on the lower side of the mud enclosure in the water ponding method, whereas the higher part becomes dry soon.

❖ **Construction Procedure of Cell-filled pavement concrete.**

1. The construction of embankment, subgrade, and subbase should be done as per Specifications for Roads.
2. A proper camber as applicable to rural roads shall be provided. Drainage layer should be provided in high rainfall areas (annual rainfall exceeding 1000 mm) as laid down in Road Manual.
3. Stone/concrete block or Brick on end edge should be laid on either side of the carriageway projecting 50 to 100 mm above the subgrade/subbase for the confinement and protection of cell-filled concrete.
4. A hard shoulder with proper cath is necessary for the concrete blocks' stability since trucks traveling close to the edge may damage the unconfined concrete blocks.

Figure 60 Laying of Cell filled Concrete Pavement.

5. The width of the hard shoulder should be about 0.85 m on either side of the pavement.
6. Formwork of plastic cells shall be laid across the compacted subbase and put under tension with iron spikes so that cells are close to squares in plan.
7. Nylon threads passing at 10 mm below the top of the cells shall prevent the cells from collapsing while filling the cells with concrete.
8. If any stitch of the cells opens up during tensioning, it should be stapled near the top, middle, and bottom.
9. The concrete shall be filled into the cells to a depth of 120 mm, which is about 20 mm higher than the cell's depth.
10. The iron spikes shall be removed after the cells are filled up with concrete. For RCC, two passes of the roller in static mode followed by two passes in vibratory and another pass in static mode shall be sufficient compaction and a good finish.
11. The number of passes in static and dynamic modes depends upon the texture of aggregates and moisture content.
12. Pan vibrators can be used to compact the conventional concrete having a slump of about 30 to 40 mm.
13. The number of roller passes, the amplitude of vibrations, the depth of loose concrete in cells, and the amount of water to be added shall be determined from the trial run.
14. The concrete's surface shall be covered with wet jute mats or paddy straw to prevent drying during hot weather.

❖ **Advantages of Cell Filled Concrete Pavements**

1. Use of recycled plastic.
2. As the expansion or contraction joints are not required, and hence maintenance of joints is eliminated.
3. The cost of construction is considerably reduced when compared to conventional cement concrete pavement.
4. The consumption of aggregates is almost reduced to 50% when compared to normal CC pavements.
5. If the individual block fails, it can be easily replaced without much effort and with the least cost.

❖ **Disadvantages of Cell Filled Concrete Pavements**

1. The preparation of the cells is cumbersome.
2. There are high chances of cells getting disturbed while placing the concrete, and hence proper care is required.
3. Due to slow progress, the men and machinery's efficiency is less than the normal construction.

3. Construction Equipment: Launching Gantry

A **launching gantry** is a special-purpose mobile gantry crane used in bridge construction, specifically segmental bridges that use precast box girder bridge segments or precast girders in highway and high-speed rail bridge construction projects. The launching gantry is used to lift and support bridge segments or girders as they are placed while being supported by the bridge piers instead of the ground.
While superficially similar, launching gantry machines should not be confused with movable scaffolding systems, which also are used in segmental bridge construction. Both feature long girders spanning multiple bridge spans which move with the work, but launching gantry machines are used to lift and support precast bridge segments and bridge girders, while movable scaffolding systems are used for cast-in-place construction of bridge segments.

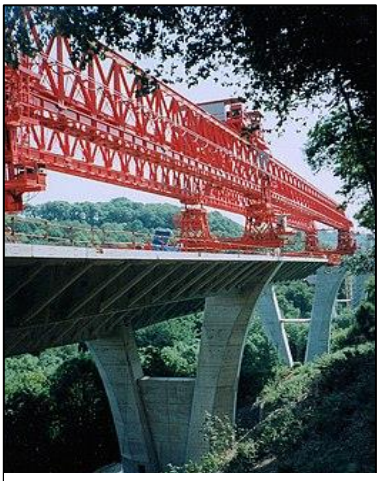
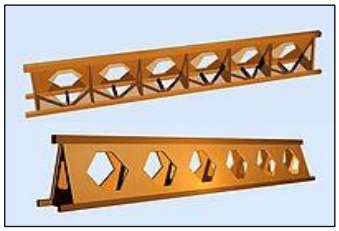
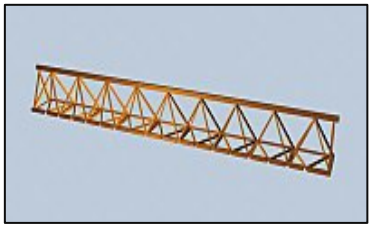
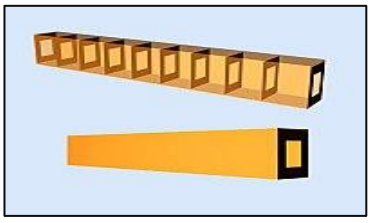


Figure 61 Launching Gantry

Bridge segments (or bridge girders) are set in place by the launching gantry until the span between adjacent piers is completed. For segmental bridges, typically a span-by-span or balanced-cantilever approach is adopted to place segments. To free up the gantry trolley(s), temporary hangers are used to support each segment after it has been placed. In the span-by-span approach, all the segments for a span are placed before bridge tendons are tensioned; in this fashion, work progresses from one pier towards an adjacent pier. In the balanced-cantilever approach, segments are placed simultaneously on each side and work progresses from a central pier towards the two nearest piers instead. In either case, the launching gantry girders and hangers essentially serve as falsework prior to tensioning. Once the bridge span between adjacent piers is completed, the winches on the trolleys are used to lift the gantry girders and "launch" them ahead to the next span. The process of lifting and placing bridge segments (or girders) followed by launching the gantry girders ahead is repeated until the bridge is complete

Table 14.2 Types of Launching Gantries

Main Girder for Launching Gantries		
		
Honeycomb girder	**Truss girder**	**Box girder**

14.1.4 Engineering Aspects of Soil mechanics - Environmental Impact Assessment

Sustainability of a system is its ability to survive and retain its functionality over time. For an engineered system to be sustainable, it should be efficient, reliable, resilient, and adaptive. Efficiency requires that the resource use, cost and environmental impacts of the engineering system are minimal. Reliability ensures that the system is sufficiently far away from its predictable failure states. A resilient system has the ability to return to its original functioning state within an acceptable period of time when subjected to unpredictable disruptions. An adaptive system is responsive to gradual and natural changes within itself and in its environment, and is flexible to modifications and alterations required to cope with such changes. Together, these characteristics help in deciding whether an engineered system is capable of surviving in a complex and evolving socio-economic environment without losing its own character and function, and without violating the limits of the carrying capacity of the natural systems. Thus, the objective of sustainable engineering is to ensure the integration of an engineered system into the natural and man-made environment without compromising the functionality of either the engineered system or that of the ecosystem and society, and this harmony between the natural and built environments must be maintained at the local, regional and global scales.

Therefore, in the engineering domain, sustainability can be looked upon as a dynamic equilibrium between four E's — engineering design, economy, environment and equity, In view of the four E's approach of sustainable engineering, the sustainability objectives that may be incorporated in geotechnical projects are:

a. involving all the stakeholders at the planning stage of the project so that a consensus is reached on the sustainability goals of the project (such as reduction in pollution, use of environment friendly alternative materials, etc.)
b. reliable and resilient design and construction that involves minimal financial burden and inconvenience to all the stakeholders
c. minimal use of resources and energy in planning, design, construction and maintenance of geotechnical facilities
d. use of materials and methods that cause minimal negative impact on the ecology and environment
e. as much reuse of existing geotechnical facilities as possible to minimize waste. This approach aims at reaching a dynamic equilibrium between engineering integrity, economic efficiency, environmental effectiveness, and social acceptability and equity.

Several research studies have been performed that aim at making geotechnical engineering practice sustainable. The areas in which research has progressed include

1. The use of alternate, environment friendly materials in geotechnical constructions, and reuse of waste materials,
2. innovative and energy efficient ground improvement techniques,
3. Bio-slope engineering,
   Efficient use of geosysnthetics,
4. Sustainable foundation engineering that includes retrofitting and reuse of foundations, and foundations for energy extraction,
5. Use of underground space for beneficial purposes including storage of energy,
6. Mining of shallow and deep geothermal energy,
7. Preservation of geodiversity, and
8. Incorporation of geoethics in practice.

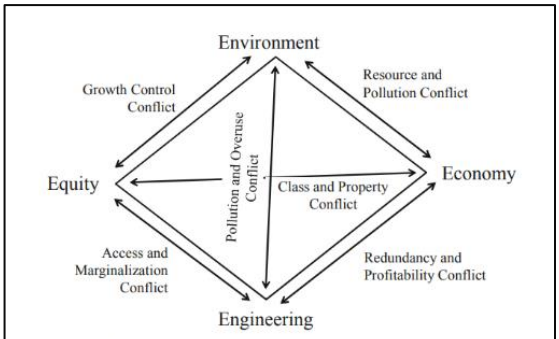


Figure 62 Four E's of Sustainability in Engineering Project

Any geo sustainability assessment framework should have a life cycle view of geotechnical processes and products and should (i) ensure societal sustainability by promoting resource budgeting and restricting the shift of the environmental burden of a particular phase to areas downstream of that phase, (ii) ensure financial health of the stakeholders, and (iii) enforce sound engineering design. As the uncertainties associated with geotechnical systems are often much greater than those with other engineered systems, sustainability framework for geotechnical engineering should include an assessment of the reliability and resilience of the geo-system, and offer flexibility to the user to identify site specific needs.

14.1.5 Water Supply-Sewerage System-Waste Water- Sustainable development techniques

❖ **Sustainable development techniques for Water Supply**

Sustainable water systems should provide adequate water quantity and appropriate water quality for a given need, without compromising the future ability to provide this capacity and quality. Water systems in the realm of sustainable development may not literally include the use of water, but include systems where the use of water has traditionally been required. Examples include waterless toilets and waterless car washes, whose use helps to alleviate water stress and secure a sustainable water supply.
Accessing the sustainability features in water supply, that is to say, the three-fold goals of economic feasibility, social responsibility and environmental integrity, is linked to the purpose of water use. Sometimes, these purposes compete when resources are limited; for example, water needed to meet the demands of an increasingly urban population and those needs of rural agriculture.

Water is used (1) for drinking as a survival necessity,
(2) in industrial operations (energy production, manufacturing of goods, etc.),
(3) domestic applications (cooking, cleaning, bathing, sanitation),
(4) agriculture.

Sustainable water supply is a component of integrated water resource management, the practice of bringing together multiple stakeholders with various viewpoints in order to determine how water should best be managed. In order to decide if a water system is sustainable, various economical, social and ecological considerations must be considered.

A water supply system will be sustainable only if it promotes efficiencies in both the supply and the demand sides. Initiatives to meet demand for water supply will be sustainable if they prioritize measures to avoid water waste. Avoiding wastage will contribute to reducing water consumption and, consequently, to delaying the need for new resources. On the supply side, it is fundamental to enhance operation and maintenance capabilities of water utilities, reducing non-revenue water (NRW), leakages, and energy use, as well as improving the capacity of the workforce to understand and operate the system. It is also necessary to ensure cost-recovery through a fair tariff system and “intelligent” investment planning. In addition, all alternatives to increase the water supply must be analyzed considering the entire life cycle.
On the demand side, the adoption of water efficient technology can considerably reduce water consumption. Investments in less water intensive industrial processes and more efficient buildings lead to a more sustainable water supply. Concrete possibilities of economic savings, social benefits (such as the involvement of different sectors of society to reach a common objective, environmental awareness of the population, etc.) and a range of environmental gains make the adoption of water efficient technologies viable.
Sustainable water supply involves a sequence of combined actions and not isolated strategies. It depends on the individual’s willingness to save water, governmental regulations, changes in the building industry, industrial processes reformulation, land occupation, etc. The challenge is to create mechanisms of regulation, incentives and affordability to ensure the sustainability of the system.

Case Study: SBT plant at Lovegrove pumping station, Mumbai Municipal Corporation

Soil Bio Technology (SBT):

Soil Bio- technology is a terrestrial system for wastewater treatment which is based on the principle of trickling filter. In this system, combination of physical processes like sedimentation, infiltration and biochemical processes are carried out to remove the suspended solids, organic and inorganic contents of the wastewater. Soil Biotechnology is designed for disposal of domestic waste water and treats them for reuse. SBT is recommended for apartment, Villas and gated communities. Unlike a conventional STP or septic tank with numerous motors, stirrer, blower, reverse flush tank, SBT based STPs have at most two motors. Life of filtering media bed is long and requires minimal maintenance, more reliable and it is energy and cost efficient. SBT can be used for arsenic/iron removal, hospital waste processing, and industrial waste water processing and industrial air purification. Suitable mineral constitution, culture containing native micro-flora and bio- indicator plants are the key components of the system. It is also known as Constructed Soil Filter (CSF). SBT systems are constructed from RCC, stone-masonry or soil bunds. It consists of raw water tank, bioreactor containment, treated water tank, piping and pumps.

- **Salient features**:

- The process can be run on batch or continuous mode.
- No sludge production
- Mechanical aeration is not required.
- The overall time of operation is 6-7 hours per day. The soil biotechnology system bed is dried prior to next cycle of use.

Figure 63 SBT plant at Lovegrove pumping Station, Mumbai Municipal Corporation

- **Project Background:**

Lovegrove pumping station treats 3 MLD out of 600 MLD wastewater through SBT. The wastewater is first screened and then diverted to SBT for treatment. Remaining screened wastewater is directly disposed to the sea through tunnel.

- **Treatment Technology:**

The treatment system has two units of 1250 sq m each called as bioreactor. The perforated pipes are laid on the surface and the wastewater is distributed over the media through these pipes. Bioreactor has different layers consisting of stone or rubble, soil media (weathered rock) containing culture. The soil media comprised of locally available weathered rock Deccan Trap Besalt with the culture containing native micro flora. The wastewater trickles down the bed and undergoes treatment. The treated wastewater is collected in separate collection tanks and then goes to a common polishing pond. The treated wastewater then undergoes chlorination and sand filtration before it is reused. The Municipal Corporation provides recycled wastewater to Mahalaxmi race course and Wellington sports club and reuses treated wastewater for horticulture purpose and central cooling in its own premises.

- **Features:**

Location: Worli, Mumbai, Maharashtra
Scale: Municipal
Implementing organisation: Mumbai Municipal Corporation, IIT Mumbai
Designed Capacity: 3 MLD
Area: 2500 sqm
Operational since: 2006
Capital cost: Rs 3 Crores
O&M: Rs 40-45 Lakhs per year

- **Performance:**

Increase in DO: BDL to 3.0
BOD reduction: 99%
COD reduction: 94%
TSS reduction: 97%

CHAPTER 15

ALL DESIGNS WITH EXPENDITURE, PERIOD AND BENEFITS

Table 15.1 Design Expenditure, Implementation period and Benefits

Sr No.	Design Proposal	Implementation Period	Approximate Cost (Rs)	Benefits
1	Public Toilet	Immediately	8,51,562	• Proper Sanitation • Elimination of Open Defecation
2	Skill Development Centre	Immediately	1,02,969	• Helpful to gain skills to unemployed people • Increase in employment and education of Women
3	Water Tank for Animals	Long Term	6,252	• Helpful to stray animals • Clean source of water for animals
4	Public Garden	Long Term	3,76,292	• Increase the aesthetic view of village • Promote Relaxation • Space for children to play
5	Post Office	Within 1 Year	11,87,162	• Increase the connectivity • Access to all postal facilities
6	Public Library	Immediately	4,92,948	• Free access to educational resources • Best place to Study • Availability of online resources through internet
7	Bank	Long Term	10,21,379	• Access to financial facilities • Availability of internet banking facilities • No need to travel to city for loan related services
8	Primary Healthcare Center	Within 1 Year	17,15,591	• Increased Access to Health Services • Improved Quality of Care • Early Management of Health Conditions

9	Septic Tank	Within 1 Year	6,57,007	• Reduce soil pollution • Will help in producing manure
10	Community Hall	Within 1 Year	16,68,123	• Functions can be engaged in village itself • Can be used for public gathering
11	Bio Gas Plant	Within 1 Year	163900	• Act as renewable source of energy • Fuel gas can used to domestic purpose
12	Rain Water Harvesting	Within 1 Year	1,11,867	• Ground Water Table will rise up • Rain Water can be stored and used for Domestic purpose

CHAPTER 16

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Survey with Interviewing

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

CHAPTER- 16

Sr.	Questions	Yes/ No	Remarks
1	What are the sources of income in village?		Farming
2	What are the chances of employment in village?		60 % With Self employment
3	What are the special technical facilities in village?	NO	
4	Is any debt on village dwellers?	No	Only Banks
5	Are village people getting agricultural help?	Yes	Pak dhiran loan
6	Is women health awareness Program organized in village?	NO	
7	Are women having opportunity to work and income?	Yes	Farming
8	Child girl education is appreciated in village?	Yes	
9	Facility of vaccination to child is available in village?	NO	
10	Are village people aware about child vaccination and done to each and every child as per norms?	Yes	
11	Women help line number information is provided to village people?	Yes	
12	Is water scarcity in village? How many days per year?	NO	
13	Is village under any debt?	NO	
14	Is any serious issue due to debt from bank or any person happened in village?	NO	
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	NO	
16	Is any death of patient occurred due to unavailability of medical facility in village?	Yes	Corona
17	How many disabled (physically challenged) is observed in village? Provide list with Male/female/girl/boy with age and type of disability and reason of disability.		
18	Is village improvement is observed in comparative scenario from past to present?	Yes	
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?	NO	
20	Life Living standard of girls and women is appreciated and uplifted in village?	Yes	

Nodal officer and students can add more questions. This is a sample. Having Minimum requirement.

Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

સરપંચ
કિમ્બુવા ગ્રામ પંચાયત
તા. સરસ્વતી, જિ. પાટણ

CHAPTER 17

IRRIGATION / AGRICULTURE ACTIVITES AND AGRO INDUSTRY, ALTENATE TECHNICS AND SOLUTION

Alternate Sustainable Farming Methods or Practices:

1. Make use of Renewable Energy Sources

The first and most important practice is the use of alternate sources of energy. The use of solar, hydro-power or wind-farms is ecology friendly. Farmers can use solar panels to store solar energy and use it for electrical fencing and running of pumps and heaters. Running river water can be a source of hydroelectric power and can be used to run various machines on farms. Similarly, farmers can use geothermal heat pumps to dig beneath the earth and can take advantage of earth's heat.

Figure 64 Drip Irrigation using Solar

Table 17.1 Energy Source and their uses

Energy source	Conversion to	Most applied technologies and applications
Solar energy	▪ Heat ▪ Mechanical energy ▪ Electricity	▪ Photovoltaic (PV) driven pumps for irrigation ▪ Crops, drying of fruits / spices, ice making and cold storage (through absorption or heat driven refrigeration)
Wind energy	▪ Mechanical energy ▪ Electricity	▪ Direct use: grinder, mills, mechanical water pumps ▪ Electrical water pumps
Micro hydro energy	▪ Mechanical energy ▪ Electricity	▪ Direct use: mill, grinder ▪ Electrical motor for processing
Biomass energy	▪ Heat ▪ Electricity ▪ Liquied Biofuels ▪ Biogas	▪ Dryer (fruits, herbs,spices) ▪ Fermenter (tea) ▪ Combustion motor or electric motor (fuels like ethanol and biodiesel for transportation) ▪ Anaerobic digester: biogas for lighting, cooking and heating and industrial biogas for decentralized electricity
Hybrid power systems	Combine fossil fuel-fired generators with wind or solar electrical power	▪ Wind/PV Hybrid ▪ Wind/Diesel Hybrid(s) ▪ Used in the food-processing sector (grinding of corn, wheat and millet, and milling of grain-hulling paddy)

2. Integrated pest management

Integrated pest management is a combination of pest control techniques for identifying and observing pests in the initial stages. One also needs to realize that not all pests are harmful, and therefore it makes more sense to let them co-exist with the crop than spend money eliminating them. Targeted spraying works best when one need to remove specific pests only. This not only helps you to spray pest on the selected areas but will also protect wildlife from getting affected.

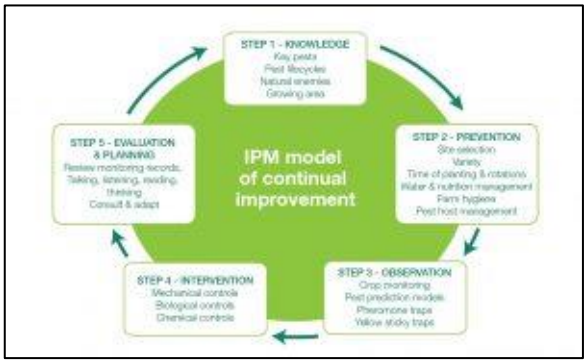


Figure 65 Steps for implementing and evaluating IPM practices

Integrated pest management (IPM) combines the use of biological, cultural and chemical practices to control insect pests in agricultural production.It seeks to use natural predators or parasites to control pests, using selective pesticides for backup only when pests are unable to be controlled by natural means.IPM should not be confused with organic practices.It does not discourage spraying chemicals; it promotes spraying with selective pesticides only when the crop needs it, which generally means that less pesticide is used.

3. Hydroponics and Aquaponics

In these innovative farming techniques, plants grow without soil and get nourished through specialized nutrients that are added to water. In hydroponic systems, crops are grown with the roots directly in a mineral solution or with the roots in an inert medium like gravel or perlite. Aquaponics combines the raising of aquatic animals (such as fish) with the growing of hydroponic crops.

Figure 66 Hydroponics

The water containing nutrients resulting from the mineralization of the waste material from the aquaculture fish is used to nourish the hydroponic plants. After the plants use the water, the water gets purified and then re-circulated back into the system to be reused by the fish.

Types of Hydroponics Systems

1. Deepwater Culture: Also known as the reservoir method, deepwater culture is thought to be the easiest method of running hydroponics. The roots are suspended directly inside the nutrient solution and growers must utilize an aquarium air pump to oxygenate the solution so the plants don't drown.

2. Nutrient Film Technique: This method depends on absorption of oxygen from the air by running a continuous flow of nutrient solution over the plants' roots. To properly execute this method, the plants must be grown on a slight tilt that allows the solution to flow downwards. This may sound like a hassle, but the increased growth rate makes it worth it!

3.Aeroponics: Aeroponics depend on suspending the roots in the air and misting them with the solution. You can promote growth this way and do it by hitting the roots with either a pond fogger or a fine nozzle.

4.Wicking: Of all the methods of running hydroponics, this is thought to be the simplest and most cost-efficient method. The plant and reservoir of a nutrient solution are connected by the wick, which slowly feeds them over time. Absorbent materials like cotton are the most common medium and slowly move the water/nutrient solution to the plant.

5. Ebb & Flow: Also known as a flood and drain system, this technique requires the flooding of the growing area at specific intervals based on a timer. In between floods, the nutrient solution drains back into the reservoir. This is considered to be an intermediate level technique and doesn't require much water.

6. Drip System: Finally, with the drip system a slow feed of nutrient solution is distributed to the hydroponics medium using a slow-draining medium like rock wool, coconut coir, or peat moss.

4. Crop Rotation

Crop rotation is a tried and tested method used since ancient farming practices proven to keep the soil healthy and nutritious. Crop rotation has a logical explanation to it – the crops are picked in a pattern so that the crops planted this season replenish the nutrients and salts from the soil that were absorbed by the previous crop cycle. For example, row crops are planted after grains to balance the used nutrients.

5. Polyculture Farming

It involves growing multiple crop species in one area. These species often complement each other, and greater diversity of products can be produced at one plot while fully utilizing available resources. High biodiversity makes the system more resilient to weather fluctuations, promotes a balanced diet and applies natural mechanisms for preservation of soil fertility.

Figure 67 Polyculture Farming

Additionally, there are many advantages associated with a polyculture system as compared to monoculture:

- Better nutrient utilization – nutrients not utilized by one crop will be beneficial to another crop in the crop rotation
- Better soil utilization – the soil is used year round
- Stable yields – the yield is not as easily threatened by adverse weather and environmental conditions
- Less land and water use – multiple crops can be grown on a single farmland, of which is much easier to manage irrigation
- Higher crop resistance to plant pests – plants grown near each other are more immune to pests
- Better soil properties – growing of different crops on the same land enhances the soil properties, making it more suitable for crop production
- Soil erosion control
- Increased biodiversity – growing a variety of plants on the same land increases local biodiversity
- Meets the food demands – a polyculture system requires less land to produce more food

6. Permaculture

Permaculture is a food production system with intention, design, and smart farming to reduce waste of resources and create increased production efficiency. The focus is on the use of perennial crops such as fruit trees, nut trees, and shrubs that all function together in a designed system that mimics how plants in a natural ecosystem would function. Permaculture design techniques include growing grain without tillage, herb and plant spirals, keyhole and mandala gardens, sheet mulching, each plant serving multiple purposes, and creating swales on contour to hold water high on the landscape.

7. Avoid Soil Erosion

Healthy soil is key to a good crop. Age-old techniques like tilling the land, plowing etc. still work wonders. Manure, fertilizers, cover crops etc. also help improve soil quality. Crop rotations prevent the occurrence of diseases in crops, as per studies conducted.

Diseases such as crown rot and tan spot can be controlled. Also, pests like septoria, phoma, etc. can be eliminated by crop rotation techniques. Since diseases are crop-specific, crop rotation can work wonders.

8. Agroforestry

Agroforestry has become one of the powerful tools of farmers in dry regions with soils susceptible to desertification. It involves the growth of trees and shrubs amongst crops or grazing land, combining both agriculture and forestry practices for long-lasting, productive, and diverse land use when approached sustainably.

Figure 68 Agroforestry

Trees here create a favorable microclimate that maintains the favorable temperature and soil humidity while protecting crops from wind or heavy rain. Trees have another important role. They stabilize soils, minimize nutrient runoff and improve soil structure. Trees in this farming system also provide wood and fruits as an additional source of income for farmers with the possibilities for product diversification. Farmers can go even as far as growing a whole edible forest.

Agroforestry is important for biodiversity for different reasons. It provides a more diverse habitat than a conventional agricultural system in which the tree component creates ecological niches for a wide range of organisms both above and below ground. The life cycles and food chains associated with this diversification initiates an agro-ecological succession that creates functional agroecosystems that confer sustainability. Tropical bat and bird diversity for instance can be comparable to the diversity in natural forests. Although agroforestry systems do not provide as many floristic species as forests and do not show the same canopy height, they do provide food and nesting possibilities. A further contribution to biodiversity is that the germplasm of sensitive species can be preserved. As agroforests have no natural clear areas, habitats are more uniform. Furthermore, agroforests can serve as corridors between habitats. Agroforestry can help to conserve biodiversity having a positive influence on other ecosystem services.

9 Natural Pest Eliminators

Bats, birds, insects etc. work as natural pest eliminators. Farmers build a shelter to keep these eliminators close. Ladybugs, beetles, green lacewing larvae, and fly parasites all feed on pests, including aphids, mites and pest flies.These pest eliminators are available in bulk from pest control stores or farming supply shops. Farmers can buy and release them on or around the crops and let them make the farm as their home

10 Biodynamic Farming

Biodynamics incorporates ecological and holistic growing practices based on the philosophy of “anthroposophy.” Biodynamic practices can be applied to farms that grow a variety of produce, gardens, vineyards, and other forms of agriculture.

In biodynamic farming, the high biodiversity of plants, animals and beneficial insects help replenish soil fertility and enhance plant growth to create a resilient ecosystem and support each other's health. Biodynamics focus on generating the necessary health and soil fertility for food production onsite through the implementation of practices such as composting, application of animal manure from farmed animals, cover cropping or rotating complementary crops. Working with the natural phenomenon of the cosmos also given much importance that influences upon the heath of the soil, plants, and animals during different moon and sun cycles.

Figure 69 Biodynamic Farming

It treats soil fertility, plant growth, and livestock care as ecologically interrelated tasks, emphasizing spiritual and mystical perspectives. Biodynamics has much in common with other organic approaches – it emphasizes the use of manures and composts and excludes the use of synthetic (artificial) fertilizers, pesticides and herbicides on soil and plants. Methods unique to the biodynamic approach include its treatment of animals, crops, and soil as a single system, an emphasis from its beginnings on local production and distribution systems, its use of traditional and development of new local breeds and varieties. Some methods use an astrological sowing and planting calendar. Biodynamic agriculture uses various herbal and mineral additives for compost additives and field sprays; these are prepared using methods that are more akin to sympathetic magic than agronomy, such as burying ground quartz stuffed into the horn of a cow, which are said to harvest "cosmic forces in the soil".

No difference in beneficial outcomes has been scientifically established between certified biodynamic agricultural techniques and similar organic and integrated farming practices. Biodynamic agriculture lacks strong scientific evidence for its efficacy and has been labeled a pseudoscience because of its reliance upon esoteric knowledge and mystical beliefs.

11. Managed Grazing

A periodic shift of the grazing lands for cattle should be maintained. Moving livestock offers them a variety of grazing pastures. This means they will receive various nutrients, which are good for them. The excreta of these animals serve as a natural fertilizer for the land.

Change of location also prevents soil erosion as the same patch of land is not trampled upon constantly. Also, by grazing in time and mowing the weeds can be gotten rid off before they produce more seeds and multiply.

12. Better Water Management

The first step in water management is the selection of the right crops. One must choose the local crops as they are more adaptable to the weather conditions of the region. Crops that do not demand too much water must be chosen for dry areas. Irrigation systems need to be well planned otherwise, they lead to other issues like river depletion, dry land and soil degradation. One can also build rainwater harvesting systems to store rainwater and use them in drought prevailing conditions. Apart from that, municipal wastewater can be used for irrigation after recycling.

13. Urban Agriculture

Since most of the global population is predicted to live in cities in the future, there is tremendous scope for urban agriculture to make a significant positive impact on how we produce our food around the world. The recent requirement to localize our food system requires that we grow food much closer to home,

including in cities. Therefore, today, many innovative and sustainable growing techniques are already in the application in cities, including backyard farms and gardens, community gardens, rooftop farms, growing crops in urban greenhouses, indoor hydroponic farms, and perhaps even growing food inside urban farm towers

Urban agriculture can reflect varying levels of economic and social development. It may be a social movement for sustainable communities, where organic growers, "foodies," and "locavores" form social networks founded on a shared ethos of nature and community holism. These networks can evolve when receiving formal institutional support, becoming integrated into local town planning as a "transition town" movement for sustainable urban development. For others, food security, nutrition, and income generation are key motivations for the practice. In both scenarios, more direct access to fresh vegetables, fruits, and meat products through urban agriculture can improve food security and food safety.

Figure 70 Urban Agriculture

Types of Urban Agriculture

1. Backyard Gardens

This is the growing of food on home property. Its produce is mostly shared among friends, family, and neighbors as it typically leads to a surplus in the harvest. The food can also be stored and preserved. Backyard gardens are beneficial to communities as neighbors can share each other's backyard and employ different methods of farming leading to better yields.

2. Tactical Gardens

This involves using the limited space available to practice agriculture without having to incur hefty expenses. For instance, an urban dweller could easily make a keyhole garden to cover a space that was intended for car parking in the street. This puts to good use land that could have potentially have gone to waste and instead creates an activity that can be done for leisure or to make more food.

3. Street landscaping

This is the landscaping of streets for different uses such as community gardens, which are tended to by the people in the neighborhood. They not only make the streets look beautiful but also purifies the air creating a clean environment. Since they are primarily located along the street, their added advantage is their capability of reducing urban stormwater runoff.

4. Forest gardening

It pertains to the practice of having gardens grown within an urban forest. Forest gardening is achieved by having different crops, vegetables, and fruits grown within urban settings. Forests usually create an environment that is favorable for crop development and for this reason, they help in ensuring that forests are protected and can make deforestation a nonfactor in the urban settings. Forest gardening can also be

part of afforestation efforts, which encourages the planting of trees as a step towards the fight against global warming in urban areas.

5. Greenhouses

It involves the practice of agriculture in residential, commercial, and communal urban spaces in greenhouses. They require a substantial size of land to set up depending on the crops being planted. Greenhouses give farmers the ability to grow a crop all year round as they provide a controlled environment where the crops can be subjected to specific conditions required for their growth.

6. Rooftop gardens

Since urban areas have limited space, it does not mean agriculture cannot be practice. This is where rooftop space comes in as they can easily be utilized for cropping vegetables, fruits, and herbs. The advantage of rooftop gardens is that it can aid in reducing urban heat island as well as improving the air quality. Aside from these, rooftop gardens can be used to beautify recreational facilities.

7. Green walls

The green wall encompasses the growing of vegetation or food crops on the external or internal space of a wall. It does not use up a lot of space as the mechanism used helps to supply the food with adequate water and it uses soil present on the walls. It is a good method for reducing stormwater runoff.

8. Vertical farms

This involves potentially farming upwards to reduce the agricultural land footprint. Green walls can be used as a method for vertical farms as it also uses minimal space and is practiced on the sides of vertical walls.

9. Animal husbandry

This is the practice of rearing animals for food in urban settings. An urban dweller can choose a location suitable for keeping different types of animals or focus on specific animals such as poultries, goats, rabbits, or sheep. Some cities limit the number of animals one can keep and also the type of animals that can be kept.

10. Urban beekeeping

This is a possibility but comes with a lot of restrictions and regulations from the local government depending on the location and the city. In other words, the requirements for beekeeping may vary from city to city. If practiced, however, it has lots of benefits to the local environment. Bees are important to the ecosystem as they not only produce honey but act as pollinators and promote biodiversity.

Figure 71 Vertical Farming

Figure 72 Green Wall in Mexico

CHAPTER 18

SOCIAL ACTIVITIES – ANY ACTIVITES PLANNED BY STUDENTS

- **Technology in education**

Activity-based learning has been in use for many years, but adapting it to rural settings and integrating it with technology is still in its infancy. Many believe that teaching technology to children in an underprivileged environment will improve the skilled workforce in future. According to a two-year study conducted by the World Bank, merely putting computers in schools and training teachers to use them will not improve the learning level of students. A successful integration of technology in classroom embeds technology within the teachers' lesson plans.

Figure 73 Online Classes

Students use technology to gather information, organise learning and present it through computer applications. This initiative requires teachers also to go beyond the traditional role of giving information and act as facilitators for students to create authentic learning artifacts using technology. Contemporary teaching methods test the students' memory rather than their knowledge or comprehension. An interactive class open to discussions, and activities that prompt students to think beyond textbooks and learn using technological tools is an essential step to bridge the digital divide in rural areas

Challenges in implementation: Implementing this has its share of challenges. frequent power cuts, lack of power inverters and poor Internet connectivity due to villages being remote, affect the smooth running of an online class, conducted for an hour every week.

- **Covid-19 Awareness Activities**

World is being hit by a very contagious virus name COVID-19 Corona Virus. Urban population has access to every resource used to tackle this pandemic. Rural population is unaware and has no access to "recently developed tools" to tackle this virus. Rural population possess equal right to access those facilities by every mean possible. Not having enough information and knowledge about the recent developments, rural people are un aware of taking safety precautions regarding tackling the Virus. To bridge this gap, one can organize an awareness activities camp and can create awareness about the Covid-19 virus in village.

Figure 74 Distribution of masks and sanitizers

Following activities shall be conducted to make aware of this pandemic:

2. Creating awareness about what is Covid-19 virus, how it spreads and explaining how social distancing checks spread of coronavirus
3. Demonstrating how wearing of masks can reduce the risk of infecting others and protecting ourselves
4. Correct method of using and discarding the masks
5. Distribution of masks to the villagers
6. Demonstration of correct method of washing with soap
7. Effective use of sanitizers and
8. Distribution of sanitizers to the panchayat cleaning staff

Amid the ongoing pandemic, creating awareness about the disease and distributing things of basic necessity among those who cannot afford them is a good step. The Covid Kit has all essential things required to maintain hygiene and monitor health parameters including a face mask, face shield, sanitiser, gloves, thermometer, and oximeter. All the products provided in the kit are branded which reflects the quality and seriousness with which the administration is running this campaign aims to help those who are unable to manage COVID-19 safety gear on their own. it is important to send out a message to people, to make them aware of basic hygiene, precautions and preventive steps to be taken.

- **Business Ideas for Self Help Group women during this Pandemic**

Program and Activities shall be done to encourage the self-help group of the village for doing business and making their own income. This will eliminate their dependency on other and can improve their life style. There are several medium and small scale business, which can be done by women of the village.

Women can start Papad making business and can sell in their own village. Selling the product in their village will maintain the economy which in turn help other villagers too. During this pandemic time, face masks and face shields are in good demand. Women knowing basic sewing operation can start this work and can sell their product in their own village.

Figure 75 Papad making women

CHAPTER 19

SAGY QUESTIONNAIRE SURVEY FORM WITH THE SARPANCH SIGNATURE

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

(1)

Village: Kimbuva Gram Panchayat: Kimbuva Ward No.____

Block: Saraswati District: Patan

State: Gujarat L S Constituency: Patan

1. Family Identity and Size

Name of Head of Household	Dahyabhai Mathabhai Patel							Male/ Female	M
SECC Survey ID:		Family Size	3	Over 18	3	6 to 18	0	Under 6	0

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]		Life Insurance	(1.) All Adults 2. Some Adults 3. None	AABY	1. Yes 2. (No)	Kisan Credit Card	Yes (No)
Poverty Status Year[2]:	1. BPL (2.) APL	Health Insurance	(1.) All Adults 2. Some Adults 3. None	RSBY	1. Yes 2. (No)	MGNREGS Job Card Number	
PDS (If NFSA is not implemented)	Annapurna	Antyodaya	BPL	APL	Is any woman in the family member of an SHG? Yes / No		
PDS (If NFSA is implemented)	Annapurna	Antyodaya	Priority	Other			

2. Adults (above 18 years)

Name	Age	Sex M/F / O	Disability Status Y/N	Marital Status[3]	Education Status[4]	Adhaar Card (Y/ N)	Bank A/C (Y/N)	Social Security Pension[5]
Dahyabhai Patel	53	M	N	2	08	Y	Y	0
Dilaben Patel	53	F	N	2	04	Y	Y	0
Tushar Patel	23	M	N	1	08	Y	Y	0

3. Children from 6 years and up to 18 years

Name	Age	Sex M/F/O	Disability Y/N	Marital Code*	Level of Education: Code#	Going to School /College (Y/N)	Current Class	Computer Literate Y/N
N/A								

4. Children below 6 years

Name	Age	Sex M/F/ O	Disability Yes/No	Going to School (Y/N)	Going to AWC Y/N	De-worming Done	Fully Immu-nised Y/N	Mother's Age at the time of Child's Birth
N/A								

[1] Scheduled Caste 1, Scheduled Tribe 2, Other Backward Castes 3, Other 4

[2] Enter the BPL Survey round being used in the Gram Panchayat for identification of BPL Families (e.g. 1997/2002/2011)

[3] *Marital Status: Not Married – 1, Married – 2, Widowed – 3, Divorced/Separated – 4*

[4] *Level of Education: Not Literate – 01, Literate – 02, Completed Class 5 - 03, Class 8th – 04, Class 10th-05, Class 12th-06, ITI Diploma-07, Graduate-08, Post Graduate/Professional – 09 (write the highest level applicable)*

[5] No Pension – 0, Old Age Pension – 1, Widow Pension – 2, Disability Pension – 3, Other Pension – 4 (mention)

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

5. Hand washing

	Always		Sometimes		Never
After use of Toilet	Soap	Other	Soap	Other	
Before Eating	Soap	Other	Soap	Other	

6. Use of Mosquito Net
Children: Yes / No Adults: Yes / No

7. Do members take Regular Physical Exercise

	Yoga	Games	Other Exercises
Adults	Yes / No	Yes / No	Yes / No
Children	Yes / No	Yes / No	Yes / No

8. Consumption of Tobacco

	Smoking	Chewing
Adults		✓
Children		

9. House & Homestead Data

Own House: Yes / No	No. of Rooms: 2
Type: Kutcha / Semi Pucca / Pucca	
Toilet: Private / Community / Open Defecation	
Drainage linked to House: Covered / Open / None	
Waste Collection System: Door Step / Common Point / No Collection System	
Homestead Land: Yes / No	Kitchen Garden : Yes / No
Compost Pit: Individual/ Group/ None	Biogas Plant: Individual/ Group/ None

10. Source of Water (Distance from source in KMs)

Source of Water		Distance
Piped Water at Home	Yes / No	0.2
Community Water Tap	Yes / No	0.2
Hand Pump (Public / Private)	Yes / No	
Open Well(Public / Private)	Yes / No	
Other (mention):	ESR & Sump	0.2

11. Source of Lighting and Power

Electricity Connection to Household: Yes / No
Lighting: Electricity/Kerosene/Solar Power
Mention if Any Other: _____
Cooking: LPG/Biogas/Kerosene/Wood/Electricity
Mention if Any Other: _____
If cooking in Chullah: Normal/Smokeless

12. Landholding (Acres)

1. Total	5	2. Cultivable Area	5
3. Irrigated Area	5	4. Uncultivable Area	0

13. Principal Occupations in the Household

Livelihood	Tick if applicable
Farming on own Land	✓
Sharecropping /Farming Leased Land	✓
Animal Husbandry	✓
Pisciculture	
Fishing	
Skilled Wage Worker	
Unskilled Wage Worker	
Salaried Employment in Government	
Salaried Employment - Private Sector	
Weaving	
Other Artisan(mention)	
Other Trade & Business (mention)	

14. Migration Status
Does any member of the household migrate for Work: Yes / No. If Yes Entire Year / Seasonal
Does anyone below 18 years migrate for work: Y/N

15. Agriculture Inputs

Do you use Chemical Fertilisers	Yes/No
Do you use Chemical Insecticides	Yes/No
Do you use Chemical Weedicide	Yes/No
Do you have Soil Health Card	Yes/No
Irrigation: None/ Canal/ Tank/ Borewell/Other	
Drip or Sprinkler Irrigation: Drip /Sprinkler/ None	

16. Agricultural Produce in a normal year (Top 3) (5 acres)

Name	Unit	Quantity
Castor	kg	4000
Wheat	kg	8000
Mustard	kg	3600

17. Livestock Numbers

Cows: 0	Bullocks: 0	Calves: 0
Female Buffalo: 3	Male Buffalo: 0	Buffalo Calves: 2
Goats/ Sheep: 0	Poultry/ Ducks: 0	Pigs: 0
Any other: Type N/A		No.
Shelter for Livestock: Pucca / Kutcha / None		
Average Daily Production of Milk(Litres): 15		

18. What games do Children Play

N/A

19. Do children play musical instrument (mention)

Schedule Filled By:
Principal Respondent:
Date of Survey:

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(2)

(Note: Please aggregate information from village level questionnaires wherever relevant)

I. Basic Information

a. Gram Panchayat: Kimbuva

b. Block: Saraswati

c. District: Patan

d. State: Gujarat

e. Lok Sabha Constituency: Patan

f. Number of Wards in the Gram Panchayat: _____

g. Number of Villages in the Gram Panchayat: 1

h. Names of Villages: Kimbuva

Demographic Information

Number of Households 627 Total Population 2960 Male 1518 Female 1442

SC HHs _____ ST HHs _____ OBC HHs _____ Other HHs _____

I. Access to Infrastructure / Facilities / Services

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
a.	ANM/ Health Sub Centre	YES	0.3 km
b.	Nearest Primary Health Centre (PHC)	NO	8 km
c.	Nearest Community Health Centre (CHC)	NO	8 km
d.	Nearest Post Office	yes	0 km
e.	Nearest Bank Branch (Any)	yes	
f.	Nearest Bank with CBS Facility	NO	14 km
g.	Nearest ATM	NO	14 km
h.	Nearest Primary School	yes	
i.	Nearest Middle School	yes	
j.	Nearest Secondary School	yes	
k.	Nearest Higher Secondary School / +2 College	yes	
l.	Nearest Graduate College	NO	14 km
m	Nearest ITI / Polytechnic Centre	NO	14 km
n	Kisan Seva Kendra	NO	14 km

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
o	Agriculture Credit Cooperative Society	NO	8 km
p	Nearest Agro Service Centre	NO	4 km
p	MSP based Government Procurement Centre	NO	14 km
q	Milk Cooperative /Collection Centre	Yes	
r	Veterinary Care Centre	Yes	
s	Ayurveda Centre	NO	14 km
t	E – Seva Kendra	NO	14 km
u	Bus Stop	Yes	
v	Railway Station	NO	14 km
w	Library	NO Yes	14 km
x	Common Service Centre	NO	14 km

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total 0 Public 0 Private 0

b. Mini Stadium : N Yes(Y) /No (N) *(Playground with equipment and sitting arrangement)*

V. Education, ICDS

. a. Number of Angan Wadi Centres: 4

b. Number of villages without Angan Wadi Centres 0

Names of such villages: _____

c. Schools (Number)

Primary Private: N Primary Govt.: 4

Middle Private: N Middle Govt.: 4

Secondary Private: N Secondary Govt.: 4

Higher Secondary Private: N Higher Secondary Govt: 4

VI. Public Distribution System

	Item	Private Contractor	Women's SHG	Gram Panchayat	Cooperative	Other (Mention)	Location in GP (mention Location)	If outside GP, Location & distance from GP HQrs)
a.	Cereal (Rice/ Wheat/ Millets)					Farmers		
b.	Kerosene	✓						Patan 14 km
c.	Other (mention)							

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

3

VII. Coverage of Villages under different Facilities & Services

	Parameter	Villages Status[1]	Names of Villages Covered	Names of Villages not Covered
a.	Piped Water Supply Coverage to Villages	Covered 1 Not Covered 0	Kimbuva	
b.	Hand Pump Coverage in Villages:	Covered 0 Not Covered 0	Kimbuva	
c.	Coverage under Covered Drains:	Covered 1 Not Covered 0	Kimbuva	
d.	Coverage under Open Drains:	Covered 0 Not Covered 0	Kimbuva	
e.	Villages with Household Electricity Connection (Numbers)	Connected 1 Not Connected 0	Kimbuva	

VIII. Land and Irrigation

	Private Land	Area in ~~Acres~~ hectare		Common Land	Area in ~~Acres~~ hectare		Irrigation Structure	No.
a.	Cultivable Land	944 hec	d.	Pasture / Grazing Land	67 hec	g.	Check Dam	0
b.	Irrigated Land	500 hec	e.	Forests/ Plantations	—	h.	Wells/Bore Wells	22
c.	Un-irrigated Land	—	f.	Other Common Land	57 hec	i	Tanks /Ponds	2

[1] Mention the number of Villages Covered and Not Covered

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

IX. Parameters relating to Households & Institutions

		Number
a)	Number of eligible Households for pension (old age, widow, disability)	–
b)	Number of Households receiving pension (old age, widow, disability)	5, 8, 3
c)	Number of eligible Households who are not receiving pension	–
d)	Number of Households eligible for Ration Card	–
e)	Number of eligible HHs having ration cards	–
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	150
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	10
h)	Number of active Job Card holders under MGNREGA	491
i)	Number of Job Card holders who completed 100 days of work during 2013-14	–
j)	Number of shops selling alcohol	0
k)	Number of BPL families	238
l)	Number of landless households	–
m)	Number of IAY beneficiaries	–
n)	Number of FRA[2] beneficiaries	–
o)	Number of Community Sanitary Complexes	–
p)	Number of Households headed by single women	–
q)	Number of Households headed by physically handicapped persons	–
r)	Total number of Persons with Disability in the village	–
s)	Number of SHGs	82
t)	Number of active SHGs	–
u)	Number of SHG Federations	–
v)	Number of Youth Clubs	–
w)	Number of Bharat Nirman Volunteers	–

Name and Signature of Surveyor and Respondent'

Pravin Patel Surveyor	જયેશ.જી.પરમાર સરપંચ કિમ્બુવા ગ્રામ પંચાયત તા.સરસ્વતી,જિ.પાટણ PRI Respondent (Preferably Gram Panchayat Chairperson)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	12/05/2021 Date of Survey

[2] The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

This questionnaire should be filled for each of the villages in the selected Gram Panchayat[1]

(4)

I. Basic Information

a. Village: Kimbuva

b. Ward Number: _____

c. Gram Panchayat: Kimbuva

d. Block: Saraswati

e. District: Patan

f. State: Gujarat

g. Lok Sabha Constituency: Patan

h. Number of Habitations / Hamlets in the Gram Panchayat: _____

i. Names of Habitations / Hamlets:

Demographic Information

Number of Households 627 Total Population 2960 Male 1518 Female 1442

SC HHs – ST HHs – OBC HHs – Other HHs _____

II. Access to Infrastructure/Amenities etc.

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
a.	Nearest Primary School	Y	
b.	Nearest Middle School	Y	
c.	Nearest Secondary School	Y	
d.	Kisan Seva Kendra	N	14 km
e.	Milk Cooperative /Collection Centre	Y	
g.	Health Sub Centre	Y	
h.	Bank	Y	
i.	ATM	N	14 km
j.	Bus Stop	Y	
k.	Railway Station	N	14 km

[1] While filling this the surveyor must collect the information from the Ward Member/s and relevant government officials

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
l	Library	N	14 km
m	Common Service Centre	N	14 km
n	Veterinary Care Centre	Y	

ii. Road Connectivity
a. Habitations connected by All-weather Roads 1 *(1-All 2-None 3-Some)*
If 3 mention the name of the habitations where not available: B - Farmhouse

iii. Drinking Water Facilities
a.Piped Water Supply Coverage to Habitations: 1 *(1-All 2-None 3-Some)*
If 3 mention the name of the habitations not covered:

b.Hand Pump Coverage in Habitations: 2 *(1-All 2-None 3-Some)*
If 3 mention the name of the habitations not covered:

iv. Coverage of Habitations under Waste Management System
a. Coverage under Covered Drains: 1 *(1-All 2-None 3-Some)*
If 3 mention the name of the habitations not covered:

b. Coverage under Open Drains: 2 *(1-All 2-None 3-Some)*
If 3 mention the name of the habitations not covered:

c. Coverage under Doorstep Waste Collection: *(1-All 2-None 3-Some)*
If 3 mention the name of the habitations not covered: 2

v. Coverage of Habitations under Electrification
a. Coverage under Household Connections: *(1-All 2-None 3-Some)*
If 3 mention the name of the habitations not covered: 1

b.Coverage under Street Lighting: All*(1-All 2-None 3-Some)*
If 3 mention the name of the habitations not covered: 1

vi. Sports Facilities in the Village
a.Number of Play Grounds in the Village (minimum size 200 square meters): 0
b.Mini Stadium : N Yes(Y) /No (N)

vii. Education, ICDS
a. Number of Anganwadi Centres: 4
c. Schools (Number)
Primary Private: 0 Primary Govt.: 1
Middle Private: 0 Middle Govt.: 1
Secondary Private: 0 Secondary Govt.: 1
Higher Secondary Private: 0 Higher Secondary Govt: 1

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

viii. Land Category		Area in ~~Acres~~ Hectare		Land Category	Area in ~~Acres~~ Hectare		Irrigation Structure	No.
a.	Cultivable Land	944 hec	d.	Pasture / Grazing Land	67 hec	g.	Check Dam	0
b.	Irrigated Land	500 hec	e.	Forests/ Plnatations	—	h.	Wells/Bore Wells	22
c.	Un-irrigated Land	—	f.	Other Common Land	57 hec	I	Tanks /Ponds	2

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	491
2	Number of active Job Card holders who have completed 100 days of work	—
3	Number of shops selling alcohol	0
4	Number of BPL families	238
5	Number of landless households	—
6	Number of IAY beneficiaries	—
7	Number of FRA beneficiaries	—
8	Number of common sanitation complexes	—
9	Number of SHGs	82
10	Number of active SHGs	—
11	Existence of SHG Federation in the Village (Yes / No)	—
12	Number of Youth Clubs	—
13	Number of Bharat Nirman Volunteers	—

Name and Signature of Surveyor and Respondent'

Dharmik Patel	વિરેશ.જી.પટેલ સરપંચ કિમ્બુવા ગ્રામ પંચાયત તા.સરસ્વતી,જિ.પાટણ		12/05/2021
Surveyor	PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey

CHAPTER 20

TDO-DDO-COLLECTOR EMAIL SENDING SOFT COPY ATTACHMENT IN THE REPORT

GPERI

PATEL DHARMIK <171040106010@gperi.ac.in>

Development scenario of village Kimbuva, Ta: Saraswati, Dist: Patan.

PATEL DHARMIK <171040106010@gperi.ac.in> Thu, Jul 1, 2021 at 8:06 PM
To: mam-patan@gujarat.gov.in, ddo-pat@gujarat.gov.in

Respected Sir/Madam,

We are the students of **Gujarat Power Engineering and Research Institute, Mehsana** affiliated to **Gujarat Technological University-GTU**. GTU has assigned us this project named **Vishwakarma Yojanaa** in which we have surveyed various villages and designed various amenities to make them ideal for living and get a better life as per requirements & village problem statements. As a part of Vishwakarma Yojana's guidelines, we have been asked to inform all the respected officers about our project in which we will shortly notify about **Kimbuva** Village profile of issues for development and our design work for them which is as below.

Sr. No.	Design Proposal	Implementation Period	Approximate Cost (Rs)	Benefits
1	Public Toilet	Immediately	8,51,562	Proper Sanitation and Elimination of Open Defecation
2	Skill Development Centre	Immediately	1,02,969	Helpful to gain skills to unemployed people and Increase in employment and education of Women
3	Water Tank for Animals	Long Term	6,252	Helpful to stray animals and Clean source of water for animals
4	Public Garden	Long Term	3,76,292	Increase the aesthetic view of village and Promote Relaxation Space for children to play
5	Post Office	Within 1 Year	11,87,162	Increase the connectivity and Access to all postal facilities
6	Public Library	Immediately	4,92,948	Free access to educational resources, Best place to Study and Availability of online resources through internet
7	Bank	Long Term	10,21,379	Access to financial facilities, Availability of internet, banking facilities and No need to travel to city for loan related services
8	Primary Healthcare Center	Within 1 Year	17,15,591	Increased Access to Health Services, Improved Quality of Care and Early Management of Health Conditions
9	Septic Tank	Within 1 Year	6,57,007	Reduce soil pollution and will help in producing manure
10	Community Hall	Within 1 Year	16,68,123	Functions can be engaged in village itself and can be used for public gathering
11	Bio Gas Plant	Within 1 Year	163900	Act as renewable source of energy and Fuel gas can used to domestic purpose
12	Rain Water Harvesting	Within 1 Year	1,11,867	Ground Water Table will rise up and Rain Water can be stored and can be used for Domestic purpose

Please find herewith the Detailed Project Report of Kimbuva Village.

Regards,
Dharmik Patel (Email: 171040106010@gperi.ac.in)
Pray Patel (Email: 171040106027@gperi.ac.in)
U.G.,Civil Engineering
Gujarat Power Engineering and Research Institute, Mehsana
Gujarat Technological University

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CHAPTER 21

COMPREHENSIVE REPORT FOR THE ENTIRE VILLAGE

Kimbuva village is been selected as an allocated village for this project. Kimbuva village is located in Saraswati Taluka of Patan district. It is around 17 km away from Patan City. The population of this village is 2960 and 124 km from State capital Gandhinagar. The population of village is 2960 with the area of approximately 11 km^2. Villagers are engaged with Agricultural, House hold industries, government jobs, etc. Many facilities are available in this village like Primary and Secondary School, Sub Center, Drinking water facilities like ESR and Sump, access to irrigation water, Internal Streets, etc.

Several visits were made to the targeted sites, with view to enhance the existing infrastructural facilities and develop the new technologies for Kimbuva village allocated under Vishwakarma Yojana. To develop the perceptions and rationales, smart village and ideal village where been visited too and reviewed for existing facilities and infrastructure of these villages. For collecting the geographical features and socio-economic conditions of people, demographic patterns, etc., village people where been interviewed and relevant data were collected and analyzed. Based on Gap analysis carried out as per URDPFI guidelines, public toilets and skill development Centre design, measurement sheets and estimates were proposed. Basic facilities where been considered as first priority. All the design kept economical and sustainable to an extent.

The allocated village Kimbuva was surveyed and studied thoroughly and various techno-economic surveys were done. Techno- Economic survey gave an idea about the existing scenario of village

After visiting the Ideal and Smart village, several field visits were been carried out for Allocated village, analyzing Survey Details, a clear gap was found to be fulfilled in terms of Infrastructural Facilities. In this concern, several facilities were being planned, designed and estimated for Allocated Village Kimbuva

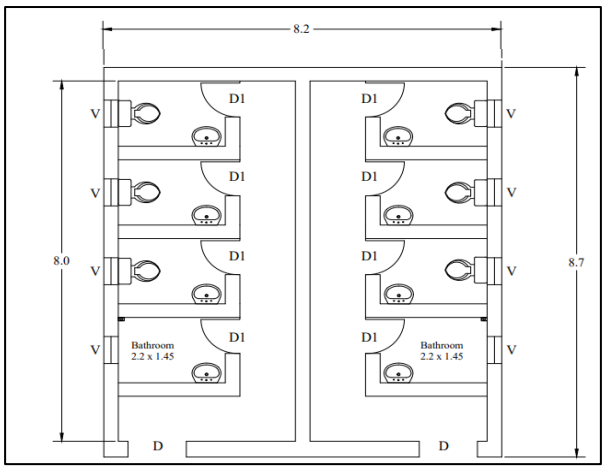
The efforts are made to propose these facilities for village Kimbuva for betterment of socio-economic perspective of village. With fulfillment of these facilities, gap between Allocated and Smart/Ideal village can be filled.

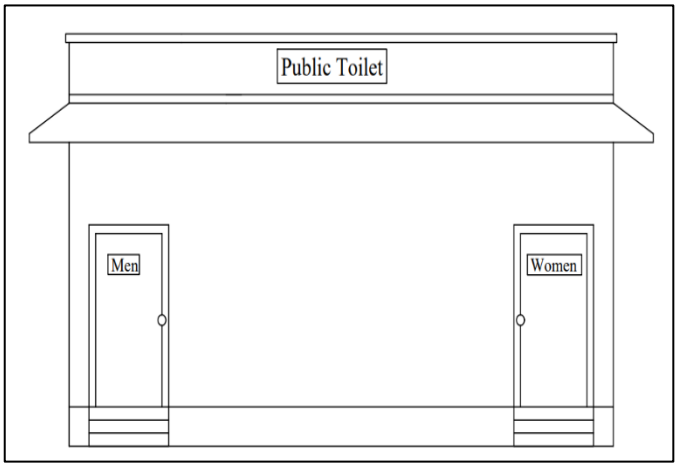
Total 12 Designs were proposed after analyzing and doing the gap analysis. Designs were such proposed that it fulfills the gap and village gets the required infrastructural facility. The Designs which were proposed and their benefits are as follows:

1. **Public Toilet**
2. **Skill Development Centre**
3. **Water Tank for Animals**
4. **Public Garden**
5. **Post Office**
6. **Public Library**
7. **Bank**
8. **Primary Healthcare Center**
9. **Septic Tank**
10. **Community Hall**
11. **Bio Gas Plant**
12. **Rain Water Harvesting**

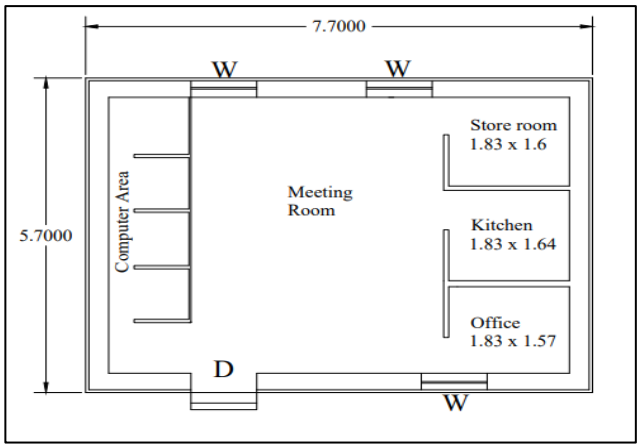
- After the addition of these facilities, villagers will be benefited in many ways. Public toilet will help in maintaining proper sanitation in village.
- Skill development Center and Public Library will boost the education and Skill, which are essential part of nation building.
- Post Office in the village was in very poor condition, and so it was proposed. New post office will enhance the postal as well as financial services of the village. Nearly every facilities will be made available to the villager and will not have to travel to city for getting the service.
- Animals and Livestock are earning tools for the villagers as most of them are engaged with animal husbandry. Water Tank for Animals will helpful to those animals.
- In the village there was no such place for amusement. People use to find peace and relaxation after work. Constructing a Garden will help to solve this problem.
- In the village, Bank was also not in a good state to work with. Introducing a bank with all financial facilities will help in reducing the load in urban banks. Rural people will get to know about internet facilities. Every sort pf work cand done from rural banks itself
- Health and wellness are a key part of Living. Getting primary health service is a right of every citizen. Primary Healthcare Center will provide each facility to the villagers. Emergency condition can be handled in the village itself
- The sewage generated from houses is disposed directly into a pit. This can cause mosquito and fly nuisance into the area. Also, it pollutes the soil strata. Due to Septic Tank, fly nuisance and disease-causing mosquitoes will get eliminated as the whole tank is covered. Pollution due to disposal of sewage directly into soil will also be reduced. Sludge produced from soak pit shall be used as manure to the fields
- In the allocated village there was no facility where public gathering and function can be done. Public gathering and events, ceremony and marriage function can done in village itself.
- Many of the villagers were associated with animal husbandry. Cow dung produced from that was thrown away. This dung can be used to generate gas. Bio gas Plant act as a renewable source of energy. Gas produce can be used for domestic purpose.
- Rainfall in the region on allocated village is significant. Using a sustainable technique for water storage will reduce the water shortage. This facility act as a sustainable infrastructure. Rain water harvesting can reduce the outflow of water from roof tops and finally reduce the surface runoff. Using the rain water for domestic as well as irrigation purpose shall reduce the water charges

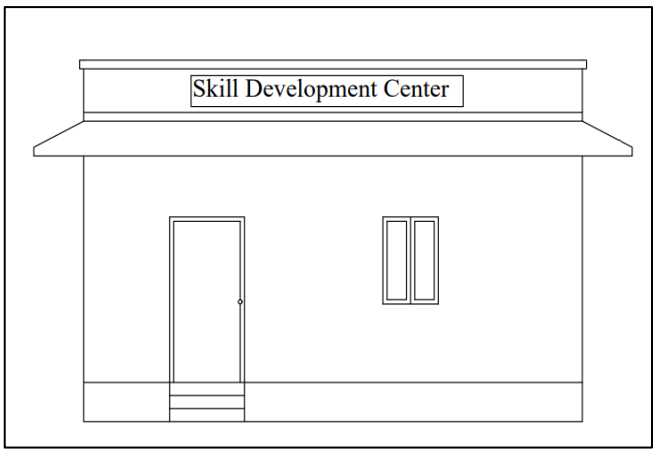
1. Public Toilet



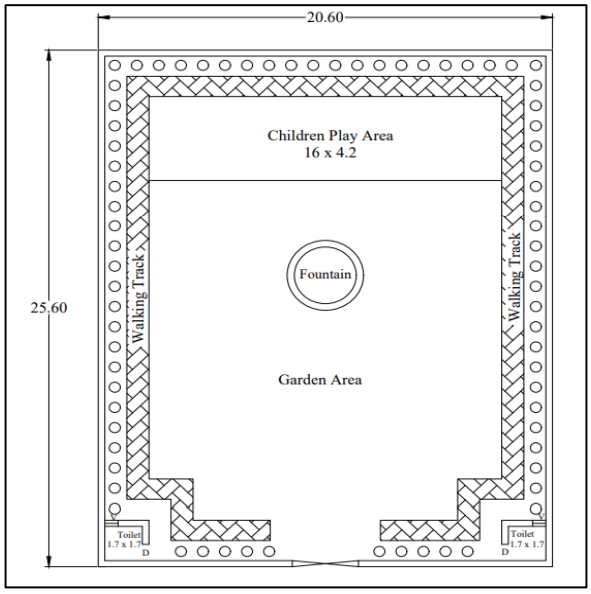


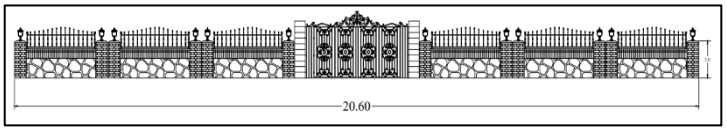
2. Skill Development Center



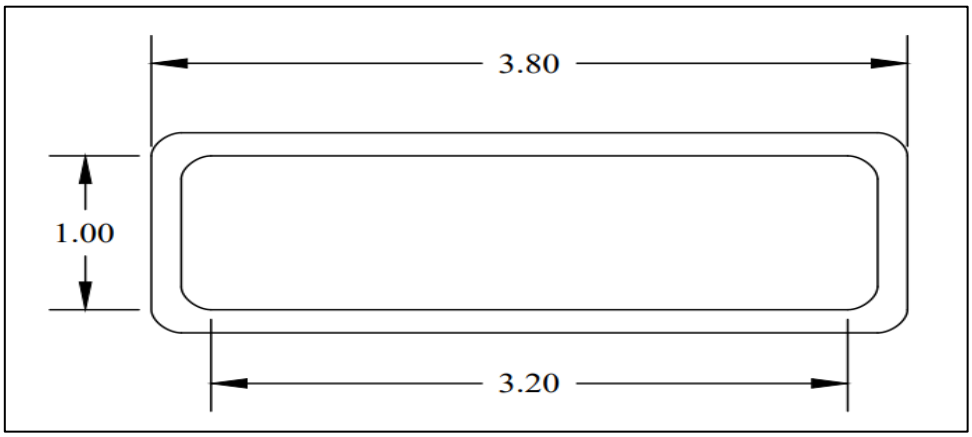


3. Public Garden

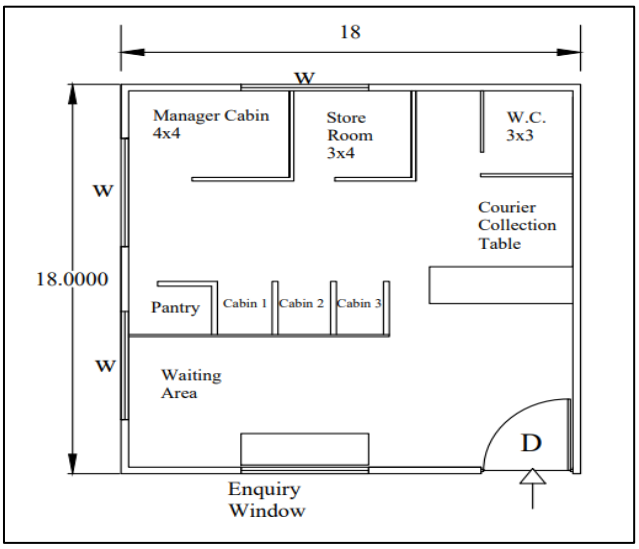


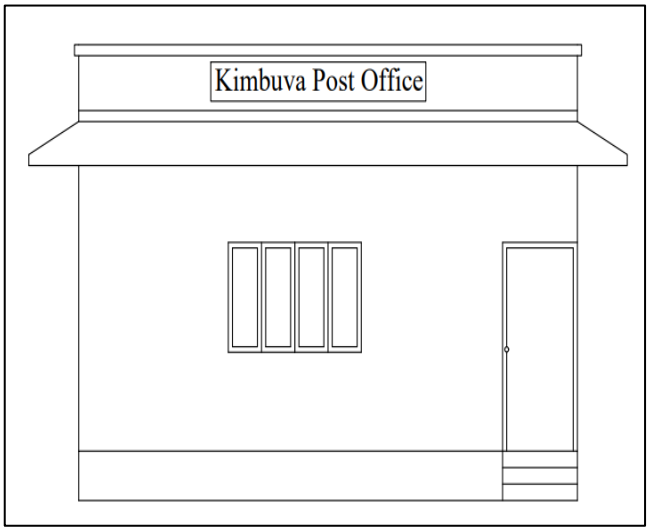


4. Water Tank for Animals

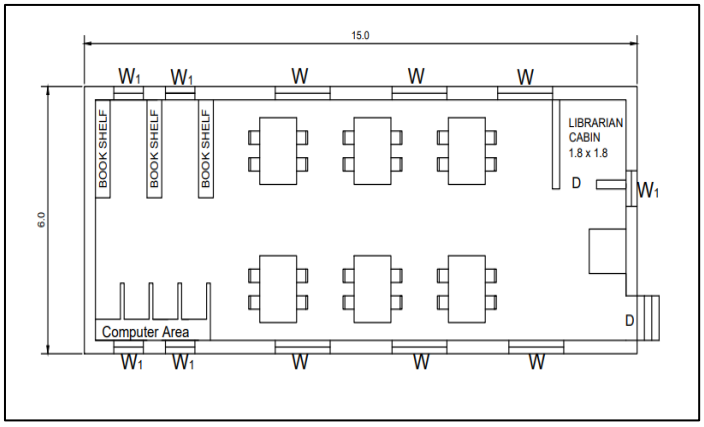


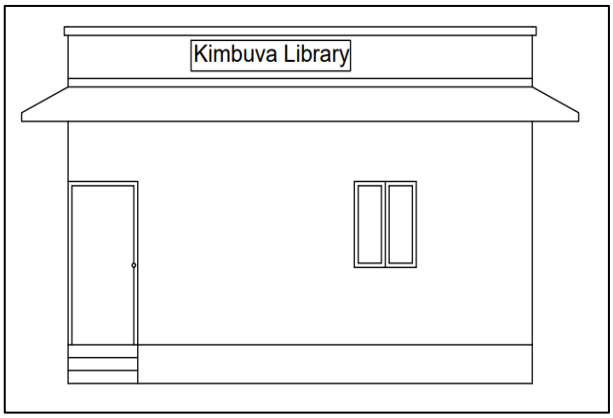
5. Post Office



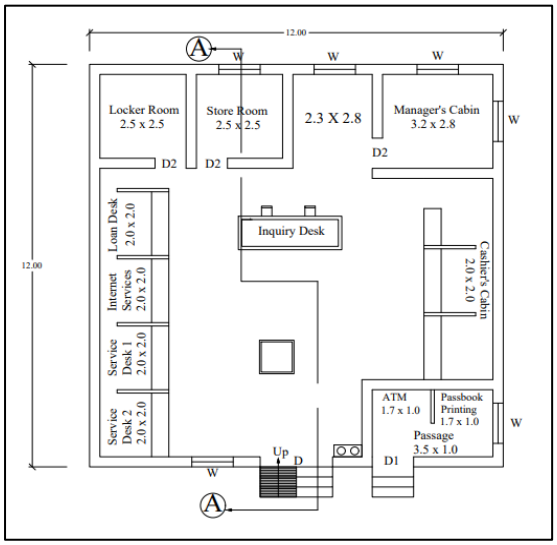


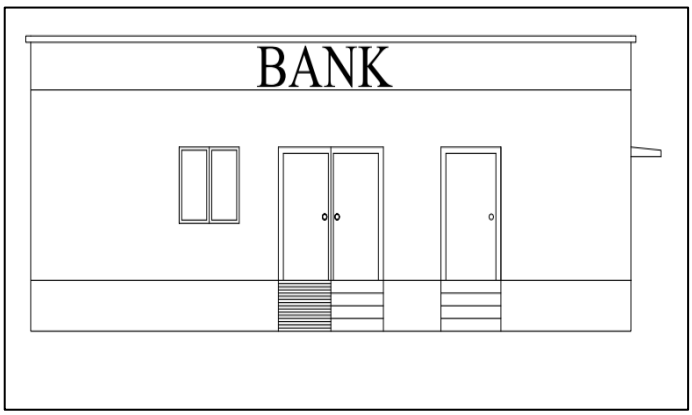
6. Public Library



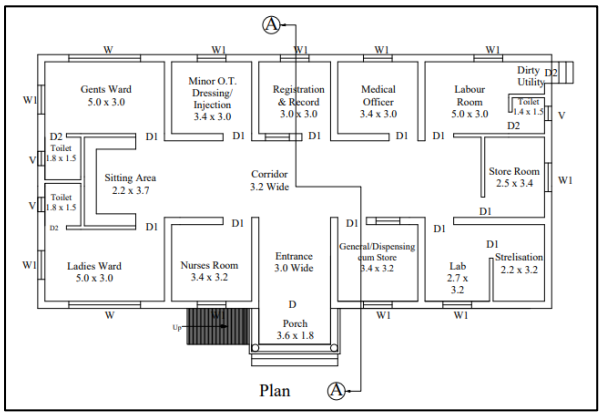


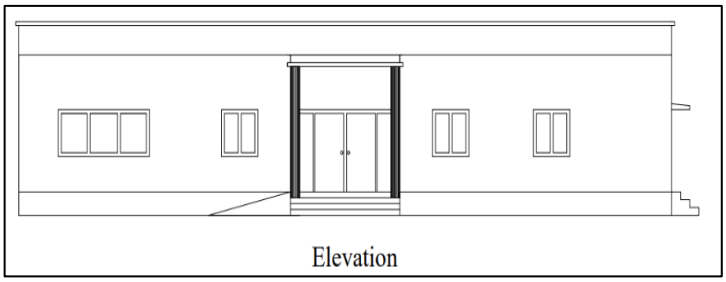
7. Bank



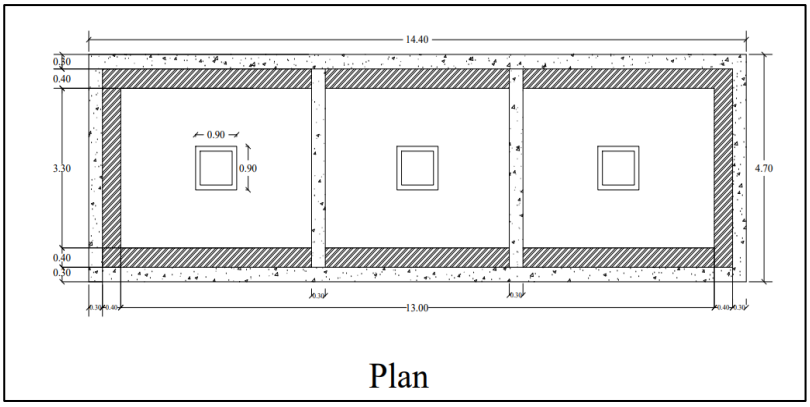


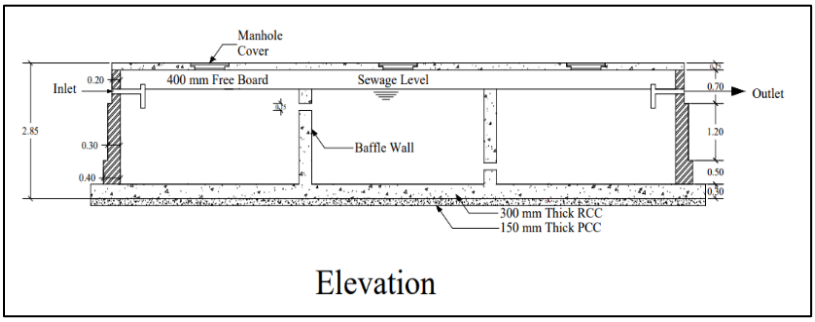
8. Primary Healthcare Center

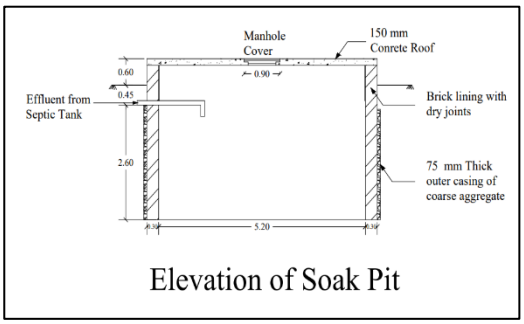




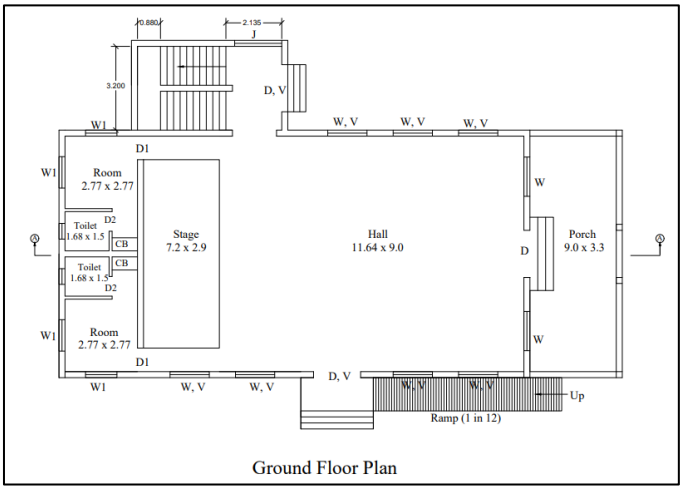
9. Septic Tank

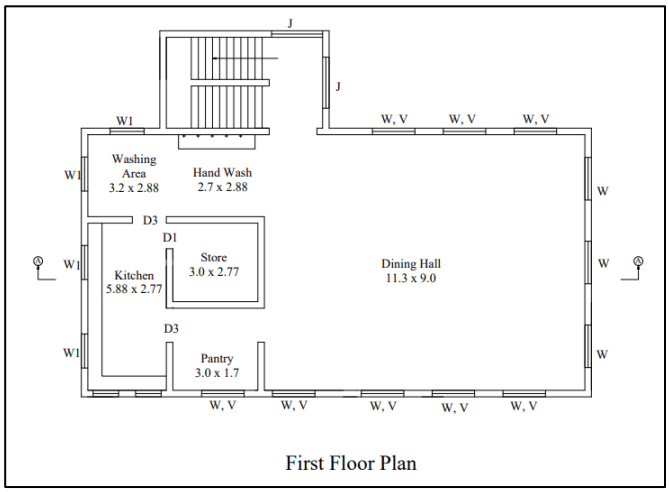


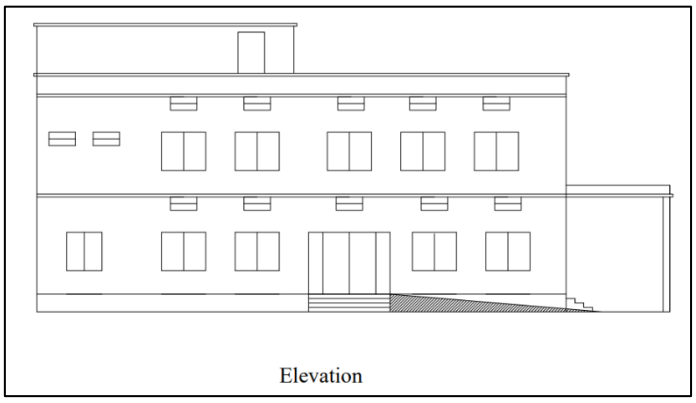




10. Community Hall

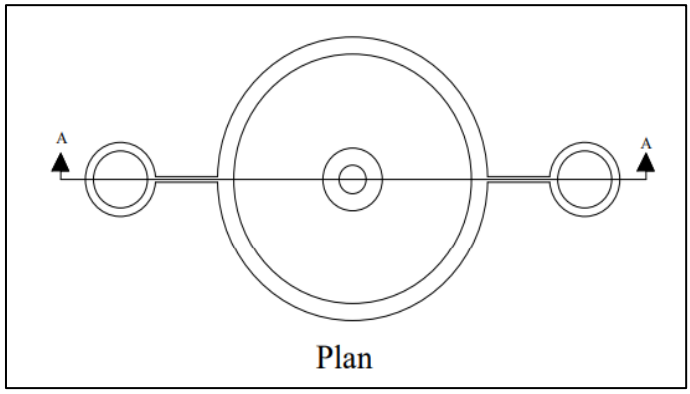




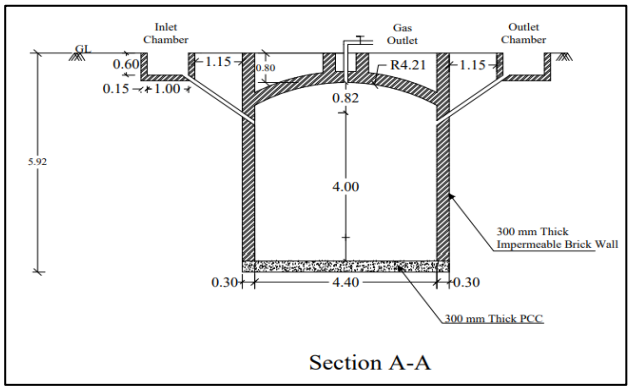


Elevation

11. Bio Gas Plant

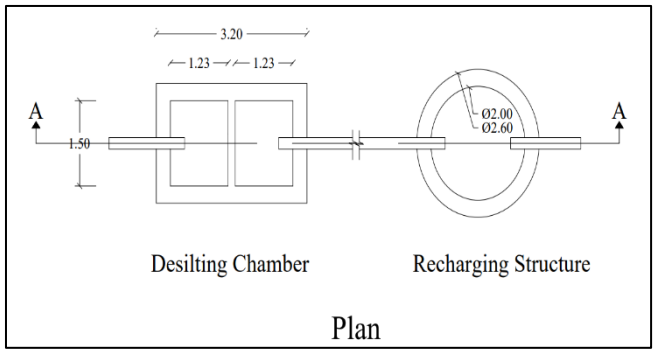


Plan

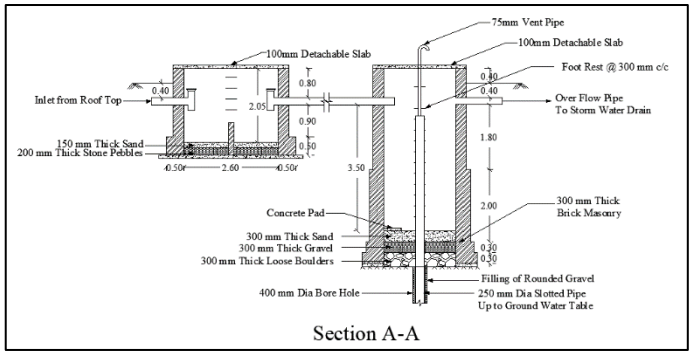


Section A-A

12. Rain Water Harvesting



Plan



Section A-A